the ROI of Instructor Development

Instructors

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MESH Solutions, LLC (a DSCI Company)

Thesis

- [ ] Instructor quality matters
- [ ] Instructor quality can be defined
- [ ] Instructor quality can be developed via training
- [ ] Investments in instructor development make sense

It is clear from Tables 1 to 3 that the two most important factors impacting student gain are the teacher and the achievement level for the student. The teacher effect is highly significant in every analysis and has a larger effect size than any other factor in twenty of the thirty analyses. The achievement-level effect is significant in twenty-six of the thirty analyses and has the largest effect size in ten of the thirty analyses. These results are

0.05, 0.01, 0.001, and 0.0001 are 1.64, 1.96, 2.58, 3.29, and 3.89, respectively.

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The third most important factor overall was the school system. There were significant

Table 2. *z*-Values for Analyses of Fourth-Grade Gains.

Source	*Set*	*Math*	*Reading*	*Language*	*Social Studies*	*Science*
System (*S*)	1	5.63	3.66	5.68	4.23	2.55
	2	5.56	5.07	4.62	4.02	3.00
Heterogeneity (*H*)	1	0.20	0.03	0.13	2.53	0.62
	2	1.84	1.32	0.94	1.47	1.00
Class size (*C*)	1	1.65	1.00	1.30	2.83	1.47
	2	0.39	1.14	1.14	0.81	0.49
H*C	1	2.29	0.80	0.98	2.30	0.75
	2	1.31	0.69	0.62	2.40	1.11
Teacher (*S*H*C) (*T*)	1	11.17	6.04	9.24	7.17	7.93
	2	12.49	5.72	10.48	6.69	7.62
Achievement level (*A*)	1	2.45	13.04	8.61	3.37	10.99
	2	6.70	11.92	8.36	4.59	10.91
*A*S*	1	2.63	3.01	1.86	2.14	1.55
	2	3.50	4.50	1.43	5.27	3.74
*A*H*	1	0.28	1.32	2.53	2.01	0.12
	2	0.59	0.89	1.02	0.55	2.06
*A*C*	1	2.96	0.84	1.18	1.53	0.34
	2	1.09	1.99	0.99	0.42	1.68
*A*H*C*	1	1.13	1.33	0.02	0.73	1.25
	2	1.50	0.18	0.05	1.09	0.78
*A*T*	1	1.75	0.56	1.40	2.45	1.24
	2	2.14	2.61	1.10	1.06	0.47
N	1	10344	10477	10497	9438	9329
	2	13102	13102	13498	12320	12406

Set: 1 = 30 East Tennessee school systems.
2 = 24 Middle Tennessee school systems.
N = total number of students.

Instructor

hard data

The most important factor affecting student learning is the teacher

35% increase in teacher quality raises scores by ≈8-9%

Estimates of teacher fixed effects from linear regressions of test scores consistently indicate that there are large differences in quality among teachers in this data. A one standard deviation increase in teacher quality raises test scores by approximately .20 standard deviations in reading and .24 standard deviations in math on nationally standardized distributions

≈35% increase in teacher skill

≈8-9% student achievement increase

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standard

d devia-

tionally standardized distributions

antly raises student test scores in

reading subject areas. Reading test scores differ by approximately .20 standard deviations on average between beginning teachers and teachers with ten or more years of experience. Moreover, estimated returns to experience are quite different if teacher fixed effects are omitted from my analysis. This suggests that using variation across teachers to identify experience effects may give biased results due to correlation between teacher fixed effects and teaching experience.

Policymakers have demonstrated their faith in the importance of teachers by greatly increasing funding for programs that aim to improve teacher quality in low performing schools.[4] However, the vast majority of these initiatives focus on rewarding teachers who possess credentials that have not been concretely linked to student performance (e.g. certification, schooling, teacher exam scores). My results support the idea that raising teacher quality is an important way to improve achievement, but suggest that policies may benefit from shifting focus from credentials to performance-based indicators of teacher quality.

This paper is

[4]The most recen
training and recruit
targeting teachers,
tuition for teachers'

Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. The American Economic Review, 94(2), 247-252.

