IPRPD
International Journal of Arts, Humanities & Social Science
ISSN 2693-2547 (Print), 2693-2555 (Online)
Volume 03; Issue no 05: May, 2022

Using Data Teaming and Differentiated Instructional Planning to Address the Learning Support Needs of Academically At-Risk Students in an Urban Elementary School: A Design Research Case Study

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Abstract

Addressing the learning improvement needs of academically at-risk students is a challenge that school leaders continually struggle with. This article showcases how a team of school improvement leaders in one urban elementary school setting used an innovative design research methodological approach to: 1) investigate and identify the underlying root causes of their school's persistent student-learning problems; and 2) develop a targeted professional learning intervention program to address the specific data teaming and differentiated instructional planning support needs of teachers. A literature-informed discussion is included on how the elementary campus principal and her instructional improvement team utilized applied design research thinking in conjunction with focused data-teaming processes to provide third- and fourth-grade teachers with relevant data literacy and differentiated instructional planning knowledge and skills to effectively address the learning improvement needs of the campus's large population of economically disadvantaged and academically at-risk students. Finally, several design principles emerging from the collective results and findings of the elementary school case study are presented that may be of practical use to school leaders seeking to explore the potential of applying educational design research methods in their school settings to jumpstart and invigorate their own context-specific instructional improvement efforts.

Keywords: Educational Design Research Methodology; Data Teaming; Differentiated Instructional Planning; Professional Learning Interventions

Introduction

Identifying effective strategies for promoting the reading and overall literacy development of elementary-age students constitutes an enduring instructional challenge for teachers and principals in elementary school settings. Moreover, this instructional challenge is heightened for elementary teachers and principals in many school districts across the United States who find themselves grappling with how to respond adequately to the increased learning support needs of substantial populations of students on their campuses who are identified as economically disadvantaged and academically at-risk. In many elementary school settings, teachers regularly struggle with providing appropriate reading and literacy instruction to the diverse students in their classrooms (in terms of socioeconomic status, cultural/ethnic diversity, family/home circumstances, etc.) often because these teachers attempt to utilize the same instructional approach and instructional interventions for all students. Instructional improvement leaders on elementary campuses (principals, assistant principals, instructional coaches, grade-level teacher team leaders, etc.) working to investigate the underlying root causes of the chronically low reading and literacy development learning performance levels of their economically disadvantaged and academically at-risk students in many instances discover that grade-level teachers are not engaging in the kinds of *focused, data-informed instructional planning practices* that are required for teachers to be able to develop and implement targeted lessons and instructional interventions to meet the diverse reading and literacy development needs of their students. In many of these elementary campuses, teachers simply do not possess the professional knowledge and skills needed to be able to disaggregate student learning performance data at the level required to be able to make informed decisions regarding individual student interventions.

Interestingly, elementary teachers' ineffective instructional planning and classroom teaching practices can often be traced to teachers' misguided pedagogical beliefs—such as: teachers' beliefs regarding the perceived

limitations of their roles and responsibilities as classroom instructors in addressing the needs of diverse learners, teachers' deficit thinking beliefs regarding the limited learning capabilities of their students, etc.—and teachers' resulting over-reliance on routinized instructional planning procedures and standardized teaching strategies for facilitating students' learning in their classrooms. These pedagogical beliefs, which can become entrenched in teachers' pedagogical thinking over time, can influence and ultimately directly impact teachers' habits of classroom instructional practice. School leaders (principals, assistant principals, grade-level team leaders, instructional coaches, curriculum specialists, etc.) who are focused on designing and implementing campus-based instructional improvement initiatives at some point inevitably come to the realization that to effectively address student-learning problems on their campuses they must *first address* their own teachers' instructional planning and classroom teaching practice deficiencies (i.e., deficiencies that are often rooted solidly in teachers' pedagogical deficit thinking). This recognition by school leaders of their own teachers' pedagogical deficit thinking and resulting instructional deficiencies that can act as underlying root causes fueling students' learning problems requires that campus instructional leaders work intentionally to develop targeted *professional learning interventions* to provide teachers with the specific knowledge and skills they need to transform and revitalize their instructional planning and classroom teaching practices.

Collaboratively designed teacher professional development (PD) programs developed jointly by school leaders and teachers can be especially useful when these PD programs are constructed creatively to provide teachers with *immersive professional learning experiences* that highlight the learning payoffs to teachers and their students of engaging intentionally in data-informed collaborative instructional planning. Indeed, engaging together in intensive mining and analyses of their students' learning performance data in conjunction with open team conversations about the results of these data analyses are some of the best team-centered strategies teachers can utilize to investigate teaching and learning performance challenges on their campuses and identify underlying root causes of students' learning problems (see: Bambrick-Santoyo, 2012, 2019; Bernhardt, 2013; Blanc et al., 2010; Boudett, City & Murnane, 2010; Bowers, Shoho & Barnett, 2014; Datnow & Park, 2014; Dufour et al., 2004; Dufour and Fullan, 2013; Dufour et al., 2016; Kennedy & Jones, 2015; Love et al., 2008; Love, 2009; Mandinach, 2012; Mandinach & Honey, 2008; Mandinach & Jackson, 2012; Margot & Kettler, 2019; Venables, 2011, 2014; White, 2011). For elementary school leaders seeking to address vexing instructional improvement challenges on their campuses, there are a number of current literatures that offer targeted knowledge and skills along with multiple, actionable creative strategies that can benefit teams of grade-level and cross grade–level teachers as they strive to address their diverse students' learning improvement needs. These literatures include but are not limited to: 1) addressing student instructional equity concerns (Darling-Hammond, 2010; Skrla et al., 2009); 2) identifying the reading and literacy development needs of diverse learners (Nabaa-McKinney, 2019; Tyler, 2009); 3) enhancing teachers' Response to Intervention (RtI) model knowledge and competencies (Allington, 2019; Austin, 2016; Bender & Shores, 2007; Rogers et al., 2020); 4) developing students' digital literacy to maximize students' technology-integrated learning success (McLeod & Lehmann, 2012; Militello & Friend, 2013; Schrum & Levin, 2015; Sheninger, 2014); 5) creating deeper learning environments in schools for teachers and students (Borko, 2004; Bouwmans et al., 2017; Bradley & Hernandez, 2019; Hernandez et al., 2019; Kameda, 2017; Martinez & McGrath, 2014; McTighe & Silver, 2020; Ottmar, 2019); 6) supporting teachers' data-informed instructional planning capacity-building efforts (Bambrick-Santoyo, 2012, 2019; Ende, 2016; Krečič & Grmek, 2008; Lieberman et al., 2014; Marzano et al., 2016; Reeves, 2009, 2010; Stringer, 2013; Schweitzer & Bailey, 2017; Widmann & Mulder, 2020); and 7) expanding teachers' knowledge and skills in the area of culturally responsive teaching (Khalifa et al., 2016; Khalifa, 2021; Samuels, 2014; Theoharis, 2009; Theoharis & Brooks, 2012).

Notably, *educational design research* has emerged in recent years as an innovative methodological approach of practical use to school leaders interested in investigating vexing student-learning problems and formulating actionable intervention strategies to address their campus-based teaching and learning improvement challenges (McKenney & Reeves, 2012; Plomp & Nieveen, 2010; van den Akker et al., 2006, 2006a). As described by Tjeerd Plomp (2010), "…key characteristics of design research are that it is research focused on designing interventions in the real context of education or training (interventionist characteristic) combined with efforts to understand and improve interventions (process orientation), utilizing state of the art theories whilst the field testing and the evaluation of the consecutive prototypes should contribute to theory building (theory orientation). …one of the aims of design research *is designing and developing an intervention as an (innovative) solution to a complex problem* [emphasis added], and therefore the starting point for design research are educational problems for which no or only a few validated principles ('how to do' guidelines) are available to structure and support the design and development activities. …design research results in interventions (programs, products, processes) and in design principles or intervention theory. A third output of design research is professional development of the participants involved in the research." (Plomp, 2010, pp. 19-22) Thus, at a fundamental level, educational design research is about designing, developing, implementing, and evaluating teaching and learning improvement *interventions*. Design research methodological principles, when utilized in elementary and secondary school contexts, involves school leaders in working together in collaborative teams to systematically mine and analyze multiple kinds of data (e.g., teaching and learning performance data, including iterative sets of multi-week student learning benchmark data; comprehensive

campus- and district-level student-learning improvement needs assessment data, and the like; teaching staff, student, parent and community perspectivist data; grade-level team observational data) as a concerted means to generate new data-analytic insights regarding possible underlying root causes of complex teaching and learning problems. These root causal insights can then enable school leaders to design and implement *targeted professional learning interventions* for teachers and other educational staff on their campuses to provide educators with the specific knowledge, skills, and strategies they need to effectively meet the learning improvement needs of their students. Thus, school leaders (school principals, assistant principals, instructional coaches, curriculum specialists, teachers, and other instructional improvement leaders) interested in systematically investigating and addressing their students' learning problems can employ educational design principles and procedures as a means to: 1) critically examine difficult, entrenched problems of practice in individual school and school district settings; and 2) generate creative, actionable sets of practical improvement strategies to address these problems and move their schools and school districts forward in positive, transformative ways.

Educational design research is a particularly accessible and easily implementable approach that school leaders working in a variety of elementary and secondary settings can leverage to systematically focus educators' collaborative instructional teaming efforts in investigating, designing, implementing, and evaluating targeted, data-informed intervention programs that can effectively address students' identified learning problems.

