BRIEF: The Impact of Methods of Inquiry on Retention, Graduation Rates, and Grades

Methods of Inquiry (MOI) is a credit-bearing course designed to help students develop cognitive skills important to college success. Students meet twice a week for lecture to learn how to apply learning principles and strategies to the content of other courses they are taking, and they meet weekly with a peer monitor who helps assess how well they are achieving learning goals. Those who successfully complete MOI are expected to know "how to predict exam questions, how to think clearly and critically, how to improve their understanding of course material, as well as their grades, and how to respond meaningfully to class content and assignments[1]." The analyses presented here examine the impact of MOI on retention rates, graduation rates, and grades (QPA).

Sample

Matriculated freshmen entering the university in fall 2001 are included in the present analyses (3,018 students). Table 1 displays sample demographic and educational data. Comparisons between those who successfully completed MOI[2] and non-MOI students are also shown. MOI students are more likely to be under-represented minorities and enrolled in the Educational Opportunity Program (EOP, in which students receive funding for ten semesters). MOI students are less likely to be Honors students and to enroll full time, and they enter UB with lower high school averages and SAT scores. Since the variables on which the two groups differ are related to retention and graduation rates (see Appendix A) and QPA (Appendix B), these variables will serve as control variables in subsequent analyses[3].

Table 1. Sample Composition

Variable	2001 Cohort ($N = 3018$)	MOI Students ($N = 730$)	Non-MOI Students ($N = 2288$)
Percent Female	45.2	43.3	45.8
Percent Under-Represented Minority[***]	14.6	25.7	10.9
Percent International	3.1	2.1	3.5
Percent Athlete	4.8	5.9	4.5
Percent Honors[***]	30.6	24.9	32.5
Percent EOP[***]	7.3	25.5	1.4
Percent CAP	3.8	3.0	4.1
Percent Enrolled as Undecided	23.3	24.8	22.8
High School Average[***]	89.2	87.9	89.6
SAT Verbal[***]	577	523	560
SAT Math[***]	551	556	584
Age at College Entrance[*]	18.0	17.9	18.0
Percent Full Time Semesters[*]	92.3	91.6	92.6

Note. Asterisks represent statistically significant differences: * $p < .05$, **, $p < .01$, *** $p < .001$.

Table 2. Retention Rates for MOI versus Non-MOI Students

Retention Year	Total Retained/ Graduated	Percent MOI	Percent Non-MOI	Odds Ratios	
				MOI Completion	MOI Grade
Fall 2002[***]	2574	93.9	83.9	3.6[***]	0.9
Fall 2003[***]	2232	84.3	71.8	3.3[***]	1.5[*]
Fall 2004[***]	2119	79.1	68.1	2.8[***]	1.4[*]
Fall 2005[***]	1946	73.2	62.2	2.3[***]	1.2
Fall 2006[***]	1914	71.9	60.7	2.5[***]	1.5[***]

<u>Note</u>. Asterisks represent statistically significant differences: * $p < .05$, **, $p < .01$, *** $p < .001$.

Methods of Inquiry and Student Retention

Table 2 shows student retention/graduation rates over the five year period of the study not accounting for the control variables. In order to examine the impact of MOI at each time point, a series of logistic regression analyses were run with the six control variables as covariates and retention/graduation at each time point as the dependent variable. For each year's analysis, only those students who had completed MOI successfully within the specified time frame were coded as MOI students (the independent variable) so as not to include students who had not yet taken the course. In addition, combining retention and graduation into a single outcome variable provides an accurate indicator of those who continue enrollment or exit successfully versus those who leave.

The results (shown in Table 2) suggest that the odds of being retained each year are at least twice as high for MOI students. For example, students who successfully complete MOI in the first year are 3.6 times as likely to be retained as those who do not. MOI has an important, positive impact on student retention/graduation rates, and the effects are strongest for those students who take the course early in their college careers (i.e., within the first two years).

To examine the impact of MOI grade on retention/graduation rates, these same analyses were run for MOI students only with MOI grade (converted to quality points) used as the independent variable. The results of these analyses suggest that MOI grade *does* matter to retention/graduation rates for three of the five time points examined. For example, as shown in the last column of Table 2, for each one-third quality point increase in MOI grade (e.g., B to B+ or B+ to A-), the likelihood of being retained/graduated in year three is increased 1.5 times. Similar results are found for years four and six. In sum, students are more likely to be retained or graduated simply by completing the course successfully. However, for three of the five years studied, increased success in MOI leads to an even greater chance of being retained/graduated.