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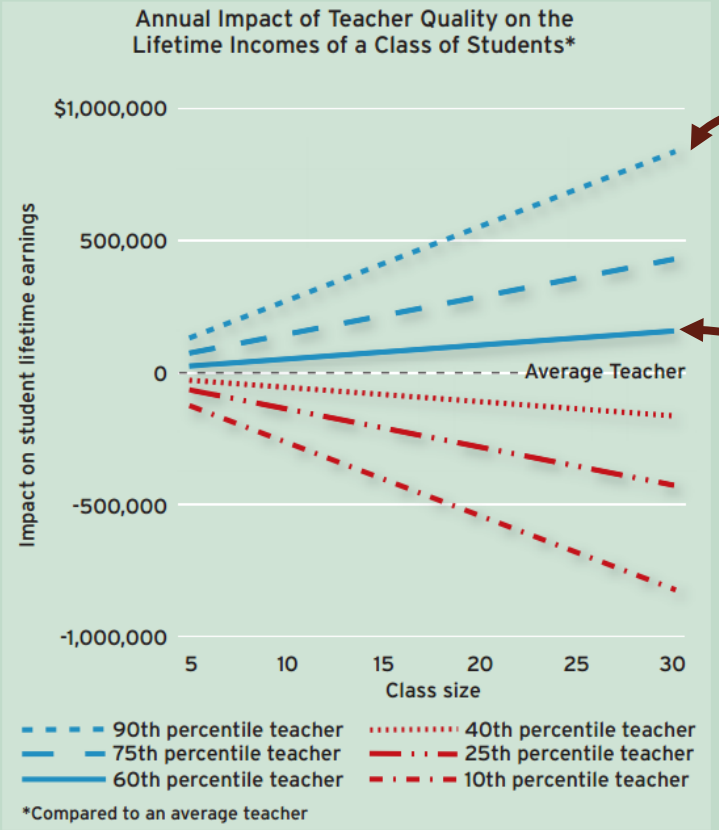
Top teachers (at 84th percentile) will increase student earnings by $20K across a lifetime

Effective Teachers Raise Students' Earnings
(Figure 1)

The economic value of an effective teacher grows with larger classes, and the economic costs of having an ineffective teacher are substantial.



SOURCE: Authors' calculations

their increases in earnings. Consider, for example, a teacher with a class of 20 students. Under such circumstances, the teacher at the 60th percentile will—each year—raise students' aggregate earnings by a total of $106,000. The impact of one at the 69th percentile (as compared to the average) is $212,000, and one at the 84th percentile will shift earnings up by more than $400,000.

But there is also symmetry to these calculations. A very low performing teacher (at the 16th percentile of effectiveness) will have a negative impact of $400,000 compared to an average teacher.

A good, but not great, teacher increases each student's lifetime earnings by $10,600. Given a class of 20 students, she will raise their aggregate earnings by $212,000.

Hanushek, E. A. (2011). How much is a good teacher worth? Education Next, Summer 2011, pp. 41-45.

WHAT IS "BEST"?

