**Data-Driven Decision Making**

As I discussed the features of Quality Rating Improvement System (QRIS) in the earlier chapters, data-driven decision making (DDDM) is considered one of the key features in continuous quality improvement by systematically gather, analyze, and disseminate various types of data to inform decision making for improvement (Los Angeles County Department of Children and Family Services [LA DCFS], 2013; Ikemoto & Marsh, 2007; Mandinach et al., 2006; Marsh et al., 2006). In this chapter, I will discuss what is DDDM, what are common practices and features of DDDM, why is it important to address DDDM in building high quality early childhood systems, and how a state agency foster DDDM at a system level.

**Overview of Data-Driven Decision Making (DDDM)**

Ongoing data collection and analysis is fundamental to build a system to understand what is working and what is not working (LA DCFS, 2013). As the field is claiming “we are completely data driven” (Marsh et al., 2006; p.1), DDDM plays a critical role in federal and state educational accountability policies (Guss et al. 2013; Marsh et al., 2006). Despite the increased interest in DDDM, the field is struggling to encompass how to utilize the information from its overwhelming abundance status (Celio & Harvey, 2005; Ingram et al., 2004) to inquire iterative processes and its impact in the field (Guss et al. 2013; Marsh et al., 2006).

DDDM was modeled from the ideas and features of Continuous Quality Improvement ([CQI], Byrk et al., 2016; Deming, 1986; Lemire et al., 2012; Perla et al., 2010). Marsh and her team (2006) described DDDM as an organizational improvement to enhance and response to various types of data including “input data such as material costs, process data such as production rates, outcome data such as defect rates, and satisfaction data including employee and customer opinion” (p.2). Marsh et al. (2006) further noted the concept of DDDM arose in the 1980s from early discussions of measurement-driven instructions (Popham, 1987; Popham et al., 1985) to initiatives of a state’s use of site-based planning and decision-making processes in the 80s (Massell, 2001), and efforts to engage in strategic planning in the late 80s and 90s (Schmoker, 2004). DDDM has gained more attention due to the introduction of No Child Left Behind ([NCLB], U.S. Department of Education, 2001). NCLB emphasized four initiatives including *accountability* to ensure disadvantaged students achieve academic proficiency, *flexibility* to allow school districts to use federal educational funds for improving student achievement, *research-based education* to emphasize implemented educational programs and practices have warrants as evidence-based practices, and *parent options* to increase the choices for allowing students to attend Title I schools (Ikemoto & Marsh, 2007; Marsh et al., 2006; Washington Office of Superintendent of Public Instruction, n.d.; U.S Department of Education, 2001).

As I further reflect the origin of DDDM in the education system, it seemed clear that the current version of CQI and DDDM addressed in the early learning initiative such as Race to the Top (RTT; U.S. Department of Education, 2009) and majority of the available studies focused on data use in K-12 school settings (Anderson et al., 2010; Horn et al., 2015; Means et al., 2009; Murnane et al., 2005; Sharkey & Murnane, 2003; Sutherland, 2004; Wohlstetter et al, 2008). It was also not surprising to see limited information was available from literature on why increased use of data is considered fundamental component for system change in the early learning system (Little et al., 2019). There were some examples from Ikemoto & Marsh (2007) that DDDM processes in NCLB failed to acknowledge how use of data for decision making among practitioners varies yet studies have shown actors in all levels of an education program (classroom, school, and district) believed DDDM is an important process and deemed useful for change (Kerr et al., 2006; Marsh et al., 2005). It seems valuable to understand the process and features of DDDM and how different models of DDDM plays a critical role and I hope to illustrate the use of DDDM in K-12 settings and how it differs in the early learning field in the upcoming sessions.

**DDDM in K-12 Settings**

* Process from Mandinach et al. (2006).
  + Collecting and org data
  + Understanding the situation by combining the data
  + Information to knowledge (Sensemaking processes)
  + Collection of new data informed by the above stages
* Four Quadrants/Models of DDDM (Marsh et al., 2007)
  + First quadrant: Basic
  + Second quadrant: Analytic focused
  + Third quadrant: Data-focused
  + Fourth quadrant: inquiry based (Coplan, 2003; Halverson et al., 2005)

**DDDM in Early Learning System**

DDDM featured in an early learning system presented both similar and different features from the model in K-12 settings. Little et al. (2019) described DDDM in the framework of Cohen-Vogel and Harrison (2013)

* Example from Little et al. (2019) on 1) Data access & availability, 2) Capacity for data use and action, and 3) Culture of data use
* Add reference from Sandall et al. (2014).

Sandall et al. (2014) shared insights on why collecting and using data in early learning settings is challenging and perhaps different than the needs currently shown by Early Achievers implementation actors around building a system-wide database to capture coaching-relevant information. Sandall et al. (2014) stated the three primary tenets of data collection in the early childhood settings by referencing the work of Wolery (2014), which include: a) to validate initial assessment information; (b) to develop a record of progress over time; and (c) to evaluate instructional effectiveness and make instructional decisions” (p. 161).

