

Teacher Instructional Practices (TIP)

Project STAIR

Technical Report TR-04

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The research reported here is supported by the U.S. Department of Education, Office of Special Education Programs (OSEP, award H326M170006). The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

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Teacher Instructional Practices

Purpose

The purpose of this technical report is to provide information on the *Teacher Instructional Practices* (TIP) scores of the second cohort (2019-2020) of Project STAIR teachers. This report seeks to provide information of whether teachers increased their understanding, confidence, and frequency regarding the implementation of evidence-based practices.

Method

Participants

A total of 16 teachers completed at least one form of the Teacher Instructional Practices survey, including 11 teachers in the treatment group (STAIR) and 5 teachers in the control group.

Measures

The *Teacher Instructional Practices* (TIP) included a series of Likert-scale type questions that asked teachers to rate the following categories: (a) the importance of practice, (b) understanding of practice, (c) confidence in implementing the practice, and (d) frequency. Teachers rated the following practices: (1) explicitly model mathematics concepts and procedures; (2) provide guided practice opportunities (i.e. teacher and students working together; students working together); (3) provided independent practice opportunities; (4) use planned examples; (5) use multiple representations (concrete, representational, and abstract), linking back to concepts or procedures; (6) use precise mathematical vocabulary and mathematics

terminology; (7) use questioning strategies that elicit a variety of student responses (why, when, how); (8) require students to respond frequently; (9) provide opportunities for student discourse around important concepts in mathematics; (10) provide affirmative feedback; (11) provide corrective feedback; (12) make adjustments to lesson flexibility to address students' needs; (13) pace lessons to the developmental level/needs of students and the purpose of the lesson; (14) encourage students to search for multiple solutions strategies and to recognize task constraints that may limit solution possibilities; (15) build fluency with facts, computation, etc.; and (16) teach effective problem-solving strategies.

The TIP survey included 27 items on a 4-point or 6-point Likert scale and measured three areas of teacher perception and practice: DBI content knowledge, instructional practices, and assessment practices. For each prompt, teachers read a prompt and rated their perception of the importance of the practice, their understanding of the practice, their confidence in implementing the practice, and the frequency in which they currently use the practice. The assessment was not timed. Participants completed the survey prior to the Core PD and following the completion of student data collection. Cronbach's alpha for each section of the TIP was $\alpha = .84$ for DBI construct, $\alpha = .96$ for instructional practices, and $\alpha = .93$ for assessment practices.

Results

Descriptive statistics include results of the *Teacher Instructional Practices* survey at pre- and posttest for treatment (STAIR) and control groups (see Table 1). To evaluate whether treatment and control groups differed significantly at posttest, we conducted independent *t*-tests (see Table 2). There were no statistical significances between treatment (STAIR) and control groups on any item in the *Teacher Instructional Practices* survey ($p > .05$).

Table 1*Descriptive Statistics of Teacher Instructional Practices*

		Treatment				Control			
		Pre (N = 11)		Post (N = 9)		Pre (N = 3)		Post (N = 5)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Data Based Individualization	Importance of practice	2.42	0.56	2.52	0.64	2.67	0.71	2.47	0.64
	Understanding of the practice	1.88	0.86	2.30	0.78	2.11	0.60	2.13	0.74
	Confidence in implementing the practice	1.70	0.88	2.00	0.96	2.11	0.93	2.27	0.70
	Frequency of implementing the practice	3.45	1.44	3.37	1.45	3.56	1.33	3.27	1.22
Instructional Practices	Importance of practice	2.80	0.40	2.89	0.36	2.90	0.31	2.89	0.32
	Understanding of the practice	2.50	0.59	2.77	0.42	2.42	0.50	2.63	0.62
	Confidence in implementing the practice	2.27	0.67	2.62	0.63	2.33	0.56	2.39	0.70
	Frequency of implementing the practice	4.35	0.88	4.44	0.74	4.65	0.53	4.14	1.14
Assessment Practices	Importance of practice	2.51	0.57	2.54	0.69	2.63	0.71	2.70	0.72
	Understanding of the practice	2.09	0.69	2.40	0.69	2.17	0.96	2.25	0.71
	Confidence in implementing the practice	1.95	0.84	2.32	0.73	2.29	0.55	2.30	0.80
	Frequency of implementing the practice	2.53	1.46	2.68	1.38	2.42	1.50	2.75	1.69
Culture/Climate		3.55	0.67	3.41	0.50	2.89	0.78	3.13	0.64

Table 2*Independent i-Tests for Comparing the Means at Posttest of Treatment and Control Groups*