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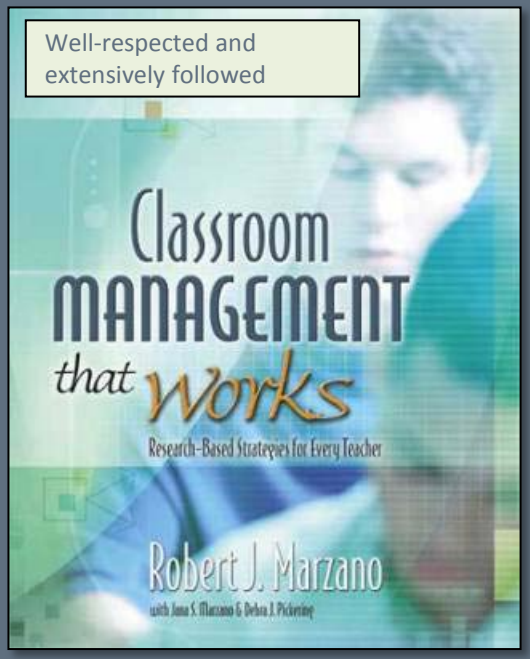
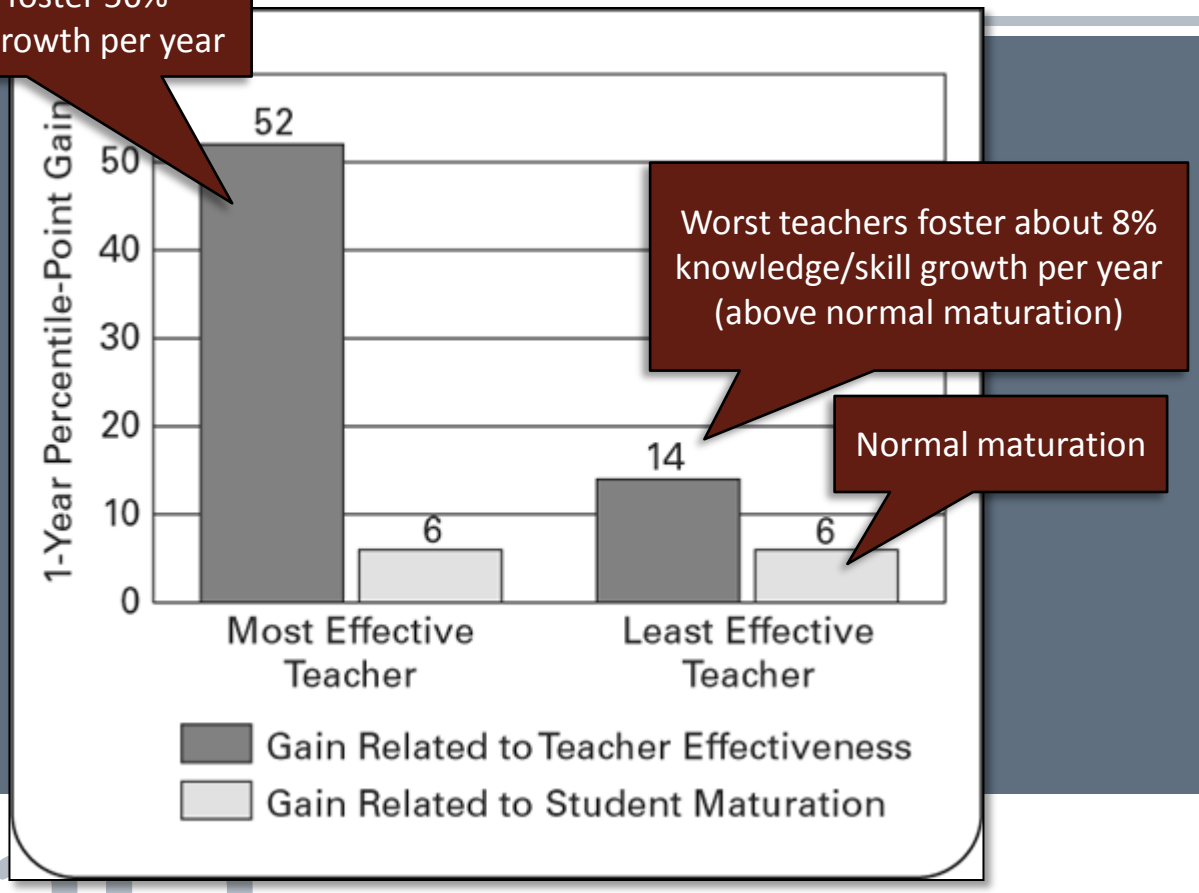




hard data

Marzano, J. S., & Pickering, D. J. (2003). Classroom management that works: Research-based strategies for every teacher. ASCD.

