

# Improvement in Math Achievement with Wayang

Year	Percentage of Correct Answers (Correct Problems / Total Problems)	Overall Improvement (Posttest – pretest)	(posttest – pretest) / (100-pretest)
Spring 2003 N~50 <i>South Deerfield, MA</i>	Pretest = 38% Posttest = 45%	<b>7%</b>	<b>13%</b>
Fall 2003 N~50 <i>South Deerfield, MA</i>	Pretest = 29% Posttest = 34%	<b>5%</b>	<b>7.6%</b>
Fall 2004 N=119 <i>Orange &amp; Springfield</i>	Pretest = 21% Posttest = 29%	<b>8%</b>	<b>10%</b>
Spring 2005 N=34 <i>Springfield, MA</i>	Pretest = 40% Posttest = 50%	<b>10%</b>	<b>17%</b>
Fall 2005 N=120 <i>Springfield, MA</i>	Pretest = 32% Posttest = 44%	<b>12%</b>	<b>18%</b>
Spring 2006 N=116 <i>Springfield, MA</i>	Pretest = 33% Posttest = 42%	<b>9%</b>	<b>13%</b>
Winter 2007-2008 <i>Holyoke, MA N~50</i>	Pretest = 45% Posttest = 54%	<b>9%</b>	<b>16%</b>
Fall 2008 N=67 <i>Belchertown/Amherst</i>	Pretest = 42% Posttest = 53%	<b>11%</b>	<b>25%</b>
Spring 2009 N=250 <i>Turners Falls/S. Deerf</i>	Pretest = 53% Posttest = 59%	<b>6%</b>	<b>13%</b>
Spring 2009 N=250 <i>S. Deerf. Middle Sch</i>	Pretest = 72% Posttest = 76%	<b>4%</b>	<b>14%</b>

MCAS passing% Wayang	MCAS passing% No Wayang
<b>77%</b>	<b>60% **</b>
<b>34%</b> <small>d=0.25</small>	<b>24% *</b>
<b>92%</b> <small>d=0.12</small>	<b>76% *</b>
	<small>d=0.24 for charts group</small>
Wayang Posttest	Control No Wayang
<b>76%</b>	<b>67% **</b>
	<small>d=0.52</small>

d=0.31 for Wayang Group posttest compared to pretest of same group

Note: Results are summaries of experiments carried out in each semester, year in public schools in Massachusetts. Group sizes were of at least 25 students, but generally more, using Wayang Outpost for approximately 3 hours. Pre to posttest improvement within a group was always significant, at least at  $p < 0.05$ . Control groups for MCAS passing rates comparison were matched (same levels, same teachers) and had regular classroom instruction of about 1 teacher every 20 students. \*\*  $p < 0.05$  \*  $p < 0.1$  (marginal)

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Spring 2010 <i>Holyoke and Turners</i>	Pretest = 52% Posttest = 55%	<b>3%</b>	<b>7%</b>
College level 2008-10 <i>UMASS Amherst and ASU Arizona (N=94)</i>	Pretest = 70% Posttest = 80%	<b>10%</b>	<b>33%</b>

*d=0.54 compared to pretest*

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