Purpose

This article describes how an elementary school principal and an instructional team of educators (i.e., identified grade-level teachers and the school's instructional coach) collaborated to apply educational design research methodological principles along with actionable data-teaming processes to address the large percentages of their school's students—in particular, large percentages of the school's diverse Hispanic and African-American student sub-populations—who were performing substantively below grade level in the areas of reading and overall literacy development. The school improvement case study presented in this article highlights the sustained efforts this team of educators engaged in to utilize a refined instructional improvement–focused version of the educational design research approach—namely, the *Design-Based School Improvement Logic Model and Operational Steps Process* developed by Rick Mintrop (2016)—as an intentional means to "reconceptualize" or "reframe" their problem identification and analysis thinking to progress systematically from a superficial analysis of their school's "reading and overall literacy development student-learning problems" to a comprehensive data-informed and root-causal understanding of the underlying "problem of professional practice" challenging grade-level teachers at the school and fueling their campus's student-learning issues. The case study presented provides the contextual background for an in-depth literature-informed discussion of how the elementary school principal and her instructional improvement team colleagues were able to leverage student-learning problem reframing techniques along with intervention design development procedures articulated in Mintrop's (2016) *Design-Based School Improvement Logic Model and Operational Steps Process* to design, develop, and implement a targeted professional development (PD) program intervention plan for teachers in this school setting. The immersive professional learning intervention implemented on this campus empowered teachers to be able to examine in an in-depth manner their own pedagogical mindsets and explore new kinds of instructional strategies to address their students' learning challenges. As a result, through the course of the PD intervention implementation teachers began to demonstrate meaningful change and improvement in their own pedagogical thinking and team-centered instructional planning practices. Importantly, through applying design-based school improvement principles and processes in this elementary setting, the principal and her instructional team colleagues were able to forge a new kind of *instructional improvement team-leadership culture* within which teachers and administrators could work together to positively impact the reading and overall literacy development performance of their school's diverse student populations.

Research Methods

The *Design-Based School Improvement Logic Model and Operational Steps Process* articulated by Rick Mintrop (2016) was used as the specific methodological framework guiding the data-informed analytic thinking and intervention design development and implementation strategies employed in the elementary school case study presented and discussed below. The Design-Based School Improvement Logic Model provides school and school district leaders with a practical framework for using intervention design development principles along with systematic operational strategies to engage in team-centered data mining and analysis activities to progress from an initial intuitive, surface-level (*high-inference*) understanding of student-learning problems existing in their school learning communities to a fully data-informed and literature-supported refined (*low-inference*) comprehension of the underlying, root-causal problem(s) associated with educators' own professional practice that can often fuel persistent student-learning problems.

The operational steps process associated with the Design-Based School Improvement Logic Model as delineated by Mintrop (2016) involves school instructional improvement leaders in first generating an *initial (high*

inference) Student-Learning Problem rationale statement along with an accompanying *intuitive Theory of Action (If/Then) statement* emanating from their review of readily available performance data and observational information school leaders routinely collect and review as part of their everyday professional practice. School leaders are then encouraged to probe the underlying root causes of their school's persistent student-learning problem(s) through engaging in a systematic Exploratory Needs Assessment (ENA) investigation to mine, collect, and analyze multiple kinds of relevant data, such as: student-learning accountability data provided in district and state academic performance reports; student-learning formative assessment data in the form of benchmark and progress monitoring assessments; principal observational data collected during classroom teaching walkthroughs and observations of teachers' collaborative work during grade-level professional learning community (PLC) instructional planning meetings; and teacher individual and focused group interview data. As an integral part of their Exploratory Needs Assessment investigation, school leaders develop sets of findings and conclusions that emerge logically from their various data analysis results. Resulting from this ENA investigative work, school leaders are then able to generate a refined (*low inference*) Problem of Professional Practice statement, which is a more fully data-informed and insightful articulation of the underlying "root causes" (i.e., problems associated with educators' own professional instructional practices) of their school's student-learning problem(s). School leaders then work to explore school improvement literatures that can lead to the development of a "Change Drivers Diagram" that can guide school improvement efforts. In particular, the Change Drivers Diagram highlights actionable school improvement strategies that can be incorporated into a focused *Design-Based School Improvement Intervention Plan* to provide educators with the specific literature-supported knowledge, skills, and instructional planning strategies they need to be able to effectively address the learning improvement needs of their students.

Rick Mintrop's Design-Based School Improvement Logic Model and Operational Steps Process (Mintrop, 2016) was utilized as the "design research intervention" approach employed in the elementary school case study described in the following section.

Design-Based School Improvement Case Study

This section profiles a case study of design-based school improvement work completed by a team of educators at an elementary school campus located in a large urban school district. This elementary school is one of several schools located in the Panhandle and Permian Basin regions of west Texas in the southwestern United States at which I have served as a school improvement consultant over the past five years. The case study below presents a narrative description of the specific challenges confronting the elementary school principal and her school-wide instructional improvement team of educators working to address identified *reading performance and overall literacy development* learning improvement need areas associated with the school's large percentage of economically disadvantaged and academically at-risk students. Summary descriptions of the iterative, design-based school improvement efforts engaged in by the school's principal and her instructional improvement team are presented. Pseudonyms are used in place of the actual names of the school and school leaders. The case study narrative highlights how the school principal and her instructional improvement team applied design-based school improvement *data-analytic thinking* in conjunction with specific *intervention program development and implementation activities* to identify and address the "root-causal", context-specific problem(s) of professional practice for educators underlying and fueling the chronic, "surface-level" student-learning issues besetting this elementary campus.

Case Study: Instructional Team Capacity-Building at Hernandez Elementary School

Initial Framing of Hernandez Elementary School's Student-Learning Problem

Carla is in her second year as principal of E. L. Hernandez Elementary School, a kindergarten through sixth-grade campus primarily serving low-income, blue-collar working families. Prior to becoming principal of Hernandez Elementary, Carla had served for five years as an elementary campus principal in another school district. Because of her solid reputation as an accomplished "school turnaround" change agent leader at her former campus, Carla was hired by her present school district to enact positive change and instructional improvement at Hernandez Elementary. Hernandez Elementary is one of seven elementary campuses that are part of a large school district located in an urban city in the Permian Basin region of west Texas in the United States. Notably, Hernandez Elementary School is one of two elementary schools and one middle school in the district that have received an overall campus evaluation rating of F (on an A through F rating scale) on the Texas State School Accountability System for their overall student-learning performance scores during the past academic year. Because of these schools' recent repeated low campus evaluation ratings on the state's school accountability system over two or more consecutive years, these three schools have been identified as *Improvement Required* (IR) campuses by the Texas Education Agency. These same three campuses have also been identified for Comprehensive, Targeted, and Additional Targeted Support under the US federal government's Every Student Succeeds Act (ESSA) and, as a result, are required to go through a process known as the Effective Schools Framework (ESF) aimed at continuous school improvement. This Effective Schools Framework provides Texas Education Agency evaluators with a

"school improvement assessment" protocol for monitoring and evaluating an individual school's progress in demonstrating substantive teaching and learning improvement across three domains: Student Achievement, School Progress, and Closing the Gaps.

As an integral part of her instructional leadership activities, Carla has been continuously reviewing student learning performance assessment data for Hernandez Elementary. A large percentage of students attending Hernandez Elementary are from economically disadvantaged families and are considered "academically at-risk", and 68 percent of Hernandez Elementary students are on the free and/or reduced-cost lunch program. Through her review of the school's multi-year assessment data, Carla found that over the past three years large percentages of third- and fourth-grade students, particularly large percentages of the campus's Hispanic and African American student populations, were performing substantively below grade level in the areas of reading and overall literacy development. After reviewing the most recent available 2019-2020 State of Texas Assessments of Academic Readiness (STAAR) learning performance data for third and fourth grades at this campus and the Fall 2020 Istation reading assessment results for current third- and fourth-grade students, Carla determined that reading and overall literacy development were the critical areas of need she and her educator colleagues at Hernandez Elementary would need to focus on to turn around her students' academic learning performance. Carla even further examined her school's data to identify specific areas of need *within* students' reading and overall literacy development performance. After careful review of all available data, Carla determined that text fluency was the biggest area of need for her campus's fourth-grade students because 88 out of 189 students were currently tier III text fluency (very low text fluency) on Istation (Mathes et al., 2016; Istation Reading Assessments: https://www.istation.com/Reading). Campus data for Hernandez Elementary also highlighted the fact that economically disadvantaged students at this school—a large percentage of whom are African American and Hispanic students who historically have been found to be *long-term, academically at-risk students* in the district—are underperforming on standardized learning assessments compared to the rest of the student body. Thus, economically disadvantaged students at Hernandez Elementary would be in particular need of third- and fourth-grade teachers' focused instructional intervention support.

In addition to the ongoing instructional leadership challenges Carla and her educator colleagues are presently facing in having to find new, creative ways to "turn around" their IR-designated campus's student learning performance in the areas of reading and overall literacy development, there has been some recent administrative upheaval in the district. The superintendent resigned in the middle of the 2020-2021 school year and a new superintendent came in who immediately began the process of reorganizing district central office program supervisor positions, a process which ended up extending over several months. As a result of the turmoil ensuing from this supervisor position reorganization, no one at the school district's central office during the spring of 2021 was in charge of teacher professional development for the district. Campus principals, in reaction to this turmoil, began to feel increasingly overwhelmed and rudderless without any district leadership in providing targeted professional development programs to teachers in the district on how to develop teachers' instructional teaming capacities. The new superintendent reviewed district-wide student learning performance data and was aware of the elementary grade-level student reading improvement challenges confronting the district. However, the new superintendent's move to reorganize central office program supervisor positions has left campus principals feeling abandoned and without district-level support in assisting campus leaders in designing and delivering targeted professional development programs to teachers in critical professional learning need areas. Moreover, Carla's conversations with the assistant superintendent for elementary instruction, following the new superintendent's reorganization moves, left her feeling abandoned as a campus instructional leader. Although district administrators working under the new superintendent's leadership were insistent that campus principals work tirelessly to turn around their students' reading and literacy skills development performance on accountability tests, the district was not really offering campus principals any substantive instructional improvement support. Simply put, there was no meaningful support being provided to campus principals by the district in the form of additional resources to either hire grade-level instructional coaches or to design and deliver needed professional development programs for teachers.