t learning is the teacher

y raises scores by ≈8-9%

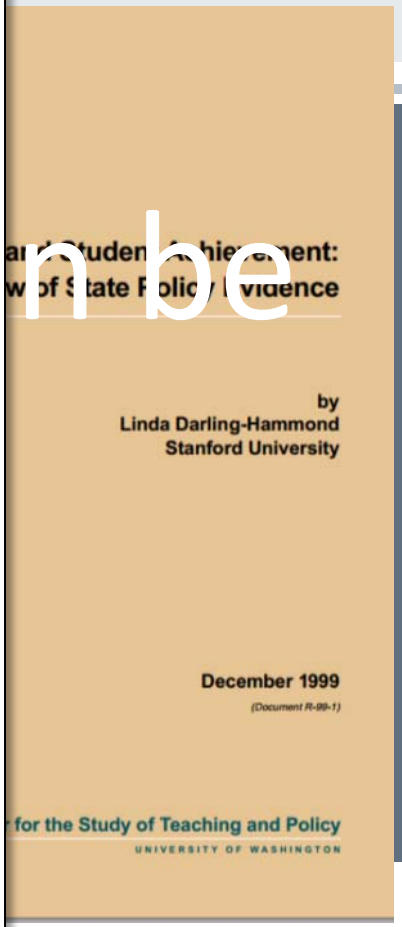
y $20K across a lifetime

r year vs. worst teachers

(Berliner & Tikunoff, 1976; Schalock, 1979; Walberg & Waxman, 1983). Successful teachers tend to be those who are able to use a range of teaching strategies and who use a range of interaction styles, rather than a single, rigid approach (Hamachek, 1969). This finding is consistent with other research on effective teaching, which suggests that effective teachers adjust their teaching to fit the needs of different students and the demands of different instructional goals, topics, and methods (Doyle, 1985).

In addition to the ability to create and adapt instructional strategies, strong research support has linked student learning to variables such as teacher clarity, enthusiasm, task-oriented behavior, variability of lesson approaches, and student opportunity to learn criterion material. Teachers' abilities to structure material, ask higher order questions, use student ideas, and probe student comments have also been found to be important variables in what students learn (Rosenshine & Furst, 1973; Darling-Hammond, Wise, & Pease, 1983; Good & Brophy, 1986). No single instructional strategy has been found to be unvaryingly successful; instead, teachers who are able to use a broad repertoire of approaches skillfully (e.g., direct and indirect instruction, experience-based and skill-based approaches, lecture and small group work) are typically most successful. The use of different strategies occurs in the context of "active teaching" that is purposeful and diagnostic rather than random or laissez faire and that responds to students' needs as well as curriculum goals (Good, 1983).

Teacher education appears to influence the use of these practices. Teachers who have had formal preparation have been found to be better able to use teaching strategies that respond to students' needs and learning styles and that encourage higher order learning (Perkes, 1967-68; Hansen, 1988; Skipper & Quantz, 1987). Doyle (1986) hypothesizes that since the novel tasks required for problem-solving are more difficult to manage than the routine tasks associated with rote learning, lack of knowledge about how to manage an active, inquiry-oriented classroom can lead teachers to turn to passive tactics that "dumb down" the curriculum (see also Carter & Doyle, 1987), busying students with workbooks rather than complex tasks that require more skill to orchestrate (Cooper & Sherk, 1989).



nd student achievement: A review
nter for the Study of Teaching and Policy, University of Washington.

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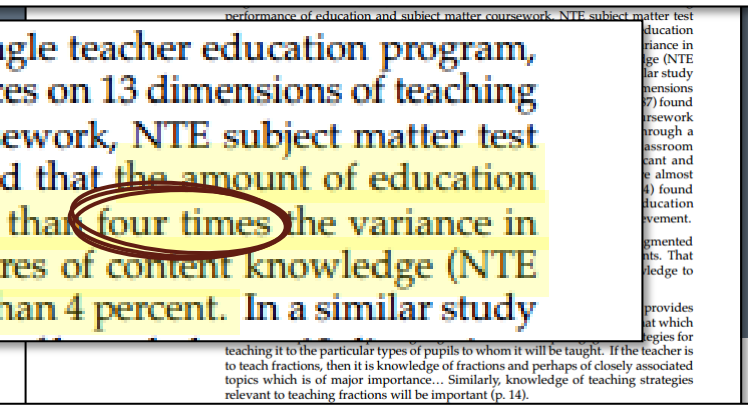
Quality = Pedagogical (andragogical) knowledge and skills

