

Using a delayed learning test to
measure learning in two-stage
collaborative exams
(uber-preliminary results)

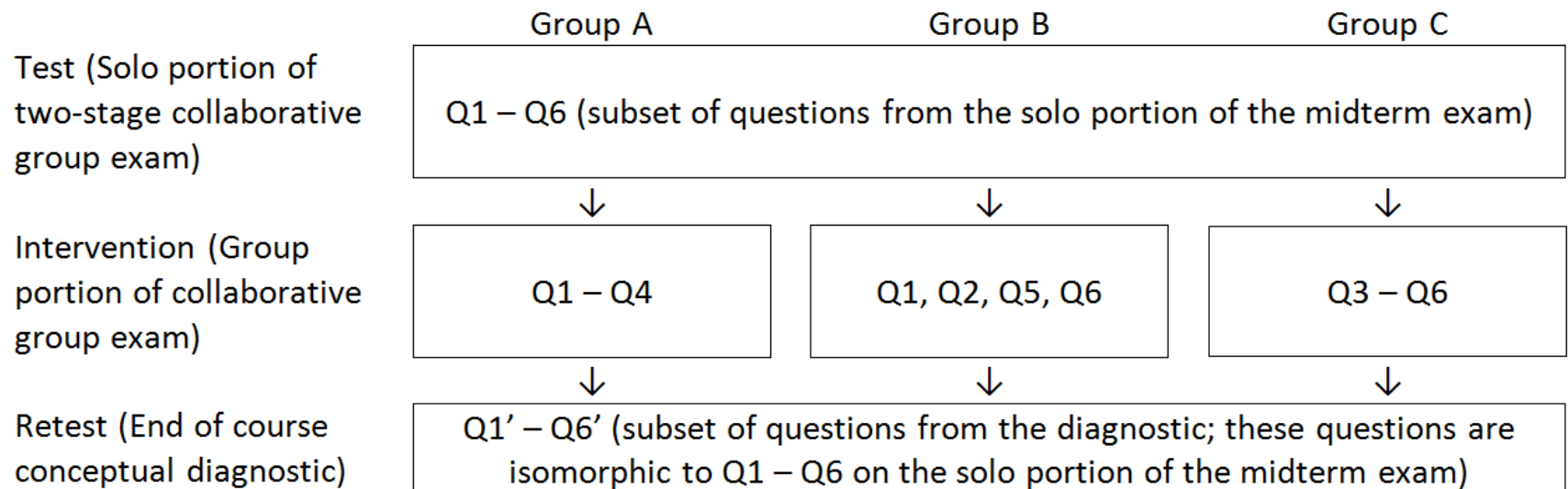
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For each midterm question used in the study, 2/3rds of the ≈ 750 students also saw this question on their group exam and the other 1/3 did not. The end of course diagnostic was used as a delayed learning test

MT1 (Feb. 11): Q1.1-Q1.6

MT2 (Mar. 19): Q2.1-Q2.6

Diagnostic (Mar. 25 – Apr. 4): All questions



Question	MT Solo (N=748)	MT Group	Diagnostic results		Correct on MT Solo (Intervention)	Incorrect on MT Solo		Incorrect MT Solo, Correct group
			No Intervention	Intervention		Intervention	No intervention	
1.1	44.8%	70.3%	50.7±3.5% (N=205)	47.5±2.3% (N=474)	51.9±3.5% (N=206)	44.0±3.0% (N=268)	46.6±4.9% (N=103)	44.9±4.0% (N=156)
1.2	48.0%	67.4%	44.9±3.0% (N=274)	48.6±2.5% (N=405)	61.3±3.6% (N=186)	37.9±3.3% (N=219)	*34.1±4.0% (N=138)	*44.5±4.7% (N=110)
1.3	63.5%	79.9%	43.4±3.5% (N=205)	38.4±2.2% (N=474)	48.3±2.9% (N=296)	21.9±3.1% (N=178)	21.7±5.0% (N=69)	24.1±4.0% (N=112)
1.4	73.8%	96.8%	51.5±3.0% (N=274)	55.1±2.5% (N=405)	61.9±2.8% (N=302)	35.0±4.7% (N=103)	29.6±5.4% (N=71)	36.1±4.9% (N=97)
1.5	60.0%	87.4%	44.0±3.4% (N=200)	39.7±2.2% (N=479)	46.6±2.9% (N=298)	*28.2±3.3% (N=181)	*39.3±5.3% (N=84)	*27.0±3.7% (N=141)
1.6	80.7%	96.6%	50.0±3.5% (N=200)	46.1±2.3% (N=479)	50.4±2.5% (N=393)	26.7±4.8% (N=86)	36.1±8.0% (N=36)	25.6±4.9% (N=78)
2.1	83.9%	100%	68.3±3.2% (N=218)	74.1±2.5% (N=455)	74.7±2.2% (N=380)	***70.7±5.3% (N=75)	***28.1±8.0% (N=32)	***70.7±5.3% (N=75)
2.2	63.9%	84.0%	63.5±3.3% (N=219)	64.6±2.2% (N=455)	65.8±2.8% (N=284)	62.6±3.7% (N=171)	63.2±5.5% (N=76)	61.3±4.5% (N=119)
2.3	83.7%	97.1%	70.3±3.0% (N=236)	72.1±2.1% (N=438)	75.9±2.2% (N=370)	51.5±6.1% (N=68)	54.8±7.7% (N=42)	49.2±6.4% (N=61)
2.4	62.1%	84.6%	73.7±2.9% (N=236)	70.5±2.2% (N=438)	79.0±2.49% (N=267)	57.3±3.8% (N=171)	59.3±5.5% (N=81)	57.6±4.6% (N=118)
2.5	68.1%	91.6%	**57.1±3.3% (N=219)	**65.3±2.2% (N=455)	72.7±2.49% (N=319)	47.8±4.3% (N=136)	39.7±5.7% (N=73)	48.1±4.9% (N=106)
2.6	28.6%	54.9%	**34.2±3.2% (N=219)	**42.6±2.3% (N=455)	78.8±3.56% (N=132)	27.9±2.2% (N=323)	***21.9±3.3% (N=160)	***43.8±4.2% (N=137)

Two-tailed two-proportion z-test: ***p<0.01, **p<0.05, *p<0.1