**Ways for System Initiatives (i.e. QRIS) to Enhance DDDM**

* **Understand the catalysts and barriers of DDDM including**
  + Accessibility/timeliness of data
  + Perceived validity of data
  + Staff capacity and support
  + Time
  + Partnership with internal/external organizations and professionals
  + Tools
  + Organizational culture and leadership
  + Federal, state, local political context
* Also consider recommendations from Marsh et al. (2017):
  + Practical Implications (which can be also addressed in the results/discussion section).
    - DDDM is complex (it's not a linear process)
    - DDDM in a classroom setting mostly focuses on "basic" model of DDDM as educators may not have quant background nor support from experts (i.e. Guss et al., 2013 implied perhaps that's one of the reason why when professionals review results of ERS/CLASS, expert coaching may help to reflect practices
    - Or counter claim that the basic model of DDDM is sufficient (Celio & Harvey, 2005; Herman & Gibbons, 2001) for answering questions addressed in a classroom level (i.e. less is more).
  + Policy implications
    - DDDM is not a straightforward process rather iterative processes requiring collection and reflection of multiple types of data sources (input, process, outcome, satisfaction data)
    - Improving the availability, timelines, and comprehensiveness of data is fundamental for DDDM
    - Providing resources and support such as professional development and resources for local and expert reviews will further enhance the processes.

Let’s talk about how a state system can evaluate its own initiatives by utilizing data-driven decision-making processes. For a system to evaluate its own design, it is desirable to have a theory of change (Coffman, 2007). Coffman (2007, p.1) described the notion of “theory of change” gained its attention in the early childhood field especially in the 1990s. Connell and the team (1995) introduced the approach for evaluating complex initiatives such as Community Initiatives for Children and Families. Despite its popularity as a system level initiative, Coffman (2007) noted theories of change is not a “panacea for all evaluation dilemmas” (p.1). The approach was merely describing the system elements and its complexities rather than testing assumptions and validity of assessments (Coffman, 2007).

Coffman (2007) further described and introduced the theory of change that can be implemented for a Quality Rating Improvement System (QRIS). The five elements of a system initiative consist of *context, components, connections, infrastructure,* and *scale* (Coffman, 2007, p.2)*.* *Context* describes the political environment around the system that sketches policy and funding changes for sustaining the system. *Components* establishes high-performance systems that drives results for system initiatives. *Connections* creates linkages between system components for further improvement. *Infrastructure* develops and supports the system. And finally, *scale* ensures access to system to a broader community and beneficiaries so that it produces inclusive results for all. Not all system has all five element (Coffman, 2007) and it may be worth dissecting activities, outcomes, and impacts of the Coffman’s model that describes the elements of DDDM. All five elements of Coffman (2007)’s model describes a methodology for collecting and analyzing data for system improvements, yet I believe it’s worth further investigating the *connections* and *infrastructure* stages of the change.

During the *connections* phase*,* Coffman (2007) utilized questions to inquire whether the initiative connected implementation components as intended and whether those connections produced intended outcomes. Several approaches were introduced including Social Network Analysis (Durland & Fredericks, 2005) to understand the relationships among actors, groups, and entities in a system. By identifying nodes and networks among those ingredients, one can establish and determine whether the network connections look similar or different over time (Coffman, 2007). An experimental or quasi-experimental design can be constructed for understanding how connections produced intended outcomes (Coffman, 2007). For instance, Coffman (2007) introduced a case study from SPARK initiative evaluation as Berkley (2005) equipped a cluster evaluation where an overall evaluator assesses the initiative level assessment across the SPARK sites and project-level evaluators at a site level. Despite the methodology was not clearly articulated, findings suggest partnerships within the SPARK sites and the intentional leadership effort from key partners became catalysts for local, state, and national level change (Coffman, 2007). These outcomes were queried based on kindergarten readiness assessments, focus groups and key informant interviews at a site level, and surveys and quarterly calls among grantees which also lead to content analysis of key documentation (Berkley, 2005).

It seemed clear to me that the evaluation team utilized multiple approaches including quantitative and qualitative data collection, the effort resulted in a great example for creating a process for shared data systems for monitoring individual and organizational level outcomes for system linkages, alignment, and coordination (Coffman, 2007), so that the data can further describe elements for data-driven decision-making processes.

In the *infrastructure* phase, Coffman (2007) focused on asking whether the infrastructure for the initiative support the original objectives and inquiring whether the initiative achieved the objectives for “effectiveness, sustainability, and quality” (p.17). Case study or performance audit were introduced for understanding the effectiveness of such infrastructure (Coffman, 2007). As a type of post-hoc analysis for understanding success or failure of a system, Coffman (2007) described the success case method of Brinkerhoff (2003) combined storytelling features and deliverables such as reports that all actors in a system can “understand and believe” (p.23) the initiatives. Performance audit was also introduced which determines how well an entity is functioning for its intended initiative (Coffman, 2007). Performing customer satisfaction surveys or program evaluations can help stakeholders to understand whether a particular service is considered accessible and user-intuitive, or it has an impact to the intended recipient of the service (Coffman, 2007). This was another great example where DDDM was employed by creating a cross-system governance protocol or system-wide use of data to describe how infrastructural outcomes connect to beneficiary impacts (Coffman, 2007). It seemed well organized to ensure the ecosystem of a complex system level initiatives which produces better impacts for beneficiaries across “a broad spectrum of domains and on a system-wide population level” (Coffman, 2007, p.8).