Training in educational skill = 4Xs more meaningful than subject-matter expertise

Studies have found a somewhat stronger and more consistently positive influence of education coursework on teachers' effectiveness. Ashton and Crocker (1987) found significant positive relationships between education coursework and teacher performance in 4 of 7 studies they reviewed—a larger share than those showing subject matter relationships. Evertson, Hawley, and Zlotnik (1985) reported a consistent positive effect of teachers' formal education training on supervisory ratings and student learning, with 11 of 13 studies showing greater effectiveness for fully prepared and certified vs. uncertified or provisionally certified teachers. With respect to subject matter coursework, 5 of 8 studies they reviewed found no relationship, and the other 3 found small associations.

In a study of more than 200 graduates of a single teacher education program, Ferguson and Womack (1993) examined the influences on 13 dimensions of teaching performance of education and subject matter coursework, NTE subject matter test scores, and GPA in the student's major. They found that the amount of education coursework completed by teachers explained more than four times the variance in teacher performance (16.5 percent) than did measures of content knowledge (NTE scores and GPA in the major), which explained less than 4 percent. In a similar study



hard data

Darling-Hammond, L. (1999). *Teacher quality and student achievement: A review of state policy evidence*. Seattle, WA: Center for the Study of Teaching and Policy, University of Washington.

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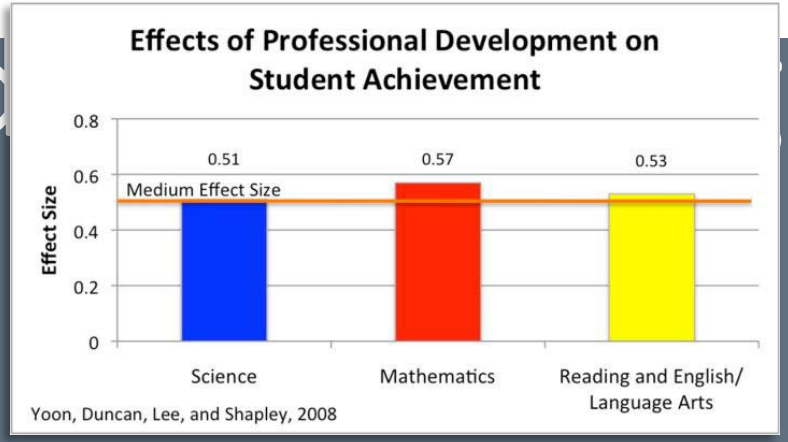
Result(s): The purpose of the paper was to research any empirical links between professional development and student achievement. An average effect size of 0.54 in mathematics, science, and reading and English/language arts was reported. Consistency across the three academic domains suggests that professional development has a moderate effect on student achievement. Achievement increased an average 21% for students whose teachers were provided professional development. Because of the limited number of studies included in the paper, the study results applied only to elementary school students and teachers.

"Achievement increased an **average 21%** for students whose teachers were provided **professional development**"



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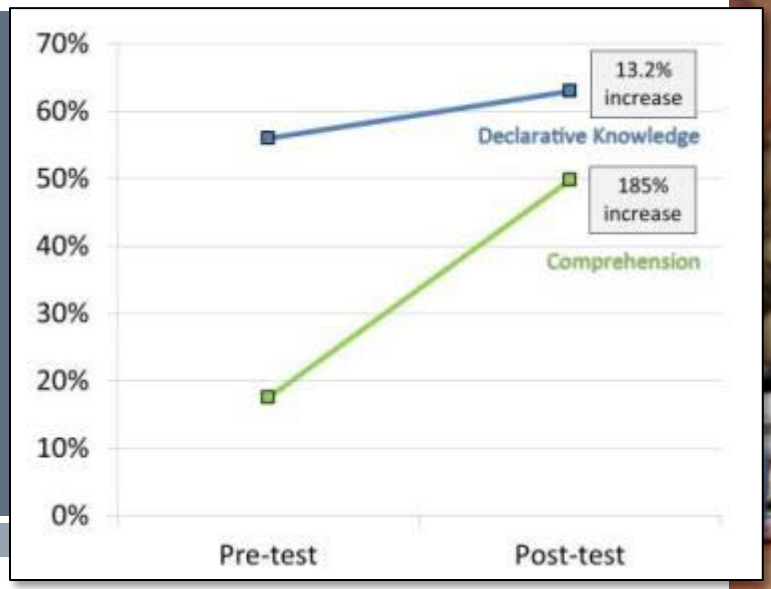
Yoon, K. S., Duncan, T., Lee, S. W., Shapley, K., Scarloss, B., Taylor, J., ... & Tang, S. (2008). The effects of teachers' professional development on student achievement: Findings from a systematic review of evidence. In *American Educational Research Association Annual Meeting*.

