

Empowering Course Coordinators: Examining Foundational Math Coordination Orientations

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This study explores the evolving approaches of eight foundational math course coordinators, uncovering key insights into their coordination strategies and mechanisms to enhance their efforts. These coordinators oversee critical courses, including College Algebra, Quantitative Reasoning, Introductory Statistics, Math for Architecture and Construction Management, Precalculus, Calculus, and mathematics courses for prospective elementary teachers. Through a dataset derived from surveys, self-reflections, and professional development workshops, we investigated their perspectives and experiences as coordinators. We analyzed data from both the coordinators and the graduate student instructors they oversee. Specifically, we highlight the integration of instructional routines that promote mathematical reasoning and the development of course-specific dynamic calendar systems, both of which have the potential to improve the instructional effectiveness and coordination of foundational math courses. Our findings offer fresh perspectives on how to better support course coordinators in their crucial role, ultimately benefiting both instructors and students.

Keywords: Foundational Mathematics, Course Coordination, Professional Development

Introduction

Course coordinators are a key population within college math education because they teach and supervise instruction of thousands of undergraduate students each semester. A key element for course coordinators is streamlining their goals and expectations and communicating those to the instructors they coordinate. This paper reports on data from the first two years of a 3-year grant project (Rogers, 2022-2025) that ultimately aims to test and refine a community of practice (Wenger et al., 2002) among eight faculty members. These faculty members coordinate and teach foundational math courses (FMCs, e.g., College Algebra, Precalculus, Quantitative Reasoning, Introductory Statistics, Math for Elementary Teachers, & Calculus). A community of practice can provide a means for faculty to share/manage professional knowledge, in this case about professional development (PD) opportunities we facilitated among college math faculty.

Key elements for effective coordination include (1) fostering community and (2) maintaining uniform course components (e.g., syllabus, textbook, homework, and assessments; Martinez et al., 2022). When asked, “How do you effectively coordinate FMCs?” coordinators may focus on people-centered approaches or structural components, reflecting their course coordination orientations. These orientations demonstrate an individual’s disposition toward their work. Our aim is to explore FMC coordinators’ orientations and identify ways to enhance their coordination efforts through PD. We asked both FMC coordinators and graduate student instructors (GSIs) to identify the coordinators’ approaches to course coordination, leading to our research questions:

1. How do GSI and FMC coordinator perceptions of course coordination relate?
2. What kinds of support structures could aid in course coordinators’ PD?

Literature Review

We are particularly interested in understanding and supporting course coordinators’ reasoning as they manage FMCs in ways that are responsive to the needs of the instructors they oversee. Our literature review focuses on two key areas: understanding the perspectives these

coordinators bring to their roles and exploring potential avenues for PD in this context. Over a decade ago, Speer et al. (2010) conducted a review of collegiate math teaching and found that instructors’ practices—specifically their pedagogical actions and the reasoning behind them—remain largely underexplored in research. This gap persists, as research on PD in college math education, especially for instructors and tenure-track faculty, continues to be sparse (Florensa et al., 2017). Our project aims to address this gap by examining course coordinators’ perspectives and providing targeted PD to enhance their coordination skills.

To investigate course coordinators’ orientations, we use Martinez et al.’s (2022) framework, which distinguishes between two orientations: *Humanistic-Growth (H-G)* and *Resource-Managerial (R-M)*. An H-G orientation focuses on the individuals being coordinated, while the R-M orientation emphasizes expertise in managing others or resources (Table 1).

Table 1. Course Coordination Orientation Themes

Humanistic-Growth (H-G) Themes	Resource-Managerial (R-M) Themes
(a) Attends to Student Experience	(f) Draws on Knowledge of Course, Department, & Institution
(b) Expresses Concern about Others	(g) Demonstrates Experience Teaching & Knowledge of Teaching the Course
(c) Takes Action to Build Community	(h) Provides Materials Related to Content & Curriculum
(d) Is Attentive to Instructor Differences	(i) Communicates Clearly
(e) Provides Support for Instructors	(j) Exhibits Strong Administrative Skills

We report on two aspects of our PD for course coordinators. First, we incorporated **instructional routines for reasoning** (Kelemanik et al., 2016). These are “specific, repeatable designs for learning that support” (Lucenta & Kelemanik, 2024, para. 1) students’ mathematical reasoning. Instructional routines highlight the interconnectedness of mathematical concepts and offer coordinators practical tools to guide instructors in fostering students’ reasoning skills. Second, we considered the use of **dynamic calendars** (Oliver & Olkin, 2021) to organize course materials in a user-friendly, calendar-like format that coordinators can personalize to include notes and recommendations for instructors. This tool can provide a clear structure, helping coordinators communicate expectations and resources effectively to the instructors they oversee.

