The Effect of Instructor and Learning Environment on Student Motivation and Attitudes: GARNET part 3, Instruction

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Previous Findings

- Trends of decreasing attitudes with learner centered environments has been well documented [1, 2]
- Self-Regulated Learning is a key way to support students' understanding of their own learning process. [3]
- Explicit connections to teaching approach can help support student attitudes and motivation. [3]

1. Ramsden, P., Martin, E., & Bowden, J. (1989). School Environment and Sixth Form Pupils' Approaches to Learning. British Journal of Educational Psychology, 59, 129-142.
2. Phipps, M., Phipps, C., Kask, S., & Higgins, S. (2001). University Students' Perceptions of Cooperative Learning: Implications for Administrators and Instructors. The Journal of Experiential Education, 24(1), 14-21.
3. Zimmerman, B. J., 2001, Theories of Self-Regulated Learners and academic achievement. An overview and analysis, *in* Zimmeran, B. J., and Schunk, D. H., eds., Self-regulated learning and academic achievement: Theoretical Perspectives: Mahwah, NJ, Erlbaum, p. 1-38.

Classroom Observation

- Reformed Teaching Observation Protocol (RTOP): Classroom Observation Instrument [4]
- Inductively-driven instrument
- Developed a rubric to assure inter-rater reliability (R^2=0.95)
- Introductory Physical Geology classrooms at Community College, Public Universities, and Private College

4. Sawada, D., Piburn, M. D., Judson, E., Turley, J., Falconer, K., Benford, R., and Bloom, I., 2002, Measuring Reform Practices in Science and Mathematics Classrooms: The Reformed Teaching Observation Protocol: School Science and Mathematics, v. 102, no. 6, p. 245-253.

