

Student Algebraic Readiness Progress Monitoring (ARPM)

Project STAIR

Technical Report #12

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Purpose

The purpose of this technical report is to examine the student level performance improvement in *Algebra Readiness Progress Monitoring (ARPM)*.

Method

Participants

Algebra Readiness Progress Monitoring (ARPM) was administered to 26 students from treatment group teachers at pretest, about weekly during DBI implementation, and at posttest.

Measures

ARPM (Ketterlin-Geller, Gifford, & Perry, 2015) is a weekly measure designed for students in grades 6-8. ARPM is published by Istation, Inc and is used to measure how students' progress towards algebra readiness. ARPM focusses on three separately assessed areas including proportional reasoning, quantity discrimination, and number properties. The ARPM included multiple parallel forms for frequent (i.e., weekly) administration.

Procedures

ARPM was administered each week during implementation of Project STAIR to track students' algebra readiness throughout the semester. The three constructs of ARPM are tested separately in timed sections. Students have three minutes to complete as many items on each section of assessment.

Participating teachers were provided with a spreadsheet called the Student Tracking Spreadsheet to input student data for the ARPM. The spreadsheet was designed for teachers to get initial baseline ARPM scores for their students, track these scores after each intervention strategy, and display trend lines through the testing process. On the "Data Entry" tab, teachers input up to three student names and ID

numbers. The graphing spreadsheet allowed teachers to see student progress each week and adjust intervention as necessary. Researchers administered the ARPM to students at pretest in fall, about weekly during DBI implementation, and at posttest in spring.

Results

To analyze change in student ARPM performance, paired t-test was conducted comparing pretest to posttest (see Table 12.1). The score represents the number of items that were answered correctly. For *number properties*, the result showed that there was no significant difference in the pre- and posttest; $t(25) = 1.40, p = 0.17$. For total score of ARPM, the result showed that there was no significant difference in the pre- and posttest; $t(25) = 1.63, p = 0.12$. For each construct of ARPM, the result showed that there was no significant difference in the pre- and posttest for *Number Properties*; $t(25) = 1.40, p = 0.17$, for *Quantity Discrimination*; $t(25) = 1.40, p = 0.17$, and for *Proportional Reasoning*; $t(25) = 1.13, p = 0.27$. Although, change in student ARPM performance was not significant, the posttest scores were greater than the pretest scorer on all three constructs of ARPM; *Number Properties*, *Quantity Discrimination*, and *Proportional Reasoning*.

Table 12.1

Student ARPM at Pre- and Posttest

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Number Properties					
Pretest	26	7.58	4.56	1.40	0.17
Posttest	26	8.92	4.57		
Quantity Discrimination					
Pretest	26	9.69	4.11	1.40	0.17
Posttest	26	9.86	5.72		
Proportional Reasoning					
Pretest	26	8.15	4.76	1.13	0.27

Posttest	26	9.00	4.87		
Total score					
Pretest	26	23.69	11.17	1.63	0.12
Posttest	26	27.62	13.00		

NOTE: These scores represent the first and last dates of administration; for more nuanced information about the total number of datapoints or the distribution of datapoints over time, log into Istation for detailed student reports.

Reference

Ketterlin-Geller, L.R., Gifford, D., & Perry, L. (2015). Measuring middle school students' algebra readiness: Examining validity evidence for experimental measures. *Assessment for Effective Intervention, 41*(1), 28–40. <https://doi.org/10.1177/1534508415586545>