Method

Context: University and Course Coordinator Backgrounds

At a public, liberal arts college, participants are eight FMC coordinators whose duties include distributing course materials (syllabi, lecture notes, pacing guides, & assessments) to ensure consistency across course sections. They facilitate orientation meetings with instructors, provide observation feedback to novices (esp. GSIs), and address student concerns. They regularly teach the courses they coordinate, but GSIs teach majority of the course sections (Rogers et al., 2024). Most FMCs are taught in traditional, in-person lectures, while College Algebra is taught using a math emporium model (adaptive learning system to individualize student pathways; Cousins-Cooper et al., 2017). Patrick (Table 2) oversees FMCs at the 2-year branch of main campus.

Workshop & Professional Development Context

During the academic year, Author 1 met with the FMC coordinators twice a month to facilitate PD opportunities while also addressing course coordination, administrative, and policy needs. These meetings have expanded to include an annual summer workshop, chosen for its lighter workload for coordinators. In the latest workshop, coordinators learned about the H-G

and R-M orientations and self-identified their alignment within this framework. They also reflected on the group's alignment. We also shared data from graduate students who described their coordinators using relevant themes. The workshop concluded with a session on instructional routines and dynamic calendars, followed by individual worktime.

Data Collection and Analytical Approach

Before the FMC coordinator workshop began, all graduate students who had served as instructor of record of these coordinators' courses were invited via email to participate in a survey. The survey asked them to assess their coordinators based on the five themes of the H-G and R-M orientations. GSIs rated their coordinators using integers on a scale from 0 (theme does not describe the coordination) to 10 (theme accurately describes the coordination) and could also provide open-ended comments. During the workshop, coordinators were introduced to the two orientations and asked to identify which themes they used or did not use. Table 2 shows the count of themes self-reported by each coordinator and the mean ratings provided by GSIs.

Table 2. Participants' Coordination Details and Coordination Orientations.

Pseudonym	Course(s) coordinating	(H-G Count, R-M Count)		No. of GSI Responses
		Self-reported	GSI Reported	
Alice	College Algebra	(4, 3)	(4.80, 5.00)	1
Alexandra	College Algebra	(4, 2)	(4.77, 4.93)	3
Camille	Calc I, Calc II, Calc III	(4, 5)	(3.48, 4.57)	6
Madaline	Prospective Teacher Math	(4, 4)	No GSIs Coordinated	0
Patrick	College Algebra & Precalculus	(4, 4)	No GSIs Coordinated	0
Pricilla	Precalculus	(4, 5)	(3.66, 4.57)	7
Reema	Quantitative Reasoning & Math for Architecture	(4, 2)	(3.37, 4.10)	3
Stella	Introductory Statistics	(4, 5)	(4.73, 4.73)	3

After identifying their orientations individually and as a group, coordinators reflected on these results. To collect reflections from all, coordinators first silently answered each reflection question on a chalkboard and then added further silent reflections using sticky notes after reviewing others' answers. This activity provided qualitative insights into the coordinators' self-perceptions and perceptions of the group. Additional data came from self-reported surveys completed by each coordinator during project year 1. Given the small sample size, no statistical analyses were performed. We compared frequencies by coding open-ended responses for the H-G and R-M themes and counting the themes identified by coordinators while averaging the GSI-provided theme scores (scaling them from [0, 10] down to [0, 1]).

Findings

RQ1: Relationship Between Coordinator and GSI Perceptions

Early in the grant project, coordinators were asked to list what aspects of course coordination they enjoyed and what aspects they found challenging. Two researchers coded the items coordinators listed using the H-G and R-M orientations and reached 100% coding agreement through discussion. For aspects the coordinators enjoyed, 20% of their responses aligned with H-G and 80% with R-M. The themes most frequently mentioned as enjoyable were three R-M: (f) drawing on knowledge of course/department/institution, (g) demonstrating teaching expertise,

and (h) providing materials. Their responses about what they found most challenging were evenly split between the two orientations, exclusively mentioning challenges identified as (c) building community, (e) providing instructor support, (h) providing materials, and (j) exhibiting strong administrative skills. After later being introduced to these descriptions at the workshop, coordinators identified their orientations by recognizing themes they use or do not use (column 3, Table 2). Across the eight participants, each coordinator identified only one H-G theme they did not use and wanted to incorporate more explicitly, as follows: (b) concern about others (37.5%), (c) seeking to build community (25%), (d) attending to instructor differences (12.5%), and (e) providing instructor support (25%). These results aligned with their earlier survey responses of areas of challenge, while also adding items (b) and (d) to the list.