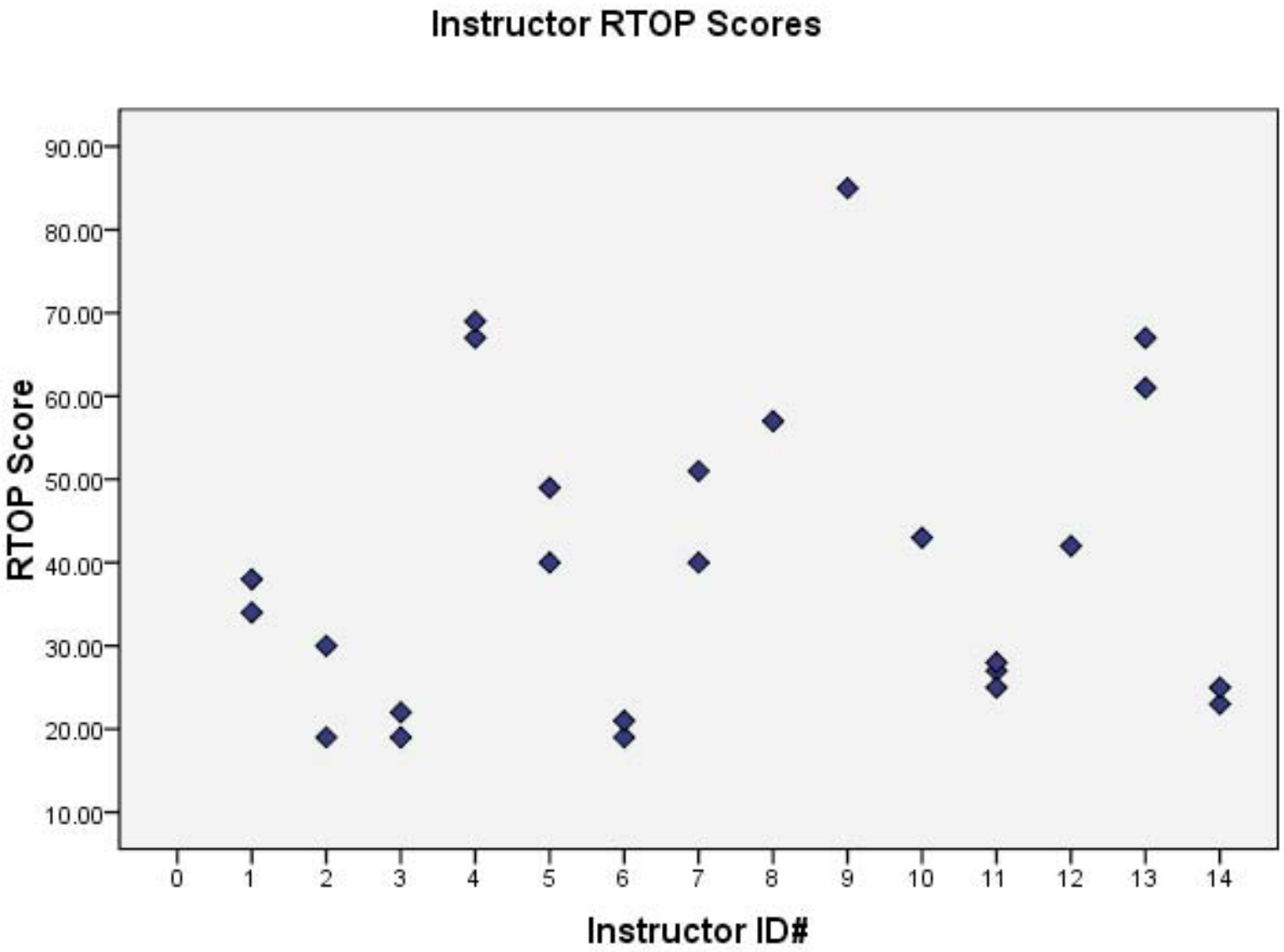
RTOP Scoring

- 5 categories:
  - Lesson Design & Implementation (What the teacher intended to do)
  - Propositional Knowledge (What the Teacher knows, and how well they are able to organize and present material in a learner-oriented setting)
  - Procedural Knowledge (What the students did)
  - Classroom Culture (Student-Student Interactions)
  - Classroom Culture (Student/Teacher Relationships)
- 0-4 for each item, total of 100 possible points