Table 3. Four-Year and Five-Year Graduation Rates for MOI versus Non-MOI Students

Graduation	Total Graduated	Percent MOI	Percent Non-MOI	Odds Ratios	
				MOI Completion	MOI Grade
Within 4 Years[*]	1067	31.8	36.3	1.2	1.4[**]
Within 5 Years	1645	57.1	53.7	1.5[***]	1.4[***]

<u>Note</u>. Asterisks represent statistically significant differences: * $p < .05$, **, $p < .01$, *** $p < .001$.

Methods of Inquiry and Graduation Rates

The impact of successful completion of MOI on graduation rates was examined separately in the same manner. Table 3 displays the 4-year and 5-year graduation rates for MOI versus non-MOI students. When no background variables are controlled, MOI students appear to be at a slight disadvantage for graduation within four years, but they "catch up" by the fifth year. The results of the logistic regression for 4-year graduation suggest that, even when accounting for the backgrounds of MOI students, successful completion of MOI has a positive but non-significant impact on the likelihood of graduating within four years. However, MOI has a significant positive impact on 5-year graduation rates: students taking MOI are 1.5 times as likely to graduate within five years as those who do not take the course.

To examine the importance of MOI grade on graduation rates, these analyses were run using only MOI students with MOI grade as the independent variable. **In spite of the fact that mere exposure to MOI does not increase the likelihood of graduating in four years, MOI grade *does*. For each one-third quality point increase in MOI grade, students are 1.4 times as likely to graduate in four years.** The results are identical for five-year graduation rates.

Methods of Inquiry and Student Grades

To examine the impact of successful completion of MOI on student grades, five analyses of covariance (ANCOVA) were computed in which cumulative QPA at five time points served as the dependent variable (i.e., the end of the first semester, the end of the first year, the end of the second year, the end of the third year, and the end of the fourth year). The same control variables were used, and the interactions of interest were those among MOI and minority status, EOP status, Honors status. As shown in Table 4, there is a large, significant impact of MOI on QPA, with those students who successfully completed MOI having significantly higher QPA's at each time point.

Table 4. QPA Comparisons

Variable	MOI Students	Non-MOI Students	Difference
End of First Semester***	3.16	2.45	0.71
End of Year 1***	2.86	2.36	0.50
End of Year 2***	2.83	2.32	0.51
End of Year 3**	2.64	2.28	0.36
End of Year 4***	2.88	2.40	0.48

Note. Asterisks represent statistically significant differences: * $p < .05$, ** $p < .01$, *** $p < .001$.

In addition, there is a significant interaction between MOI and EOP status at every time point. Once high school average and SAT scores are taken into account, EOP students who successfully complete MOI have higher QPA's than all other students, including those who are non-EOP and also successfully complete MOI. The pattern of the interaction for the end of the first semester is shown in Figure 1. (The patterns for the remaining four time points are nearly identical and are shown in Appendix C.) These results suggest that MOI is particularly effective in helping EOP students to maintain a competitive, even superior, grade point average.

Figure 1.   The Interaction of EOP and MOI at the End of the First Semester
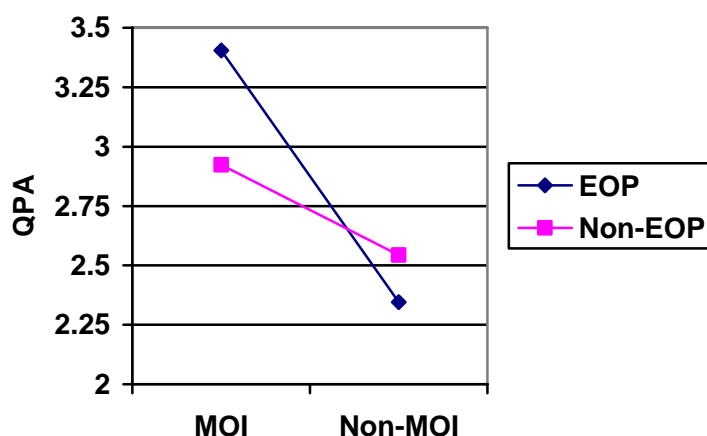
To examine the impact of MOI grade on QPA at each time point, a series of linear regression analyses were conducted for MOI students only, using MOI grade as the independent variable. For each time point assessed, MOI grade is a significant predictor of QPA, over and above the control variables. At the end of the first semester, a one-third quality point increase in MOI grade results in a .5 quality point increase in QPA. The results are not as drastic for the remaining time points but still significant and important, with each one-third quality point increase in MOI grade resulting in approximately a .3 quality point increase in QPA (year 1: 0.37; year 2: 0.35; year 3: 0.21; year 4: 0.33).