USMC Instructor Development Trial

These methods were beta tested with USMCR, 11–21 June 2012, Camp Upshur, VA

BETA TEST

An 11-day beta test of the enhanced instructional system was held at Quantico in June 2012 with 59 participants (n = 56 USMCR).



Learning outcomes from June 2012 (Kirkpatrick's level 2)

Beta Test = 11–21 June 2012, Camp Upshur, VA

Pre-Course	Course Week 1	Mid-Course	Course Week 2	Post-Course	Longitudinal
O_1	X_{1A}	O_3	X_{1B}	O_5	O_6
• Consent • Demographics • Knowledge test • Knowledge checklist • Skill checklist	• Week 1 content O_2 • Materials reactions	• Course reactions	• Week 2 content O_4 • Materials reactions	• Knowledge test • Content checklist • Course reactions • AAR discussions	• Knowledge test • Knowledge checklist • Skill checklist • Behavior survey • Cou…eactions

Collected June 2012

Collected December 2012 in Republic of Georgia (ONR)

BETA TEST

But they didn't necessarily know how to most of the techniques, except for the direct (lecture-like) methods

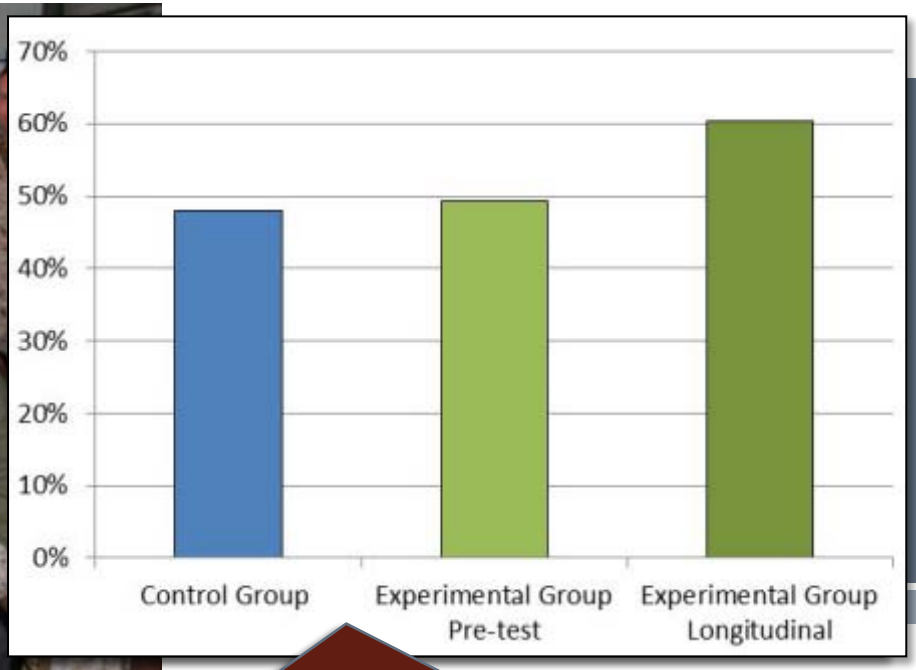
Post-course, all participants admitted that they hadn't really understood (correct applications of) direct methods