Along with the central office leadership turmoil instigated by the new superintendent's overhaul of district-level program supervisor positions affecting campus principals, principal Carla found herself having to struggle with several veteran educators on her own Hernandez Elementary campus who have been working at this school for twenty-plus years. Several of these veteran teachers are very vocal in sharing their negative perspectives regarding the perceived learning capabilities of the multiple economically disadvantaged and academically at-risk students in their classrooms and are quick to emphasize that their teaching cannot be faulted for these students' poor learning performance. These veteran teachers routinely share their long-held views with other teachers and administrative staff in both campus- and grade-level faculty instructional team meetings that these economically disadvantaged and academically at-risk students, because of their home backgrounds, are simply incapable of keeping pace with other students in their learning development. These veteran teachers hold these views to a large extent because of these students' family backgrounds and home environments. As these veteran teachers point out defensively, the parents of these economically disadvantaged and academically at-risk students: 1) provide their children with very

little, if any, ongoing home-learning support, which causes these students to have poorly developed phonic awareness and foundational literacy skills; and 2) in many cases are very skeptical of the importance of the long-term benefits of a formal education, due to the fact that many of these parents have completed very little formal education themselves and, as a result, don't fully understand how education can transform their children's lives. These teachers are also adamantly against the idea of data-informed instructional teaming. These veteran teachers are very set in their own pedagogical mindsets and "time-proven" instructional ways of teaching in their classrooms. Furthermore, these veteran teachers believe they should have full autonomy in their own classrooms and are adamantly against the idea of "teaming" in any form with other grade-level teachers.

After spending time reflecting on the multiple data-supported challenges facing her teachers as well as the additional challenges brought on by the district's recent central office supervisory reorganization efforts, Carla was able to formulate the following **initial (high-inference) Student-Learning Problem rationale statements** to guide her school learning improvement intervention thinking at Hernandez Elementary: *Hernandez Elementary School's large population of economically disadvantaged and academically at-risk students are not demonstrating progress in reading and overall literacy development because of a lack of home educational learning support, which causes students to have poorly developed phonic awareness and foundational literacy skills. As a result, Hernandez Elementary School's students are continuing to demonstrate low reading and low overall literacy development progress on standardized learning performance assessments and are in urgent need of additional learning support.* Following from this initial (high-inference) Student-Learning Problem rationale, Carla then generated the following **intuitive If/Then statement**: *If Hernandez Elementary School teachers provide students with targeted classroom instructional interventions in the areas of reading and overall literacy development, then our students will benefit from this additional focused instructional support and students' learning performance on reading and overall literacy assessments will improve*. Carla felt that she needed to move forward aggressively in developing an "intervention plan" to address her campus's identified student-learning performance problem in reading and overall literacy development. Since professional development design support would not be available from the district's central office for some time, Carla contacted a learning improvement consultant at the Texas Education Agency's regional Education Service Center for guidance in identifying relevant professional development (PD) support programs for educators in the areas of student reading and overall literacy development that Carla might be able to provide to her teachers.

Refined Reframing of Hernandez Elementary School's Student-Learning Problem as a Context-Specific Problem of Professional Practice

Following the delivery of the student reading and literacy professional development (PD) modules recommended by the Education Service Center consultant to Hernandez teachers at one of the school's regularly scheduled faculty development sessions, Carla noted in the months ahead that third- and fourth-grade students' overall learning performance on reading and literacy development formative assessments (as measured by six-week benchmark assessments, teacher-made tests, etc.) did not begin to register any observable incremental improvements. Disappointed in these results, Carla decided to create an *instructional improvement team* at Hernandez Elementary, comprised of multiple third- and fourth-grade teachers along with the school's instructional coach (hereafter referred to as the "team"), to work with her to explore in more depth what could be some potential *underlying root causes* of their school's persistent student reading and overall literacy development test score challenges.

Data Analysis and Literature Review Activities. Determined to utilize their school's own data to focus their instructional improvement efforts more clearly, Carla and her team employed **Exploratory Needs Assessment (ENA) investigation techniques** espoused by Rick Mintrop (Mintrop, 2016) as an intentional means to engage in a deeper examination of some of the potential root causes of the campus's student-learning problems. Through carefully analyzing multiple relevant data Carla and her team felt they might be able to zoom in on and identify at a deep-structural level a potential ***context-specific, overarching Problem of Professional Practice*** affecting educators at the school—that is, one or more interrelated problems associated with teachers' own instructional practices that might be operating collectively as *underlying root causes* fueling Hernandez Elementary teachers' student-learning improvement challenges. Specifically, Carla and her instructional improvement team carefully analyzed third- and fourth-grade benchmark data and six-weeks student learning assessment data over the past three years at Hernandez Elementary School in the areas of student reading and overall literacy development. In addition, Carla and her team spent time carefully reviewing the overall instructional planning practices of individual third- and fourth-grade teacher teams working within the Professional Learning Community (PLC) structures in place on the campus. Finally, Carla and her team engaged in both individual and focus-group interviews with the school's third- and fourth-grade teachers to obtain these educators' own perspectives on the challenges they are confronting daily in attempting to meet the reading and overall literacy development learning needs of students in their classrooms.

Carla and her team utilized their ENA data analysis efforts as a springboard to begin brainstorming some potential "key factors" that they believed might be operating as possible *underlying root causes* of their elementary school's third- and fourth-grade student learning performance problem. After some team discussion of their collective ENA data analysis results, Carla and her team were able to identify four **"key factors"** that they believed were

impacting their Problem of Professional Practice situation. These four key factors were: 1) Teachers are not being provided with *very specific* professional development (with intensive application follow-up) on how to leverage elementary-level reading and literacy development "best practices" to inform their classroom instructional planning; 2) The district simply does not have the resource capacity to provide the kinds of targeted professional development support to elementary teachers in the areas of reading and literacy development for economically disadvantaged and academically at-risk students that individual elementary campuses need; 3) Teachers do not have the skill sets to know how to recognize and address their sometimes entrenched negative views regarding their diverse students' learning performance challenges, nor do they understand how to properly integrate "socially and culturally responsive teaching practices" in authentic ways into their "instructional planning and student learning development *thinking*" to effectively meet the learning support needs of diverse learners; and 4) Teachers have not internalized and do not fully understand the purposes and value of authentic "data-driven, collaborative instructional planning" within their grade-level Professional Learning Community (PLC) structures as a *critical instructional teaming tool* for designing, developing, and implementing targeted learning interventions to support the specific learning needs of their elementary students (in short, teachers at Hernandez Elementary remain entrenched in their "deficit instructional planning mindsets"). Through identifying these four "key factors", Carla and her team were able to substantively narrow their investigative efforts into pinpointing in a data-informed way a possible overarching ***context-specific Problem of Professional Practice*** underlying their surface-level student-learning problem—a problem of professional practice that could elucidate the specific root-causal instructional improvement challenges confronting Hernandez Elementary teachers.

Carla and her instructional improvement team then proceeded to review pertinent literatures that they felt might support and help inform their root-causal analytic thinking. Specifically, Carla and her team began to research educational theories and instructional capacity-building best-practice strategies for reading and literacy development instruction in elementary grades. Carla and her team members discovered that research indicates that elementary teachers in general lack the in-depth understanding needed to embrace at high-competency levels the specific type of intensive, team-centered *data-driven analyses* and related *data-informed instructional planning activities* that are needed to be able to design, develop, and implement targeted classroom-level interventions that can effectively address students' reading and literacy development learning improvement needs (Bambrick-Santoyo, 2019; Mandinach, 2012; Stringer, 2013). As the instructional capacity-building research indicates, teachers typically can only acquire this kind of in-depth understanding through focused professional development (PD) and applied follow-up both at the individual and collaborative teaming levels. In addition, Carla and her team carefully examined the differentiated instructional planning and socially and culturally responsive teaching literatures. Carla and her team found that these literatures indicate there is a general lack of insight and practical skills among instructional leaders (principals, assistant principals, instructional coaches, etc.) in elementary and secondary school settings on how to: 1) develop teachers' "differentiated planning" and "socially and culturally responsive teaching–centered" *deeper learning* instructional mindsets (Khalifa, 2021; Martinez & McGrath, 2014; Samuels, 2014; Theoharis, 2009); and 2) energize and properly support teachers' overall authentic *socially and culturally responsive teaching–integrated instructional planning efforts* within grade-level teams as strategic means to enhance the overall "professional learning culture" of a campus serving diverse learners.

Problem Reframing. Upon completing their review of these literatures, Carla and her team were able to generate the following **refined (low inference) context-specific Problem of Professional Practice rationale**: *Instructional leaders and teachers on our elementary campus lack sufficient team-centered data literacy and analytical skills as well as an authentic "socially and culturally responsive teaching knowledge and skills–centered 'deeper learning' mindset" to be able to work collaboratively in grade-level instructional teams to leverage data in meaningful ways to inform the design, development, and delivery of targeted "socially and culturally responsive teaching–integrated" lesson interventions to effectively support academically at-risk students' literacy development and reading achievement.* Following from this refined (low inference) Problem of Professional Practice rationale, Carla and her instructional improvement team colleagues then generated the following **refined Theory of Action (If/Then) statement**: *If instructional leaders at Hernandez Elementary School can design and pilot implement a "targeted professional development program" to help third- and fourth-grade teachers 1) embrace and internalize an authentic "socially and culturally responsive teaching–centered 'deeper learning' mindset" and 2) learn how to systematically analyze teaching and learning data and utilize socially and culturally responsive teaching–informed instructional planning techniques to develop and deliver focused lesson interventions to their academically at-risk students, then these elementary students will gain new skills and confidence in their learning abilities and students' reading and overall literacy development will increase as measured by performance accountability test scores.*

Leveraging the above problem reframing logic, Hernandez Elementary instructional improvement team members were then able to generate a **Hernandez Elementary School Change Drivers Diagram** (see Figure 1) depicting the team's identified underlying, root-causal *context-specific Problem of Professional Practice* and the data-supported *change drivers* that would need to be implemented to realize the desired Professional Learning Improvement Goal on their campus.