Conclusions

The Methods of Inquiry course has an important impact on three student outcomes: retention, graduation rates, and college grades. Students who successfully complete the course are more likely to be retained until graduation, to graduate within five years, and to have higher QPA's than students who do not complete the course, controlling for minority status, EOP status, Honors status, high school average, and SAT scores. Although mere exposure to the course content is beneficial, *course effects are stronger with each increase in MOI grade*. Those who are more successful in MOI are more likely to be retained and to graduate within *four* years, and they have higher QPA's. The effects of the course are particularly strong for EOP students.

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[1]   Taken from the course web site at http://www.gse.buffalo.edu/cap/moi/.

[2]   Students are considered to be successful completers of MOI when they earn a grade of D or better. Non-MOI students are those who have not taken MOI or have failed the course.

[3]   Although the groups differ significantly in terms of age at college entrance and percentage of full-time semesters, the differences are extremely small in terms of practical significance (less than .1 standard deviation units). For this reason, these two variables are not included as control variables in subsequent analyses.

Appendix A.
The Impact of Minority Status, EOP Status, Honors Status, High School Average, and SAT Scores on Retention/Graduation

Variable	Minority Status		EOP Status		Honors Status		High School Average		SAT Verbal		SAT Math	
	Minority	Not Minority	EOP	Not EOP	Honors	Not Honors	Ret/Grad	Not Ret/Grad	Ret/Grad	Not Ret/Grad	Ret/Grad	Not Ret/Grad
Year 1 Retention	84.8	85.5	85.4	85.3	89.2	83.6	89.4	88.0	551	552	578	567
Year 2 Retention	68.8	74.3	68.9	74.3	81.3	70.6	89.7	87.7	552	546	581	564
Year 3 Retention	63.8	70.3	61.6	70.1	78.5	65.6	89.8	87.8	553	545	582	565
Year 4 Retention	42.9	34.3	44.7	35.0	37.8	34.7	89.2	89.2	550	551	580	575
Year 5 Retention	14.7	17.7	18.3	17.3	24.4	14.3	90.3	88.9	561	549	591	574
4-Year Graduation	16.7	38.5	11.0	37.3	50.1	28.9	91.2	88.0	567	542	592	568
5-Year Graduation	39.9	56.7	32.0	56.3	67.0	49.0	90.4	87.7	557	542	586	566

Note: Cells that are not shaded represent statistically significant differences.

Appendix B.
The Impact of Minority Status, EOP Status, Honors Status, High School Average, and SAT Scores on QPA

Variable	Minority Status		EOP Status		Honors Status		Correlations		
	Minority	Not Minority	EOP	Not EOP	Honors	Not Honors	High School Average	SAT Verbal	SAT Math
First Semester QPA	2.37	2.70	2.44	2.67	3.06	2.48	0.39	0.15	0.14
Year 1 QPA	2.27	2.71	2.18	2.68	3.05	2.46	0.42	0.19	0.20
Year 2 QPA	2.23	2.70	2.14	2.67	3.04	2.45	0.43	0.20	0.21
Year 3 QPA	2.27	2.64	2.19	2.62	2.89	2.46	0.31	0.15	0.15
Year 4 QPA	2.33	2.75	2.25	2.72	3.07	2.52	0.38	0.18	0.19

Note: Cells that are not shaded represent statistically significant differences and/or correlations.

Appendix C.
Interaction of EOP and MOI, Years 1 through 4.

Year 1

Year 2

Year 3

Year 4