

Evaluation of the VMI through 2007

A. Quantitative Student Outcomes

Since Phase 1 of the VMI is a professional development program targeted at teacher leaders, and the impact of the teacher leaders occurs at the school level, the unit of analysis for the quantitative evaluation is the school (rather than students of just the VMI teachers in the school). Student outcomes on statewide standardized testing are the variables being measured, and these are aggregated to the school level.

• Summary Review of Formal Evaluation in 2004-2005.

Finding 1: Cross-sectional Comparisons. *Comparisons of VMI grouped schools with control schools yielded an overall consistent pattern of the VMI schools exceeding the performance of Control schools in the cross-sectional analysis.*

Finding 2: Longitudinal Comparisons. *A pattern of gain favoring the VMI schools having more concentrated numbers of VMI teachers emerged from the comparison of percentile rank gains over time. Students in these VMI schools progressed at a rate more than three times that of their peers in either the group of schools having a single VMI teacher or the group of Control schools having no VMI teacher.*

• **Follow-up Longitudinal Analysis in 2005-2006.** The follow-up quantitative study in 2005-2006 used a value added model that followed a panel of about 1000 students who began with VMI teachers in 1999 at grade 4 and were tracked forward to grade 10 in 2005 and compared with a similar number of students who likewise formed a panel of control students in schools matched with the intervention schools according to school size and concentrations of low income students. We will call this the 1999 VMI cohort study.

Finding 1. *The aggregate group of VMI schools showed a statistically significant advantage over the matched comparison group of schools when students are matched from grade 4 through grade 8 to grade 10.*

In order to investigate how the level of school implementation of VMI relates to student achievement, the VMI schools were divided into two groups on the basis of the number of teachers who were enrolled in the VMI curriculum (three or more teachers as opposed to one or two teachers).

Finding 2. *The VMI High Concentration Schools significantly out-performed the matched schools and appear to carry most of the difference between the VMI and matched schools.*

Next, one asked: Are school level effects related to income level of students and levels of content implementation of the VMI curriculum? In order to investigate this question, scores of students eligible for free or reduced lunch vs. those that were not eligible were compared at grades 4, 8, and 10.

Finding 3. *(i) Not surprisingly, whether in intervention schools or matched schools, students eligible for free or reduced lunch scored significantly lower than their non-*

eligible for free or reduced price lunch peers. This pattern continued through the grade 8 testing.

(ii) Rather surprising is that given the lack of cohort differences at grades 4 and 8, at grade 10 *the free or reduced lunch eligible students in the VMI schools significantly out-scored their free or reduced lunch eligible peers, and they gained on students who are not eligible for free or reduced lunch in the matched schools.*

• **Follow up Longitudinal Analysis in 2006-2007.** The previous year's evaluation followed students of teachers who entered VMI in 1999. This report follows a second panel of students of teachers who entered VMI in the next year, 2000. We will call this the 2000 VMI cohort study. As in the previous year, students in two groups of VMI intervention schools, one with a higher concentration of VMI teachers, were compared with a control panel of students from a matched control group of 18 schools. The findings were similar to those of the 1999 cohort study.

Finding 1. *Again, intervention schools consistently outperformed control schools.*

Finding 2. *Again, the VMI High Concentration Schools significantly out-performed the matched schools and appear to carry most of the difference between the VMI and matched schools.*

Finding 3. *Again, the free or reduced lunch eligible students in the VMI schools significantly out-scored their free or reduced lunch eligible peers, and they gained on students who are not eligible for free or reduced lunch in the matched schools.*

In other words, the studies in both 2005-2006 and 2006-2007 indicate that the gap is narrowing between the free or reduced lunch eligible students in the VMI schools and their non-eligible peers in the matched schools.

B. Qualitative Teacher and School Outcomes

Beginning in 2004-05 and continuing through 2006-07 evaluators have also collected qualitative data related to implementation of Phase 1 of the Vermont Mathematics Initiative. Qualitative evaluation commenced for Phase 2 in 2006-2007, the first year of Phase 2 implementation, and the evaluation is necessary in its preliminary stage.