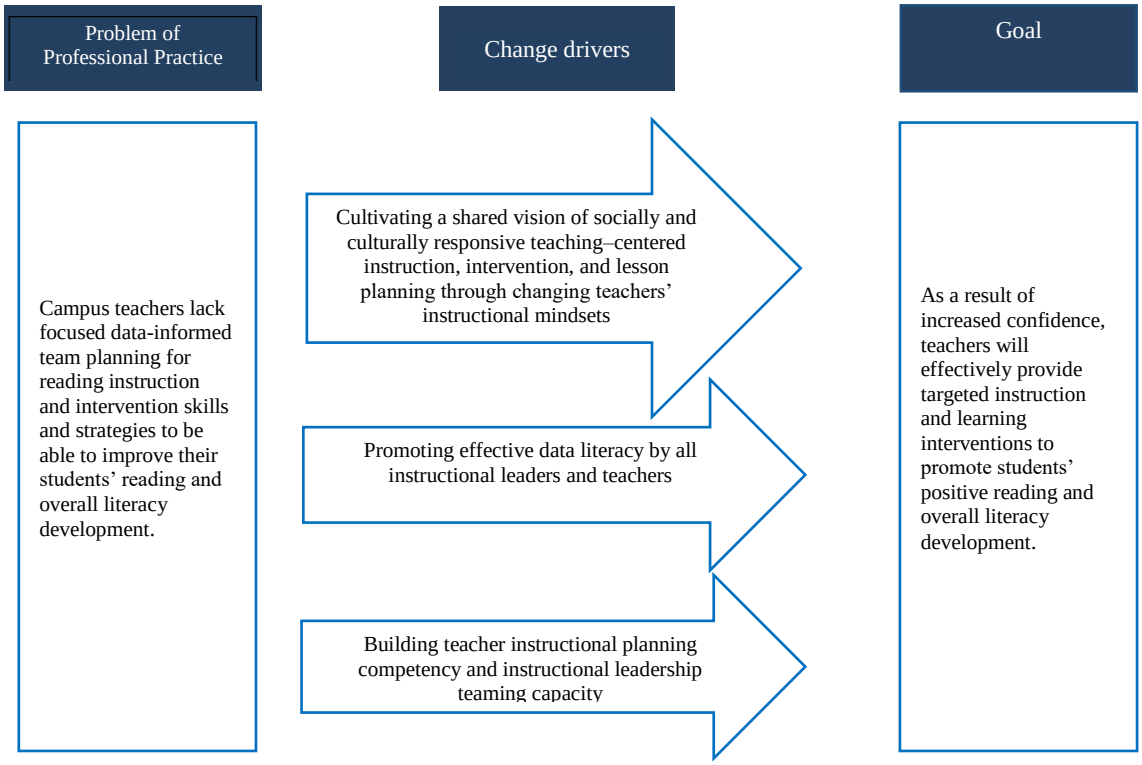

Figure 1 Hernandez Elementary School Change Drivers Diagram

Intervention Design Development

Armed with the above design-based school improvement analytic logic, Carla and her instructional improvement team were then able to proceed to identify within their Hernandez Elementary School Change Drivers Diagram (Figure 1) three specific ***change drivers*** to guide their teaching and learning intervention efforts. Importantly, these change drivers were formulated to address directly the *underlying root causes* of their school's identified "context-specific Problem of Professional Practice"—change drivers that would enable Carla and her team to focus on developing and implementing professional learning activities for teachers that would advance the school's goal of transforming teaching and learning experiences for third- and fourth-grade students at Hernandez Elementary. The **first change driver** focuses on creating a shared vision of socially and culturally responsive teaching–centered instruction, intervention, and lesson planning to help teachers gain an authentic understanding of the importance of adopting an appropriate socially and culturally responsive "instructional mindset" to inform and enhance their teaching practices (Khalifa, 2021; Samuels, 2014; Theoharis, 2009). Teachers will be able to participate in shared instructional vision capacity-building activities during their weekly curriculum, planning, and learning (CPL) time within their professional learning communities (PLCs). Participation in these capacity-building activities will help teachers create a shared vision and understanding of effective instruction, intervention, and data literacy. This vision will be centered around student achievement, differentiation to meet individual students' learning support needs, and research-based best practices. Once teachers are given the opportunity to see and fully understand what the literature supports in terms of effective instructional practices, teachers will be more likely to reproduce these practices in their classrooms. Research supports the importance of teachers developing a shared instructional vision and a clear direction on how to reach instructional goals (Fullan, 2016; Martinez & McGrath, 2014; Stringer, 2013).

The **second change driver** emphasizes the importance of cultivating data literacy and analysis by all instructional leaders and teachers. Data literacy and analysis is the ability to collect, analyze, communicate, and use multiple measures of data to improve all aspects of the learning organization continuously, especially teaching and learning (Love, 2009). Campus instructional leaders committed to nurturing a *vibrant data literacy culture* on their campuses carefully explain and model on a continuing basis for their teachers what campus and grade-level data to use, how to read these data, and how to determine appropriate student-learning interventions based on data analysis results to assist teachers in fully understanding and integrating these critical data literacy practices into their instructional planning activities.

The **third change driver** is building teacher instructional planning competency and instructional leadership teaming capacity (Murphy, 2016; Stringer, 2013). Providing sufficient professional learning time and supportive professional learning environments within which teachers can expand and deepen their instructional planning competency levels and build their overall instructional leadership teaming capacities are proactive school

improvement actions campus leaders can take to incentivize and enable teachers' authentic professional growth in these critical "collaborative instructional practice" areas. Carla and her team believe they can build teacher competency and teaming capacity through expanding teachers' participation in curriculum, planning, and learning (CPL) time each week to fifty minutes per week. This professional planning and learning time increase will be in addition to teachers' daily conference period. Teachers will utilize this additional time to further develop their understanding of direct instruction, goal setting, mastery learning, worked examples, meaningful feedback, small group instruction/intervention, and data analysis.

Employing their Change Drivers Diagram as a "practical roadmap" to guide their professional learning improvement efforts, Carla and her instructional improvement team were then able to develop a focused **Instructional Improvement Intervention Program "Implementation Plan"** consisting of carefully planned, iterative sets of content and activity interactive modules to guide educators' enhanced professional learning at Hernandez Elementary School (see Table 1).

WEEK	FORMAT	CONTENT / ACTIVITY
1	Meeting of third- and fourth-grade teachers during curriculum, planning & learning (CPL) time within their grade-level professional learning communities (PLCs) (CPL presented in a manner that reflects the lesson cycle)	· Introduction - Create campus definition and understanding of the following concepts: o What is a shared vision? o What is differentiation? o What is data literacy? o What is a lesson cycle? o What is effective lesson planning? · Journal reflection entry
2	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Group will participate in a pre-professional development survey. · Group will participate in root cause analysis activities ("Root Cause Analysis," 2015): o 10, 5, 5 o 2 Circles o 5 Whys · Develop a plan of action (Shared vision) · Journal reflection entry
3	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Analyze strategies for instruction: o Hattie Meta-Analysis (2009) o Differentiation · Lesson plan rubric introduction · Journal reflection entry
4	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Professional development to target: o Data literacy · Journal reflection entry
5	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Collect data and create "student success folders"; Students will guide their independent intervention based on their specific areas of growth. · Develop a plan and timeline for student success folders · Journal reflection entry
6	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Professional development to target: o Data literacy o Data interpretation · Journal reflection entry · Lesson plan rubric analysis
6	Classroom observations by administrators and curriculum coach	· Individual meetings with teachers to discuss observation and plan for growth. · Journal reflection entry
7	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	Professional development to target: · Differentiation · Task teachers to record one of their lessons. Provide "look fors" related to: o Perception of student engagement o Differentiation o Focus on socially and culturally responsive teaching strategies to enhance students' high-engagement "deeper learning" o Ease of teacher presenting intervention · Journal reflection entry

WEEK	FORMAT	CONTENT / ACTIVITY
8	Self-observation (video-recording of teacher delivering lesson)	· Self-analysis of recorded lessons by identifying "look fors" within teachers' lessons. · Journal reflection entry
8	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Professional development to target: o Debrief of recorded lessons o Create a plan for specific teacher needs o Journal reflection entry
9	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	Analyze data, evaluate, and refine the plan · Journal reflection entry · Lesson plan rubric analysis
10	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Professional development to target: · Progress update for specific teacher needs · Journal reflection entry
11	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	Analyze data, evaluate, and refine the plan · Journal reflection entry
11	Peer observations	· Teachers' peer-to-peer observations of other teachers incorporating targeted intervention · Journal reflection entry
12	Meeting of third- and fourth-grade teachers during CPL time within grade-level PLCs	· Debrief of peer observations. · Data analysis and evaluation.
12	Classroom observations by administrators and instructional coach	· Individual meetings with teachers and educational leaders to discuss observation and plan for continued growth · Journal reflection entry · Post-professional development survey · Lesson plan rubric analysis

Table 1 Hernandez Elementary School Instructional Improvement Intervention Program "Implementation Plan"

During the initial week of professional development (PD) intervention program implementation, information was provided to teachers regarding key components of effective instructional planning, including instructional differentiation, data literacy, lesson cycles, and effective lesson planning. In addition, important insights relating to the purposes and payoffs of working together as a team to develop a shared vision of a positive campus-based instructional culture were shared with teachers (see Table 1).