RTOP Scoring Process

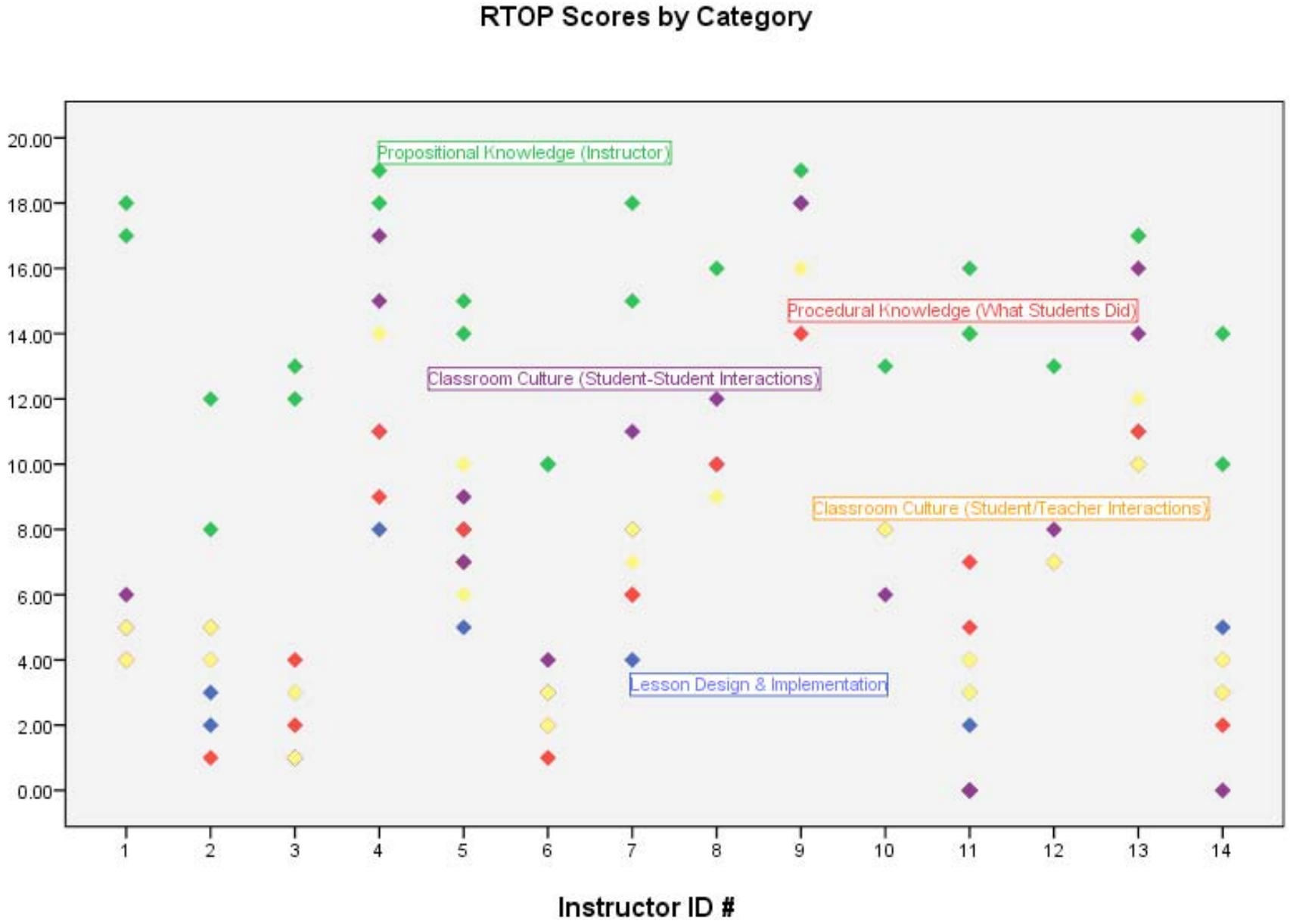
Lesson Design and Implementation (What Teacher Intended to Do)				
1) Instructional strategies and activities respected students' prior knowledge and the preconceptions inherent therein				
Never occurred 0	Lesson is designed to inform students what they already know 1	Lesson is designed to assess student's prior knowledge based on student input, but not to adjust. 2	Lesson is designed to use prior knowledge to build on and add value to content already provided 3	Lesson is designed to activate student prior knowledge (before any content delivery), and introduce content based on that input (and adjust if needed) 4
Comments:				
2) The lesson was designed to engage students as members of a learning community				
No evidence 0	Lesson has limited opportunities to engage students. (e.g., some clickers, rhetorical questions with shout out opportunities, clarification questions) 1	Lesson is designed for continual interaction between teacher and students 2	Lesson is designed to include both extensive teacher-student and student-student interactions 3	Lesson was designed for students to negotiate meaning of content primarily through student-student interaction 4

RTOP Scores


Instructor RTOP Scores
RTOP Score
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Instructor ID#