By and large, the Marines were eager to apply almost all of the new techniques

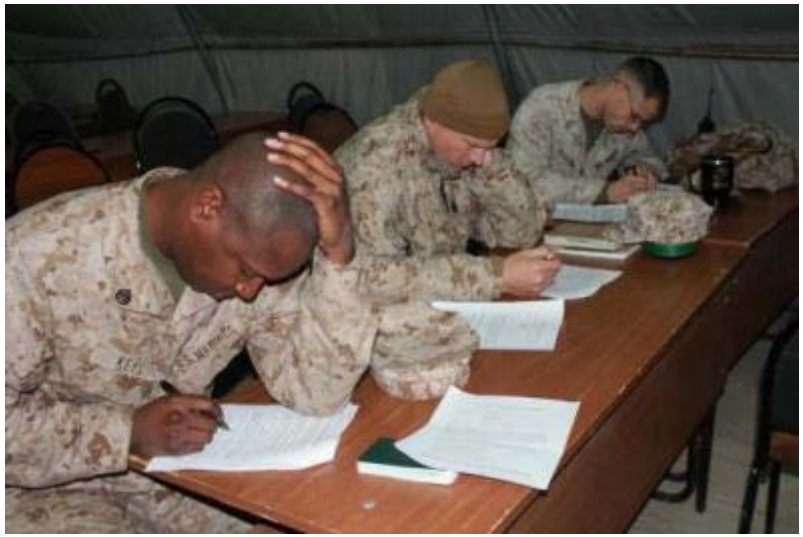
Table 2.8. Knowledge checklist, response percentages by instructional tactic. Cells are color-code…, i.e., a majority of students indicated these responses; Light gray–shaded cells … udents (although not a majority) of participants indicated these responses.

		Pre-Course (Day 1)							
		Have Used It: % of students who had used this tactic as a teacher	Have Seen It: % of students who had experienced the tactic as a student	Don't Know It: % of students who did not know the tactic	Heard of It: % of students who had heard of, but not used, the tactic	Was Incorrect: % of students thought this tactic was different prior to the course	% of students who could see themselves using this tactic in the future		
Direct	Compare and Contrast	31%	82%	6%	2%	60%	69%		
	Drill and Practice	49%	65%	5%	2%	58%	65%		
	Demonstration	73%	62%	0%	0%	85%	44%		
	Modeling Thinking (Think Aloud)	27%	58%	18%	13%	46%	69%	0%	2%
	Visualization (Mental Simulation)	30%	72%	7%	11%	71%	52%	0%	0%
Indirect	Concept Maps	7%	55%	24%	22%	13%	83%	0%	8%
	Case Studies	27%	80%	7%	0%	27%	81%	0%	0%
	Mindfulness Exercises	4%	33%	58%	9%	15%	83%	0%	6%
	Metacognitive Prompts	0%	9%	75%	16%	35%	71%	0%	4%
	Premortem Discussions	2%	2%	89%	7%	27%	79%	0%	2%
	Crystal Ball Exercises	2%	9%	73%	18%	29%	75%	0%	2%
Interactive	Jigsaw Discussion Groups	0%	9%	78%	13%	15%	81%	0%	8%
	Cooperative Learning Groups	9%	58%	35%	7%	25%	77%	0%	4%
	Fishbowl Discussion Groups	2%	20%	67%	15%	15%	83%	2%	4%
	Socratic Seminar	0%	13%	71%	18%	25%	75%	2%	8%
	Socratic Questioning	6%	21%	60%	19%	37%	73%	0%	6%
Independent	Journal Writing	4%	85%	4%	11%	23%	85%	0%	0%
	Learning Logs	4%	56%	28%	19%	17%	75%	2%	12%
	Field Research	15%	70%	6%	20%	37%	71%	0%	4%
	Assigned Questions	29%	69%	15%	7%	40%	71%	0%	2%
Exp.	Experiments	20%	87%	2%	5%	43%	71%	0%	4%
	Model Building	18%	65%	18%	13%	33%	73%	2%	6%

Longitudinal Testing (Dec 2012, Republic of Georgia)



Significant knowledge difference versus own pre-course scores and peer (fellow USMCR in Georgia) control group



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