Through the successive weeks of the intervention program's PD sessions, teachers engaged in multiple immersive learning opportunities to develop their data literacy, data analysis, and lesson planning differentiation skills. These learning activities included teachers engaging in recording and self-analysis of their classroom instruction, lesson plan rubric analysis, reflective journaling, as well as teachers' peer-to-peer observations of each other implementing the newly acquired instructional strategies into their classroom teaching followed by team debriefing and discussion.

The campus principal and her instructional improvement team observed the effects of the PD sessions on teachers as they progressed through the twelve-week intervention program. One of the most noteworthy effects of teachers' involvement in the immersive learning sessions was the change that began to become evident in teachers' *pedagogical thinking*. Incremental changes in teachers' pedagogical thinking became readily apparent during the multi-week intervention program as teachers engaged in the individual recording and self-analysis of their own teaching as well as in the peer-to-peer observations and debriefing activities with their teacher colleagues. Of special note was the impact of the collective peer observation and debriefing sessions on the deficit thinking of some of the veteran teachers regarding their perceptions of students' learning abilities. Prior to their involvement in the PD intervention program, several veteran teachers at this elementary school held negative views regarding the learning potential of the school's large percentages of economically disadvantaged and academically at-risk students. These veteran teachers' attitudes reflected their pedagogical belief that these students' poorly developed phonic awareness and foundational literacy skills were essentially the result of little to no home-learning support, due in large part to parents with little formal education and who do not understand the benefits of a solid education. As one veteran teacher described the instructional thinking transformation she experienced during the PD sessions:

> The peer observation and debriefing sessions with my fourth-grade teacher colleagues were eye-opening for me. I have been teaching at the elementary level for fifteen years and, to be honest, I have long felt that my cumulative experiences as a classroom teacher provide me with all the insights I need to understand how to work with students and their varied learning levels in my classroom—including being able to recognize which students are capable of staying on

> track with their literacy skills development and which students, because of their home backgrounds, simply are not. The team-centered data analysis skills and associated data-informed instructional planning strategies I'm learning through these PD sessions have opened my eyes to the realization that a "one size fits all" method of teaching doesn't really work in elementary classrooms, especially when the teaching and learning vision and the instructional challenge for teachers on our campus is to meet the diverse learning development needs of all our students. Examining my own teaching through the combined reflective lenses of self-analysis and peer feedback have caused me to reframe how I think about planning my lessons. I am now much more aware of how reconfiguring my lesson planning activities to focus on working with other grade-level teachers to analyze students' assessment data in order to differentiate instruction to address the individual learning needs of diverse learners can make a real difference in impacting the learning performance of my at-risk students.

Design-Based School Improvement Results and Findings

Observational and interview process data collected by Carla and her instructional improvement team during the implementation of the twelve-week PD intervention program produced some positive evidence that the intervention design was effective in helping campus leaders address their school's identified root-causal Problem of Professional Practice (i.e., *Instructional leaders and teachers on our elementary campus lack sufficient team-centered data literacy and analytical skills as well as an authentic "socially and culturally responsive teaching knowledge and skills–centered 'deeper learning' mindset" to be able to work collaboratively in grade-level instructional teams to leverage data in meaningful ways to inform the design, development, and delivery of targeted "socially and culturally responsive teaching–integrated" lesson interventions to effectively support academically at-risk students' literacy development and reading achievement.*). Analysis of these PD implementation process data generated some discernible **Design-Based School Improvement Results and Findings** for this elementary school case study. Specifically, the following professional learning benefits for teachers (i.e., **design research *results***) were identified within the Hernandez Elementary case study. First, the self-analysis of recorded lessons in conjunction with the peer-to-peer observation and debriefing sessions teachers engaged in during the multi-week PD intervention program served as important *immersive learning opportunities* through which teachers were able to experience some important "aha moments" about their own classroom teaching practices. Through analyzing their own teaching practices through the combined critical reflective lenses of self- and peer-analysis, teachers' confidence in the validity of their own, sometimes long-held, pedagogical thinking was called into question and teachers were motivated to critically examine in new ways their own deeply engrained pedagogical beliefs about the purposes and goals of classroom teaching and learning. Second, teachers' data literacy conversations during the PD sessions served to expand teachers' recognition of the *value of analyzing students' learning performance data* as an intentional means to directly inform their own collective grade-level instructional planning. Third, teachers' involvement in the peer-to-peer observations and debriefing sessions enabled teachers to observe first-hand how *integrating differentiated teaching and learning strategies into their classroom instructional practices* could increase students' positive learning engagement during lesson activities through creating more diversified learning avenues for students.

These case study results led to some noteworthy professional learning outcomes (i.e., **design research *findings***) associated with the overall designed-based school improvement activities conducted at this school. One intriguing finding that emerged from teachers' collective participation in the multi-week professional development sessions—during which teachers were involved in analyzing student learning performance data and utilizing the results of these data analyses to inform a more differentiated approach to their grade-level lesson planning—was a noticeable change in teachers' attitudes toward grade-level team instructional planning as a *positive opportunity for collaborative professional learning.* Teachers' immersive learning experiences in analyzing student data as an intentional means to expand and deepen their differentiated lesson planning efforts altered teachers' perceptions regarding the benefits of grade-level data teaming. Through involvement in these data analysis–informed lesson planning activities teachers' enthusiasm for grade-level data teaming grew as their own professional knowledge and skill levels expanded on how to effectively integrate differentiated learning strategies into their lesson plan designs. This, in turn, led to a change in teachers' pedagogical approach to instructional planning—namely, becoming less attached to a perceived need for instructional planning "autonomy" and becoming open to embracing a more positive view of data teaming as a *collaborative platform for professional learning and instructional planning support.* A second major finding emerging from the collective design-based school improvement activities completed at this school was the realization among personnel involved in this school improvement endeavor (i.e., the school's principal, her instructional improvement team colleagues, and the third- and fourth-grade teachers participating in the PD intervention program) that active participation in the overall *design research process*—namely, engaging in intensive data-analytic thinking in conjunction with specific PD intervention program development and implementation activities in order to identify and address the "root-causal", context-specific problem(s) of professional practice for educators underlying and fueling the chronic, "surface-level" student-learning issues affecting this elementary campus—afforded a unique opportunity for *instructional leadership renewal* for all educators involved in the process.

This renewal manifested itself in the ways in which school personnel became motivated through engaging in focused design research analytic thinking and intervention program planning to *recalibrate their instructional leadership mindsets* through a more informed appreciation of the importance of assessing and refining educators' own professional practices as a critical step in supporting students' classroom learning success. In summary, the **Design-Based School Improvement Logic Model and Operational Steps Process** (Mintrop, 2016) employed by the instructional improvement team at Hernandez Elementary provided these educators with the analytic tools and procedures they needed to: 1) properly focus their school improvement investigative efforts on teachers' own instructional practices; and 2) design and implement a targeted, literature-supported PD intervention program that could provide teachers with specific instructional planning knowledge, skills, and strategies to be able to effectively address their students' learning development needs.

Discussion

In this section key aspects of the Hernandez Elementary School case study are discussed in relation to instructional leadership insights and best practices found in the extant school improvement literature. The discussion below is divided into two subsections, each focused on a critical area of instructional leadership practice, namely: 1) cultivating a campus vision of authentic "differentiated instructional planning" to support the learning needs of all students; and 2) promoting teachers' data literacy skills development as an intentional means to nurture a schoolwide "professional learning culture" focused on data-informed instructional teaming. A set of *design principles* generated from the collective results and findings of the Hernandez Elementary School case study is also presented. These design principles may prove useful to educators in multiple campus settings interested in investigating the benefits of using educational design research methods to invigorate their own instructional improvement efforts.

Cultivating a campus vision of authentic "differentiated instructional planning" to support the learning needs of all students

As a result of their collective problem reframing activities Carla and her instructional improvement team came to realize that Carla's initial strategy for addressing their school's at-risk students' low reading and literacy development challenges through providing teachers with pre-packaged professional development (PD) modules on "reading improvement and overall literacy development" obtained through the regional Education Service Center was destined to fail. As Carla and her team discovered, this strategy failed because these PD modules did not address in any meaningful way the *underlying root causes* of their school's student-learning problems. Indeed, Carla and her instructional improvement team, through their data-informed problem reframing efforts, came to a new, more insightful change leadership understanding that simply providing their third- and fourth-grade teachers with pre-packaged PD on reading improvement and literacy development would not somehow—*in and of itself*—lead to demonstrable iterative improvements in their economically disadvantaged and academically at-risk students' learning performance.

In particular, Carla and her team's careful analyses of relevant problem reframing data—especially interview data emerging from both individual and focus-group interviews with a number of the school's third- and fourth-grade teachers along with principal and instructional improvement team observations of teachers' third- and fourth-grade weekly instructional team meetings—provided a new analytic window on a hitherto unsuspected underlying "root cause" of students' learning deficiencies. These collective problem reframing analyses, indeed, yielded important new insights on an intriguing, data-supported *problem of professional practice* affecting the school's teachers. Specifically, Carla and her team found that many of the school's third- and fourth-grade teachers possessed very little knowledge of the foundational pedagogical tenets undergirding the concept of "differentiated instructional planning", as well as limited understanding of the multiple positive learning dividends that can accrue to students when teachers proactively engage in differentiated instructional planning and employ differentiated teaching strategies in their classrooms. Carla and her team's review of the instructional planning literature found strong research evidence confirming the importance to school turnaround and improvement efforts in schools serving diverse student populations of teachers obtaining access to current knowledge and applied skills on how to *internalize and integrate differentiated instructional strategies* into their lesson planning and classroom teaching practices.