GARNET: Geoscience Affective Research Network

RTOP Scores: Breakdown



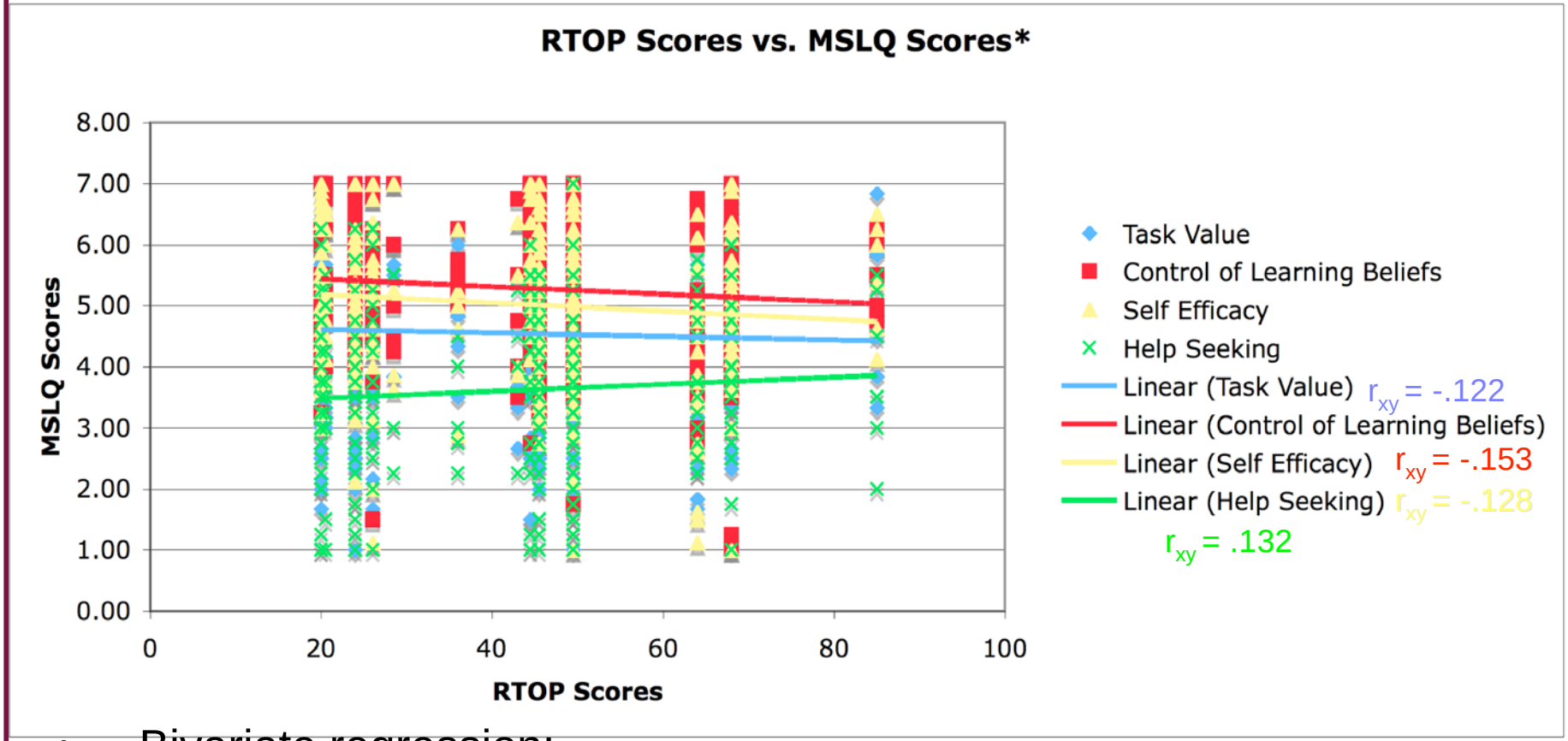
MSLQ Instrument

Motivated Strategies for Learning Questionnaire[5] (MSLQ) used to investigate how aspects of the affective domain varied for students.

Motivated Strategies for Learning Questionnaire		
Categories	**Subcategories**	**Subscales (# of questions)**
Motivation Scales	**Value**	**Intrinsic goal orientation (4)**
		Extrinsic goal orientation (4)
		Task value (6)
	Expectancy	**Control of learning beliefs (4)**
		Self-efficacy (8)
	Affect	**Test anxiety (5)**
Cognitive Scales	**Cognitive strategies**	**Rehearsal (4)**
		Elaboration (6)
		Organization (4)
		Critical thinking (5)
	Metacognitive strategies	**Metacognition (12)**
	Resource Management	**Time/study management (8)**
		Effort regulation (4)
		Peer learning (3)
		Help seeking (4)