		Treatment (N = 9)		Control (N = 5)		<i>t</i>	<i>p</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Data Based Individualization	Importance of practice	2.52	0.64	2.47	0.64	0.14	.89
	Understanding of the practice	2.30	0.78	2.13	0.74	0.38	.71
	Confidence in implementing the practice	2.00	0.96	2.27	0.70	0.54	.60
	Frequency of implementing the practice	3.37	1.45	3.27	1.22	0.14	.89
Instructional Practices	Importance of practice	2.89	0.36	2.89	0.32	0.01	.99
	Understanding of the practice	2.77	0.42	2.63	0.62	0.52	.61
	Confidence in implementing the practice	2.62	0.63	2.39	0.70	0.63	.54
	Frequency of implementing the practice	4.44	0.74	4.14	1.14	0.60	.56
Assessment Practices	Importance of practice	2.54	0.69	2.70	0.72	0.40	.69
	Understanding of the practice	2.40	0.69	2.25	0.71	0.40	.70
	Confidence in implementing the practice	2.32	0.73	2.30	0.80	0.05	.96
	Frequency of implementing the practice	2.68	1.38	2.75	1.69	0.08	.93
Culture/Climate		3.41	0.50	3.13	0.64	0.89	.39

APPENDICES

Questions from the Teacher Instructional Practices (TIP) survey

Data Based Individualization

	Frequency	Understanding of the practice	Importance of practice	Confidence in implementing the practice
	0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday	0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it	0: Not very important 1: Somewhat important 2: Important 3: Very important	0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3
Administer (weekly) measures of progress monitoring	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Analyze progress monitoring data every (4) weeks	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Make instructional adaptations based on progress monitoring data	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3

Instructional Practices

	Frequency	Understanding of the practice	Importance of practice	Confidence in implementing the practice
	0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday	0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it	0: Not very important 1: Somewhat important 2: Important 3: Very important	0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3
Explicitly model mathematics concepts and procedures	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Provide guided practice opportunities (i.e. teacher and students working together; students working together)	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Provide independent practice opportunities	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use planned examples	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use multiple representations (concrete, representational, and abstract), linking back to concepts or procedures	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use precise mathematical vocabulary and mathematics terminology	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use questioning strategies that elicit a variety of student responses (why, when, how)	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Require students to respond frequently	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3

Instructional Practices

	Frequency	Understanding of the practice	Importance of practice	Confidence in implementing the practice
	0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday	0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it	0: Not very important 1: Somewhat important 2: Important 3: Very important	0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3
Provide opportunities for student discourse around important concepts in mathematics	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Provide affirmative feedback	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

	Frequency 0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday 0 1 2 3 4 5	Understanding of the practice 0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it 0 1 2 3	Importance of practice 0: Not very important 1: Somewhat important 2: Important 3: Very important 0 1 2 3	Confidence in implementing the practice 0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident 0 1 2 3
Provide corrective feedback	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Make adjustments to lessons to address students' needs	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Pace lessons to the developmental level/needs of students and the purpose of the lesson	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Encourage students to search for multiple solution strategies and to recognize task constraints that may limit solution possibilities	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Build fluency with facts, computation, etc.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Teach effective problem-solving strategies	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

Assessment Practices

	Frequency 0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday 0 1 2 3 4 5	Understanding of the practice 0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it 0 1 2 3	Importance of practice 0: Not very important 1: Somewhat important 2: Important 3: Very important 0 1 2 3	Confidence in implementing the practice 0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident 0 1 2 3
Use data from classroom assessments to change or modify instruction	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use data from a variety of sources to identify which concepts students are struggling to grasp	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use screening data to determine which students may be at-risk for failure	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use screening data to determine the intensity of supplemental instruction students need	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

	Frequency	Understanding of the practice	Importance of practice	Confidence in implementing the practice
	0: Less often than 1 time per month 1: 1 time per month 2: 2-3 times per month 3: 1 time per week 4: 2-3 times per week 5: Everyday	0: I don't know much about it 1: I know a little bit about it 2: I know some details about it 3: I know a lot about it	0: Not very important 1: Somewhat important 2: Important 3: Very important	0: Not very confident 1: Somewhat confident 2: Confident 3: Very confident
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3
Use progress monitoring data to determine growth	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use progress monitoring data to determine effectiveness of instructional approaches for meeting students' needs	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use assessments to find out what students know before a unit begins	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
Use assessments to find out what students know during the unit	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	0 1 2 3 4 5	0 1 2 3	0 1 2 3	0 1 2 3

Culture/Climate

To what degree do you agree or disagree with the following statements:

	Strongly Disagree	Disagree	Agree	Strongly Agree
My school has a shared vision of effective instruction in mathematics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I regularly share ideas and materials with other mathematics teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have time during the regular school week for collaboration with other teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>