To directly address these professional learning deficits in their teachers' instructional thinking, Carla and her team made a point during the 12-week implementation of the team's "PD Intervention Program" (Table 1) to introduce their school's third- and fourth-grade teachers to some very practical, literature-supported differentiated instructional planning and student-responsive teaching strategies that can positively enhance their professional practice. These action strategies are being utilized by teachers in innovative elementary and secondary schools throughout the United States to broaden student access to differentiated, student-responsive learning opportunities that can expand and deepen students' learning. One excellent, creative way educators can work to expand and deepen students' overall learning development is through helping to build students' *social learning capital*. Social learning capital, defined simply, is the kind of "social networks" students have access to through which students can obtain information, advice, modeling, mentoring, and assistance to support both their short- and long-term learning and

social development. As Monica Martinez and Dennis McGrath explain: "Often young people who grow up in relatively more affluent families naturally develop or are born into networks that offer various types of information, advice, and assistance. But these networks—the source of something sociologists term 'social capital'—are generally unavailable to low-income students, that is, if the networks are not intentionally arranged and constructed by those who possess greater social capital themselves." (Martinez & McGrath, 2014, p. 184). Thus, developing low-income and academically at-risk students' "social learning capital" through providing these students with meaningful learning opportunities—through helping students gain access to *socially relevant learning networks*—is something that educators working in elementary and secondary school contexts serving diverse student populations can certainly do to enhance their students' prospects for deeper learning.

Applying the concept of "social learning capital" to their own elementary school context, Carla and her team brainstormed and shared some *social learning capital network-building strategies* with their third- and fourth-grade teachers to help these teachers operationalize this "social learning capital" idea in their own classroom teaching. Carla and her team encouraged their teachers to strive to integrate the concept of "social learning capital network-building" in practical ways into their own classroom teaching through implementing strategies such as: 1) identifying socially and culturally relevant adult professionals, particularly African American and Hispanic professionals, in the community (e.g., successful entrepreneurs, local TV personalities, athletes and professors from the regional university) and inviting these adults to visit their classrooms and volunteer to serve as *reading and literacy development mentors* to students; 2) partnering with the district's high school campus to identify high school–age students who could earn "service learning credits" through serving as *reading buddies* to economically disadvantaged and academically at-risk third- and fourth-grade students as well as co-design and co-present with their elementary student buddies an "End-of-Year Reading Showcase" Program to parents and community members; and 3) planning and hosting "international culture" events during the school year during which teachers and students working with parent volunteers plan and stage various "special programs and activities" highlighting particular social cultures of special relevance to students and their families (e.g., Black History month; Cinco de Mayo). Importantly, network-building strategies such as these can go a long way toward motivating academically at-risk students to take ownership in their own ongoing learning development through the positive mentoring relationships these students cultivate with socially and culturally relevant adult role models in their school communities. Practical, social learning network-building strategies such as these that Carla and her team encouraged teachers to implement in their elementary school context are supported by research findings in the student-responsive school leadership literature. For example, Muhammad Khalifa (2021) affirms that "culturally responsive school leaders promote school environments that embrace cultural aspects associated with minoritized student identity." (Khalifa, 2021, p. 121). In addition, Monica Martinez and Dennis McGrath (2014) emphasize that "…innovative [school-community] partnerships are particularly vital for schools that serve high proportions of children from families in poverty, in that they provide "social capital"—edifying experiences and professional contacts that affluent children often take for granted. For kids whose parents lack the time and money to haul them around to endless after-school activities and high-priced enrichment programs, a school's ties with a museum, organization, or other entity can fast-track a child's discovery of his or her natural talents. Opportunities to work with and learn from museum scholars, inventors, and corporate leaders can be life changing. The deep involvement that members of partner organizations develop with the principals, teachers, and students creates a shared sense of responsibility for the students' success, which in turn leads to a willingness to invest more time, money, and energy." (Martinez & McGrath, 2014, p. 114) In summary, school leaders' efforts in building active partnerships with multiple kinds of community organizations (businesses; arts-centered groups such as music, theatre, and cultural clubs; regional colleges and universities; and the like) can create a variety of new and important socially and culturally relevant learning opportunities for students, particularly for minoritized students.

Promoting teachers' data literacy skills development as an intentional means to nurture a schoolwide "professional learning culture" focused on data-informed instructional teaming

Developing teachers' data literacy skills is a continuing challenge for school improvement leaders in many elementary and secondary schools. In many school contexts, teachers' reluctance to develop and further refine their data literacy and analysis skills is often grounded in: 1) teachers' adherence to entrenched, time-worn instructional practices they are comfortable with (i.e., teachers fear of change); and 2) teachers' overall lack of understanding of the positive instructional payoffs that can accrue to their students and themselves as professionals through engaging in focused data-teaming. However, learning how to engage in intensive data-teaming can effectively transform and revitalize teachers' instructional planning and student learning intervention development practices. Specifically, when teachers collaborate in intentional ways in grade-level teams to carefully analyze the teaching and learning performance data available to them (student benchmark data, iterative sets of six-weeks student learning assessments, students' incremental knowledge acquisition and skill development progress as measured on teacher-made tests, etc.) then teachers are better able to formulate a data-informed, comprehensive understanding of their students' learning improvement challenges and instructional support needs. Most importantly, when school principals, as the instructional improvement leaders on their campuses, make a commitment to working directly with grade-level teams of teachers to assist teachers in their overall data literacy

development through modeling critically important team-centered data analysis techniques—such as *root-causal data analysis* to explore and pinpoint the underlying root causes of students' persistent learning problems (Love, 2009)—then teachers will be better equipped with the data-teaming knowledge and skills they need to: 1) identify students' data-supported learning challenges; and 2) design, develop, and implement targeted instructional interventions to better address the specific learning improvement needs of their students.

Teachers often make the mistake of focusing almost exclusively on the most readily available student-learning performance indicators (such as iterative formative assessment benchmark data, student learning performance on teacher-made tests, etc.) to probe and assess students' learning problems. Relying solely on these learning performance indicators to assess students' learning problems can often result in a somewhat surface-level analysis of student learning data that may reveal only the "surface-level *symptoms*" of students' learning challenges. These surface-level symptoms, intriguingly, can mask some of the more complex and harder to identify "underlying factors" (such as teachers' own pedagogical mindsets, instructional beliefs, etc.) that can often fuel at a root-causal level the more apparent surface-level student-learning problems. These illusive underlying factors, or "underlying *root causes*" of student-learning problems, can be examined carefully by teams of teachers if they make the conscious effort to broaden and deepen their data collection and analysis strategies through using practical action research procedures to scrutinize additional kinds of relevant teaching and learning data. These additional data can certainly include multiple kinds of observational and perspectivist data that school instructional leaders (campus principals, assistant principals, instructional coaches, teacher team leaders, etc.) working with teacher teams can easily collect, such as: 1) conducting informal observations of teachers' weekly grade-level team or professional learning community (PLC) meetings; 2) reviewing grade-level teachers' routine student data analysis and data conversation practices; 3) examining the frequency and quality of teachers' efforts in engaging in a variety of peer-coaching strategies, including teachers providing feedback to their grade-level teacher colleagues on their lesson plan development and refinement efforts and observing and evaluating other teachers' classroom lesson delivery; and 4) interviewing grade-level teachers to elicit teachers' own perceptions regarding the persistent teaching and learning challenges they feel they are continually struggling with in their classrooms.

One of the best strategies school improvement leaders can utilize to jumpstart teachers' data literacy and data-teaming development is to devise creative opportunities for teachers to become *immersed directly and collaboratively* in investigative endeavors associated with their own classroom teaching. These kinds of immersive, collaborative learning endeavors can empower and motivate teachers to begin exploring—*in new ways and on their own terms*—their own pedagogical mindsets and longstanding beliefs about teaching and learning (which can sometimes be somewhat narrow-visioned and/or biased) that can infiltrate and become entrenched in teachers' instructional thinking. In my own school improvement consultancy work with multiple schools and school districts in the southwestern United States over the past three decades I have come to refer to this "teacher development" leadership insight as *the transformative power of immersive professional learning*. Designing creative professional learning environments within which groups of educators can directly immerse themselves in systematically examining their own current teaching and learning practices—and, in so doing, potentially discover new, more critically reflective ways of working and thinking together that can cause educators to reevaluate their own long-held instructional beliefs—is a powerful change agent tool that can transform a school community's *professional learning culture* in positive ways. Indeed, Carla and her instructional improvement team in the Hernandez Elementary School case study highlighted in this article engaged in this precise kind of "immersive professional learning". Carla and her instructional improvement team colleagues leveraged a set of logical design-based school improvement analytic techniques articulated by Rick Mintrop (Mintrop, 2016) to mine, probe, and carefully analyze multiple kinds of grade-level teaching and learning performance data to investigate the underlying root causes of their students' persistent learning problems in reading and overall literacy development. As a result of these data analysis efforts, Carla and her team were able to "reframe" their school's student-learning problem into a much more focused root-causal "Problem of Professional Practice" centering on teachers' own professional learning needs on their campus.