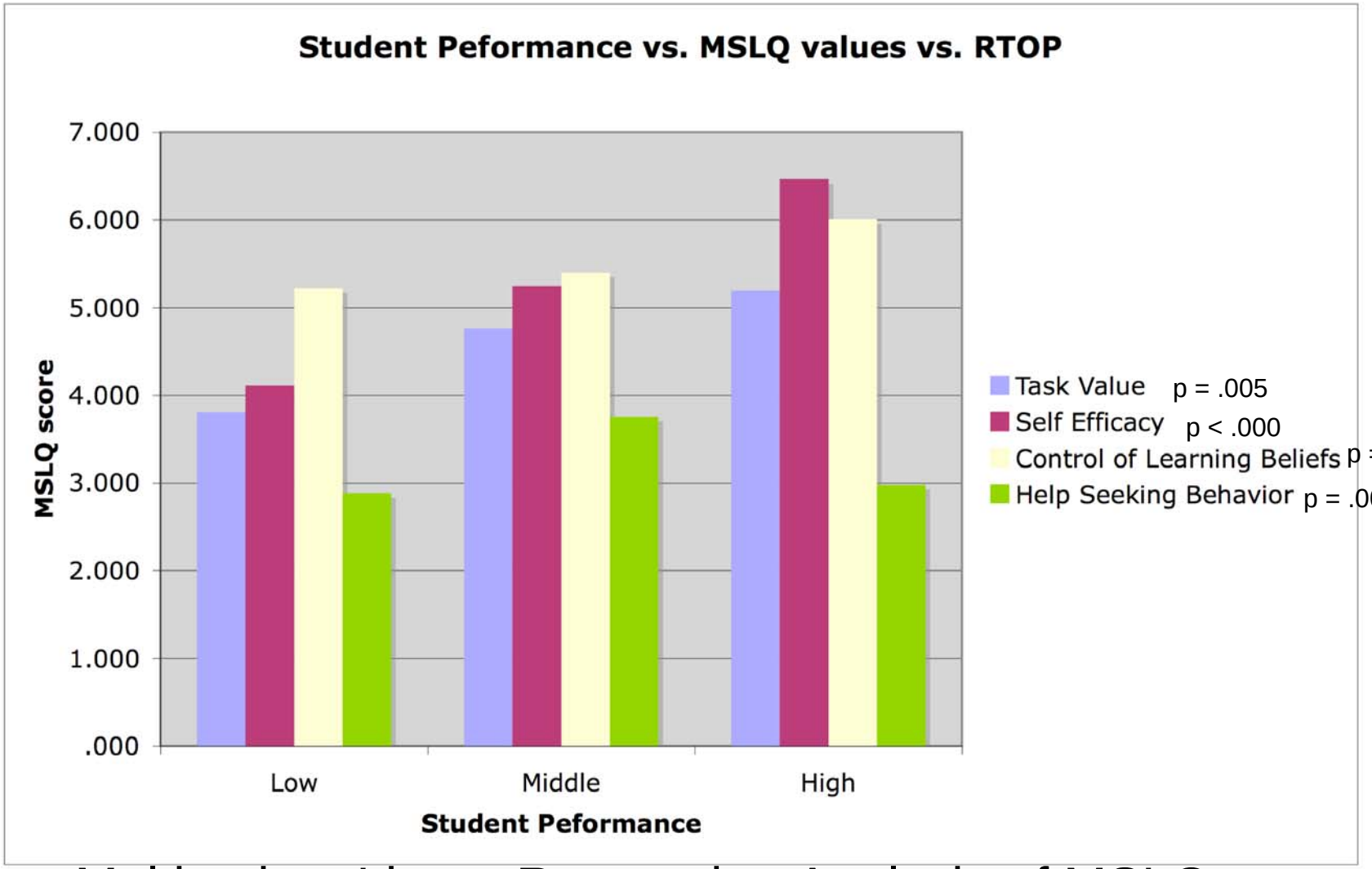
[5] Pintrich, P.R., Smith, D.A.F., Garcia, T., and McKeachie, W.J., 1991, NCRIPTL Report 91-B-004

MSLQ vs. RTOP scores



- Bivariate regression:
  - Negative weak correlations (statistically significant) between Task Value, Self Efficacy, Control of Learning Beliefs and RTOP scores.
  - Positive weak correlation (statistically significant) between Help Seeking Behavior and RTOP Scores.

MSLQ vs. Student Performance (vs. RTOP)



- Multivariate Linear Regression Analysis of MSLQ, Student Performance Rank, and RTOP scores

Implications & Recommendations

- High performers increase their task value and self-efficacy regardless of the learner environment.
- Low performers learn more in learner centered environments [6], but may decrease their own feelings of confidence unless supported.
- Metacognition and strategies for developing SRL skills can be the key to supporting success for all students [7]
- So what should instructors do?

6. Johnson, D. W., Johnson, R. T., & Smith, K. A. (1991). *Active Learning: Cooperation in the College Classroom*. Edina, MN: Interaction Book Company.
7. Weinstein, C. E., Meyer, D. K., Husman, J., Van Mater, G., & McKeachie, W. J. (2006). Teaching Students how to Learn. In *Teaching Tips: Strategies, research, and theory for college and university teachers* (pp. 270-283): Houghton Mifflin.