• Qualitative methodology

Qualitative outcomes are derived from the following sources:

- Interviews with VMI:
 - Participants (Phases 1 and 2)
 - Instructors and VMI Leaders (Phases 1 and 2)
 - Graduates (Phase 1)
 - Site Coordinators (Phase 2)
- Observations of course sessions (Phases 1 and 2)
- Review of course syllabi and materials (Phases 1 and 2)
- Review of participant portfolios (Phase 1)
- Observation of final oral master's degree presentations (Phase 1)
- Course evaluations (Phases 1 and 2)

• **Qualitative Findings**

The following findings for Phase 1 represent the three years of evaluation studies. However, as noted above, Phase 2 has been in existence only since January of this year. Consequently, some of the Phase 2 findings listed below are necessarily baseline and preliminary in nature.

	Phase 1 (3 years of evaluation studies)	Phase 2 (1 semester of evaluation)
Finding 1: Mathematical content.	An overarching theme is the impact of the VMI experience on participants’ understanding of mathematical content. This is consistent across the three years in Phase 1.	The primary emphasis on mathematics content continues in Phase 2. Participants consistently cite increased content expertise as a major outcome of Phase 2. Many state that Phase 2 participation has motivated them to seek further mathematics study, through Phase 1 or other venues.
Finding 2: Increased confidence related to mathematics	Increased understanding of mathematics content strongly impacts the confidence of Phase 1 participants, especially as related to enhancing the teaching of mathematics, and personal enjoyment of mathematics.	Phase 2 participants also report increased confidence, especially in relation to their understanding of the mathematics that they teach and the impact of this content knowledge on their teaching.
Finding 3: Impact of assessment and instructional practice	Graduates, principals, math leaders, and current participants report profound impact of VMI on classroom practice. This emerges as a powerful major theme in final oral master’s degree presentations.	Phase 2 participants report immediate changes in pedagogy and, to a lesser extent, assessment practice.
Finding 4: Impact of action research on classroom practice.	The impact of action research is mixed, with some Phase 1 participants, graduates, and principals reporting profound impact, others less so.	Action research is not a focus area in Phase 2.
Finding 5: Principal support	The active support of principals significantly enhances the work of Phase 1 participants as classroom teachers and teacher leaders.	The impact of principal support in Phase 2 has not yet been studied in detail. It is anticipated that the impact will be considerable, mirroring Phase 1.

Finding 6: Personal impact on participants	Over the three years of Phase 1 many participants form lasting friendships and meaningful professional associations with fellow participants, instructors, and VMI staff.	It is too soon to assess long-term personal impact of Phase 2 on participants. Because Phase 2 is of shorter duration and takes place within a single district, long-term personal impact of Phase 2 may manifest itself in differing ways.
Finding 7: Transfer of VMI content into the classroom	Phase 1 participants report direct transfer of mathematics content used in VMI to the mathematics experiences of their students.	This direct transfer to the classroom is also a strong theme in Phase 2.
Finding 8: Impact on student problem solving	Participants report that the emphasis on problem solving – including modeling of multiple problem solving methods, problem-solving in lesson and unit planning, and discussions of the problem solving process – combine to profoundly impact problem solving in the classroom.	Phase 2 participants also report increasing focus on problem-solving in their own teaching..
Finding 9: Impact of action research on students	Some interventions and related initiatives of Phase 1 participants have significant impact in their schools and districts.	Action research is not a focus area in Phase 2.
Finding 10: Impact on teacher leaders	Phase 1 participants and their administrators credit VMI for providing the knowledge, confidence, and support for them to take on leadership roles (including leadership of Phase 2 in the district). This is true of participants in leadership roles at all levels – school, district, and statewide.	Teacher leaders in leadership roles in Phase 2 report significant challenges, complexities, and opportunities in developing Phase 2.
Finding 11: Impact on curriculum, instruction, and assessment	There is substantial evidence in many districts (Addison Central, South Burlington, Milton, Burlington, Barre, Orleans-Essex North, et al) that Phase 1 teacher leaders and principals have made profound changes in curriculum, instructional and assessment as a	Because Phase 2 targets school and district-wide systemic change, one anticipates impact on curriculum, instruction, and assessment. This will be a topic of future study.

	direct result of Phase 1.	
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<p>Finding 12: Need for ongoing professional community</p>	<p>This need is frequently expressed by Phase 1 graduates. VMI has plans for postgraduate courses to meet this need, beginning in Year 2 of this grant.</p>	<p>One of the key goals of Phase 2 is building professional learning communities around mathematics in participating schools and districts. It is too early to assess this goal, which will be the subject of later evaluation.</p>
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