Specifically, Carla and her team engaged first in Exploratory Needs Assessment (ENA) data analyses to brainstorm some potential "key factors" that Carla and her team believed might be operating as possible *underlying root causes* of their elementary school's third- and fourth-grade student learning performance problem. The four "key factors" Carla and her team identified were: 1) Teachers are not being provided with *very specific* professional development (with intensive application follow-up) on how to leverage elementary-level reading and literacy development "best practices" to inform their classroom instructional planning; 2) The district simply does not have the resource capacity to provide the kinds of targeted professional development support to elementary teachers in the areas of reading and literacy development for economically disadvantaged and academically at-risk students that individual elementary campuses need; 3) Teachers do not have the skill sets to know how to recognize and address their sometimes entrenched negative views regarding their diverse students' learning performance challenges, nor do they understand how to properly integrate "socially and culturally responsive teaching practices" in authentic ways into their "instructional planning and student learning development *thinking*" to effectively meet the learning support needs of diverse learners; and 4) Teachers have not internalized and do not fully understand the purposes and value of

authentic "data-driven, collaborative instructional planning" within their grade-level Professional Learning Community (PLC) structures as a *critical instructional teaming tool* for designing, developing, and implementing targeted learning interventions to support the specific learning needs of their elementary students (i.e., in short, teachers at Hernandez Elementary remain entrenched in their "deficit instructional planning mindsets"). Secondly, as a result of the focused reviews of pertinent literature informing these four key factors that Carla and her team conducted, Carla and her team were then able to generate a much more **refined (low inference) context-specific Problem of Professional Practice rationale** (i.e., *Instructional leaders and teachers on our elementary campus lack sufficient team-centered data literacy and analytical skills as well as an authentic "socially and culturally responsive teaching knowledge and skills–centered 'deeper learning' mindset" to be able to work collaboratively in grade-level instructional teams to leverage data in meaningful ways to inform the design, development, and delivery of targeted "socially and culturally responsive teaching–integrated" lesson interventions to effectively support academically at-risk students' literacy development and reading achievement.*) and accompanying **refined Theory of Action (If/Then) statement** (*If instructional leaders at Hernandez Elementary School can design and pilot implement a "targeted professional development program" to help third- and fourth-grade teachers 1) embrace and internalize an authentic "socially and culturally responsive teaching–centered 'deeper learning' mindset" and 2) learn how to systematically analyze teaching and learning data and utilize socially and culturally responsive teaching–informed instructional planning techniques to develop and deliver focused lesson interventions to their academically at-risk students, then these elementary students will gain new skills and confidence in their learning abilities and students' reading and overall literacy development will increase as measured by performance accountability test scores.*) to clearly define their teachers' **Problem of Professional Practice**. Thirdly, through immersing themselves directly in their school's available multi-leveled assessment, observational, and perspectivist teaching, leading, and learning data and by engaging as an *instructional improvement data team* in the above "problem reframing logic", Carla and her Hernandez Elementary School instructional improvement team members were then finally able to generate a **Hernandez Elementary School Change Drivers Diagram** (Figure 1) depicting the team's identified underlying, root-causal *context-specific Problem of Professional Practice* and the data-supported *change drivers* that Carla and her team would need to implement in concrete ways on their campus to realize the school improvement team's desired Professional Learning Improvement Goal for their teachers.

The kind of focused "school improvement turnaround leadership process" Carla and her instructional improvement team engaged in on their campus—namely: 1) the intensive "professional learning *investigative teamwork*" that Carla and her team engaged in through their application of design-based school improvement principles and techniques to identify and address their teachers' underlying, root-causal Problem of Professional Practice; along with 2) the carefully designed "*immersive Professional Learning Program for teachers*" (i.e., **Instructional Improvement Intervention Program "Implementation Plan"** – Table 1**)** Carla and her team designed and delivered to their school's third- and fourth-grade teachers—proved effective in enabling Carla and her team to enact meaningful change and improvement in teachers' pedagogical thinking and team-centered instructional planning. Importantly, the result of these collective turnaround efforts was that Carla and her team colleagues were able to create a solid "instructional leadership foundation" upon which they could work collaboratively, moving forward, to build and nurture a *positive professional learning culture* for all educators at Hernandez Elementary School.

Design Principles Derived from the Hernandez Elementary School Case Study

The Hernandez Elementary School case study discussed in this article yielded several ***design principles*** associated with educators' application of educational design research methods and intervention program development techniques to address their specific instructional improvement challenges. These design principles—highlighting some of the distinctive dividends that can accrue to school communities through employing design research methods along with data-teaming processes to probe the underlying root causes of their student-learning problems—may be of interest to school leaders struggling with similar difficult, entrenched student-learning performance challenges who are searching for practical, data-informed approaches to energize their campus-based teaching and learning improvement efforts.

Make data teaming an integral part of teachers' weekly instructional planning regimen. School leaders can expand teachers' instructional planning toolkits through modeling the processes and payoffs of data teaming to their grade-level teacher teams. Incorporating data literacy development into professional learning programs for teachers can help teachers: 1) acquire important knowledge and skills on how to work together to mine, probe, and analyze multiple kinds of relevant teaching and learning data associated with students' overall learning performance; and 2) leverage the results of these team-centered data analyses to directly inform teachers' instructional planning and optimize teachers' efforts in designing and implementing differentiated lessons that can enhance students' classroom learning success.

Utilize peer-to-peer coaching as an intentional means to energize teachers' collaborative professional learning. School leaders can invigorate teachers' professional learning practices through introducing grade-level teacher teams to the benefits of peer-to-peer coaching. Through incorporating peer observations along with debriefing and feedback sessions into their reflective practices, teachers can: 1) gain new perspectives on their own teaching

strengths and weaknesses along with helpful suggestions from colleagues on additional teaching strategies they could consider experimenting with to enhance their own classroom teaching effectiveness; and 2) internalize a broader appreciation of the value of peer-to-peer coaching as a vital component of a healthy, school-wide professional learning culture.

Create an ongoing "instructional improvement team" at your school to focus directly on identifying and addressing student-learning problems. As a proactive approach to identifying and addressing student-learning challenges at the campus level, school principals can consider creating a campus-wide "instructional improvement team" (comprised of key instructional leaders across the campus) who would be charged with continually monitoring and analyzing relevant teaching and learning performance data to frame specific student-learning problems as they arise and to investigate the potential underlying root causes that may be fueling these student-learning performance issues. Instituting this kind of campus-based "instructional improvement team" can be an excellent means to: 1) familiarize instructional personnel (grade-level teachers, instructional coaches, learning interventionists, school counselors, etc.) on your campus with design research methods and data-teaming analysis processes that can potentially serve as effective approaches to tackling persistent student-learning and instructional improvement challenges; and 2) incentivize educators to assume active roles as *collaborative partners* in building/nurturing a positive, school-wide instructional leadership culture focused on continuous teaching and learning improvement and renewal.

Organize a district-wide professional learning community (PLC) for campus principals and other key instructional leaders in your school district to disseminate and discuss effective instructional improvement best practices. A district-wide professional learning community (PLC) can be an effective meeting space where campus principals and other key instructional leaders across the district can come together on a regular basis to discuss both their individual campus's and the overall district's student-learning improvement challenges and share with each other "creative strategies" on how to better lead and focus their campus-based teachers and other instructional personnel towards designing and implementing targeted, data-informed "high-engagement learning improvement interventions" for their students. Participation in this kind of district-wide professional learning community can: 1) directly expose campus leaders to the innovative *situational and instructional leadership thinking* of other campus leaders across the district; and 2) jumpstart the sharing and review of *creative instructional improvement strategy ideas* that individual school leaders can then potentially customize/adapt and integrate into their own context-specific school improvement teaming efforts.

Conclusion

The elementary school case study presented in this article served as an operational lens through which to highlight the advantages to school leaders of applying educational design research methods in conjunction with data-teaming processes as intentional means to address persistent student-learning improvement challenges affecting a campus community. The school turnaround efforts of the Hernandez Elementary School principal and her educator colleagues detailed in the article's case study description and accompanying literature-informed discussion demonstrate how educators, working together as an instructional improvement team, can utilize a *design research methodological approach*—namely: systematic data-teaming analysis processes in conjunction with focused intervention design development techniques—to reframe and reenergize their school turnaround and instructional improvement efforts. Specifically, applying design research methods in the Hernandez Elementary School case situation enabled educators to work together in innovative ways to: 1) mine, probe, and analyze multiple context-specific teaching and learning performance data readily available in their school situation to accurately identify the underlying "root causes" of student-learning problems; and 2) utilize the results of these collective data analyses to inform the design and development of a targeted professional development (PD) intervention program to provide teachers and other instructional personnel with the specific additional knowledge, skills, and instructional strategies they need to be able to develop and deliver differentiated lessons and enhanced, high-engagement learning experiences for their students.

The collective data analysis and intervention development work and associated design research results and findings reported in this case study provide some positive evidence for the advantages of utilizing design research thinking in combination with focused data-teaming processes as a creative way to reframe school leaders' school turnaround efforts and reinvigorate educators' instructional improvement practices. School leaders working in a variety of elementary and secondary school contexts may find the design research approach to school turnaround and instructional improvement detailed and discussed in this article useful as one practical means for accurately identifying and addressing difficult, persistent teaching and learning performance challenges in their own context-specific school situations.

Acknowledgments

The author would like to acknowledge the elementary school principal, instructional improvement team members, and third- and fourth-grade teachers who participated in the design research instructional improvement work described in this article. The collective openness of these educators to working together as a team to explore new areas of professional learning that can enhance teachers' instructional practices serve as a testament to these educators' unwavering dedication to the learning success of their students.

Disclosure Statement

The author affirms that there were no relevant financial or non-financial interests involved in connection with the school improvement research activities completed for this article report.

Works Cited

Allington, R. L. (2019). *What really matters in response to intervention: Research-based designs*. New York: Pearson.

Austin, P. (2016). An examination of response to intervention development and implementation relative to best practices. *ProQuest*.

Bambrick-Santoyo, P. (2012). *Leverage leadership: A practical guide to building exceptional schools*. San Francisco, CA: John Wiley & Sons, Inc.

Bambrick-Santoyo, P. (2019). *Driven by data 2.0: A practical guide to improve instruction*. San Francisco, CA: Jossey-Bass.

Bender, W. N., & Shores, C. (2007). *Response to intervention: A practical guide for every teacher*. Thousand Oaks, CA: Corwin Press.

Bernhardt, V. L. (2013). *Data analysis for continuous school improvement*. New York, NY: Routledge. https://doi.org/10.4324/9781315856476

Blanc, S., Christman, J., Lin, R., Mitchell, C., Travers, E., & Bulkey, K. (2010). Learning to learn from data: Benchmarks and instructional communities. *Peabody Journal of Education*, *85(*2), 205-225. https://doi.org/10.1080/01619561003685379

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, *33*(8), 3–15.

Boudett, K. P., City, E. A., & Murnane, R. J. (Eds.). (2010). *Data wise: A step-by-step guide to using assessment results to improve teaching and learning*. Cambridge, MA: Harvard Education Press.

Bouwmans, M., Runhaar, P., Wesselink, R., Mulder, M. (2017). Fostering teachers' team learning: An interplay between transformational leadership and participative decision-making. *Teaching and Teacher Education*, 65, 71-80.

Bowers, A. J., Shoho, A. R., & Barnett, B. G. (Eds.). (2014). *Using data in schools to inform leadership and decision making*. Charlotte, NC: Information Age Publishing.

Bradley, K., & Hernandez, L. E. (2019). *Big Picture Learning: Spreading relationships, relevance, and rigor one student at a time*. Learning Policy Institute.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York: Teachers College Press.

Datnow, A., & Park, V. (2014). *Data-driven leadership*. San Francisco, CA: Jossey-Bass.

Dufour, R., Dufour, R., Eaker, R., & Karhanek, G. (2004). *Whatever it takes: How professional learning communities respond when kids don't learn*. Bloomington, IN: Solution Tree Press.

Dufour, R., Esker, R., Many, T. W., & Mattos, M. (2016). *Learning by doing: A handbook for professional learning communities at work* (3rd ed.). Bloomington, IN: Solution Tree Press.

Dufour, R., & Fullan, M. (2013). *Cultures built to last: Systemic PLCs at work*. Bloomington, IN: Solution Tree Press.

Ende, F. (2016). *Professional development that sticks: How do I create meaningful learning experiences for educators?* Alexandria, VA: Association for Supervision and Curriculum Development.

Fullan, M. (2016). *The new meaning of educational change* (5th ed.). New York: Teachers College Press.

Hattie, J. (2010). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.

Hernandez, L. E., Darling-Hammond, L., Adams, J., & Bradley, K. (with Duncan Grand, D., Roc, M., & Ross, P.). (2019). *Deeper learning networks: Taking student-centered learning and equity to scale*. Learning Policy Institute. https://learningpolicyinstitute.org/product/deeper-learning-networks.

Kameda, Q. (2017). Research provocation: Creating opportunities for deeper authentic learning for teachers to improve teaching and learning in schools. *African Education Research Journal*, *5*(2), 109–113.

Khalifa, M.A. (2021). *Culturally responsive school leadership*. Cambridge, MA: Harvard Education Press.

Khalifa, M.A., Gooden, M., & Davis, J. (2016). Culturally responsive school leadership: A synthesis of the literature. *Review of Educational Research*, *86*(4), 1272-1311.

Kennedy, E., & Jones, L. (2015). *A guide to data-driven leadership in modern schools*. Charlotte, NC: Information Age Publishing.

Krečič, M., Grmek, M. (2008). Cooperative learning and team culture in schools: Conditions for teachers' professional development. *Teaching and Teacher Education*, 24(1), 59-68.

Lieberman, A., Miller, L., Roy, P., Hord, S. M., & Frank, V. V. (2014). *Learning Communities: Reach the highest standard in professional learning*. Thousand Oaks, CA: Corwin Press / Sage Publications.

Love, N. (Ed.). (2009). *Using data to improve learning for all: A collaborative inquiry approach*. Thousand Oaks, CA: Corwin Press.

Love, N., Stiles, K., Mundry, S., & DiRanna, S. (2008). *The data coach's guide to improving learning for all students: Unleashing the power of collaborative inquiry*. Thousand Oaks, CA: Corwin Press.

Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist, 47*(2).

Mandinach, E. B., & Honey, M. (Eds.). (2008). *Data-driven school improvement: Linking data and learning*. New York: Teachers College Press.

Mandinach, E. B., & Jackson, S. S. (2012). *Transforming teaching and learning through data-driven decision making*. Thousand Oaks, CA: Corwin Press.

Margot, K. C., & Kettler, T. (2019). Teachers' perception of STEM integration and education: A systematic literature review. *International Journal of STEM Education, 6*(2).

Martinez, M. R., & McGrath, D. (2014). *Deeper learning: How eight public schools are transforming education in the twenty-first century*. New York: The New Press.

Marzano, R. J., Heflebower, T., Hoegh, J. K., Warrick, P., & Grift, G. (2016). *Collaborative teams that transform schools: The next step in PLCs*. Bloomington, IN: Marzano Research.

Mathes, P., Torgesen, J., & Herron, J. (2016). *Istation's Indicators of Progress (ISIP) Early Reading Technical Report*. www.istation.com

McKinney, S., & Reeves, T. C. (2012). *Conducting educational design research*. New York, NY: Routledge.

McLeod, S., & Lehmann, C. (2012) (Eds.). *What school leaders need to know about digital technologies and social media*. San Francisco, CA: Jossey-Bass.

McTighe, J., & Silver, H. F. (2020). *Teaching for deeper learning: Tools to engage students in meaning making*. Association for Supervision and Curriculum Development.

Militello, M., & Friend, J. (2013). *Principal 2.0: Technology and educational leadership*. Charlotte, NC: Information Age Publishing.

Mintrop, R. (2016). *Design-based school improvement: A practical guide for education leaders*. Cambridge, MA: Harvard Education Press.

Murphy, J. (2016). *Creating instructional capacity: A framework for creating academic press*. Thousand Oaks, CA: Corwin Press. https://doi.org/10.4135/9781483386003

Nabaa-McKinney, B. (2019). *Impact of Data-Driven Instruction and the Use of Data Walls on Reading and Mathematics Achievement.*

Ottmar, E. (2019). The effects of deeper learning opportunities on student achievement: Examining differential pathways. *Psychology in the Schools, 56*, 840–855. https://doi.org/10.1002/pits.22237

Plomp, T. (2010). Educational design research: An introduction. In T. Plomp & N. Nieveen (Eds.), *An Introduction to Educational Design Research.* Proceedings of the seminar conducted at the East China Normal University, Shanghai (PR China), November 23-26, 2007.

Plomp, T., & Nieveen. N. (Eds.). (2010). *An Introduction to Educational Design Research.* Proceedings of the seminar conducted at the East China Normal University, Shanghai (PR China), November 23-26, 2007.

Reeves, D. B. (2009). *Leading change in your school: How to conquer myths, build commitment, and get results*. Alexandria, VA: Association for Supervision and Curriculum Development.

Reeves, D. B. (2010). *Transforming professional development into student results*. Alexandria, VA: Association for Supervision and Curriculum Development.

Rogers, P., et al. (2020). *Best practices at tier 3 [elementary]* (1st edition). Solution Tree Press.

Root Cause Analysis Process Steps. (2015, September 09). *Texas Center for District and School Support*.

Samuels, D. (2014). *The culturally responsive educator: Preparing for a multicultural world*. New York: Teachers College Press.

Schrum, L., & Levin, B. B. (2015). *Leading 21st century schools: Harnessing technology for engagement and achievement*. Thousand Oaks, CA: Corwin Press.

Schweitzer, B., & Bailey, K. (2017). *Vertical Collaborative Inquiry Teams: A Vehicle for Building Instructional Capacity in Teachers.* Western Carolina University.

Sheninger, E. (2014). *Digital leadership: Changing paradigms for changing times*. Thousand Oaks, CA: Corwin Press.

Skrla, L., McKenzie, K., & Scheurich, J. (2009). *Using equity audits to create equitable and excellent schools*. Thousand Oaks, CA: Corwin.

Stringer, P. (2013). *Capacity Building for School Improvement: Revisited*. Boston, MA: Sense Publishers. https://doi.org/10.1007/978-94-6209-329-4

Theoharis, G. (2009). *The school leaders our children deserve: Seven keys to equity, social justice, and school reform*. New York: Teachers College Press.

Theoharis, G., & Brooks, J. S. (2012). *What every principal needs to know to create equitable and excellent schools.* New York: Teachers College Press.

Tyler, K. K. (2009). *The effects of data-driven instruction and literacy coaching on kindergartners' literacy development.* ProQuest.

van den Akker, J., Gravemeijer, J., McKenney, S., & Nieveen, N. (Eds.). (2006). *Educational Design Research*. London: Routledge. https://doi.org/10.4324/9780203088364

van den Akker, J., McKenney, S., & Nieveen, N. (2006a). Introduction to educational design research. In J. van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (Eds.), *Educational Design Research (*pp. 67-90). London: Routledge. https://doi.org/10.4324/9780203088364

Venables, D. R. (2011). *The practice of authentic PLCs: A guide to effective teacher teams*. Thousand Oaks, CA: Corwin.

Venables, D. R. (2014). *How teachers can turn data into action*. Alexandria, VA: Association for Supervision and Curriculum Development.

Widmann, A., & Mulder, R. H. (2020). The effect of team learning behaviours and team mental models on teacher team performance. *Instructional Science*, 48, 1–21.

White, S. H. (2011). *Beyond the numbers: Making data work for teachers and school leaders*. Englewood, CO: Lead and Learn Press.