During the workshop, there was some noticeable agreement among the coordinators when they identified R-M themes they were and were not using. Three coordinators selected all the R-M themes as ones they were currently using. The five coordinators who indicated not using at least one R-M theme all selected (j) exhibiting strong administration skills as an aspect they were not explicitly incorporating. One or two coordinators also selected (i), (f), or (g) as R-M themes they were not currently using as well. The group discussions built upon these findings with coordinators asking how “strong” the word “strong” in item (j) was intending to be? They considered replacing that word with “some” and then they would consider selecting it. Their discussion also noted the group’s strength among the R-M orientation themes. Additionally, the coordinators all agreed that there is “room to grow” in their course coordination and that they wanted to more intentionally use H-G themes (or in the case of Alice and Alexandra, who both recently were appointed as coordinators, more R-M themes).

GSI, who were given the same descriptions of 10 themes for course coordination orientations, responded (column 4, Table 2) in ways comparable to the coordinators. Building community (c) was commonly one of the lower scored themes by GSIs, but not the lowest theme for any single coordinator. An exception is Alice and Alexandra, who see GSIs every day due to the emporium format, for whom (c) building community was the highest-scored GSI-response theme. Alice and Alexandra also self-selected (c) building community as something they currently use. In the open-ended responses, GSIs most commonly discussed the absences of (d) attentiveness to instructor differences and (e) providing instructor support. When asked to comment about the presence or absence of any R-M themes, only 16% of GSIs chose to provide open-ended responses as opposed to 44% of GSIs commenting about H-G themes.

RQ2: Coordinators’ Receptivity of Professional Development Tools

On the second day of the workshop, after further debriefing some GSI-responses together, coordinators engaged with examples of dynamic calendars and instructional routines for reasoning and then broke out for an hour of practical work time. Coordinators’ reception of the newly introduced dynamic calendar consisted of positive remarks, with half of the group either actively creating a dynamic calendar for an FMC during the work time or commenting on ways they plan to do so soon. For example, Camille began designing a cloud-based document with key topics, activities, and sample assessments for the first week of Calc I. She plans to continue constructing it during the semester to share next semester. Although Camille had these various documents accessible to instructors in a variety of folders, the dynamic calendar provided an

overarching structure and direct links to the most relevant files for each week. Providing such a resource could potentially address some of the H-G and R-M themes (e.g., (e) provides instructor support, (i) communicates clearly, and (j) administrative skills).

We modeled three types of instructional routines, and half of the group spent the entire work time adapting class materials to an instructional routine structure, while a fifth coordinator split their work time between the two tools. Using existing FMC activities, coordinators noted how they could adapt them to the routine structure, thereby providing opportunities for students to think deeply about the mathematics. Alice reflected on the experience saying incorporating instructional routines could help “students build some problem-solving skills and see past just the steps of a single topic.” We noticed that four of these five coordinators identified at least one R-M theme they wanted to more explicitly incorporate, and their written workshop reflections suggest they saw routines to provide more effective course materials for FMCs.

Discussion and Questions for the RUME Audience

After being introduced to the course coordination orientation framework, the coordinators self-identified one H-G area that they had not previously identified that was also not apparent in the GSI responses: (b) expressing concern about others. The groups of GSIs and coordinators both noted that (c) building community and (e) providing instructor support were areas that could use more explicit attention. We posit that the integration of instructional routines or dynamic calendar could be a mechanism for addressing some of these areas needing attention. We emphasized that coordinators are not expected to address all ten themes across both orientations. But noted areas where the coordinators desired to (and GSIs requested they) give more attention.

Moreover, in analyzing these findings, we observed a parallel between the roles of instructional routines for reasoning and dynamic calendars, each serving different populations within FMCs. We compare how instructional routines can influence undergraduate students’ conceptualization of mathematics and how dynamic calendars can shape FMC instructors’ teaching practices. When instructors employ instructional routines for reasoning, they provide students with a framework to approach mathematical problems and engage in reasoning across various contexts. Similarly, when coordinators develop dynamic calendars for FMCs, they are constructing a framework for instructors to guide their course planning and teaching. This organizational structure can help instructors conceptualize the course, choosing which resources or teaching strategies to incorporate. We are eager to gather feedback from RUME on how these parallel structures might further support both students and instructors. We want to hear thoughts on how this relationship might inform future PD initiatives. Additionally, we plan to explore potential challenges or pushback coordinators might face when implementing these strategies, which could lead to valuable insights for refining our approach. To facilitate this discussion, we will also ask the audience the following questions during our presentation:

- What research-based, practitioner-focused resources should we consider to help coordinators to learn from course coordination efforts nationally?
- As we enter the final year of this project, what data should we prioritize gathering about coordinators’ instructional and course coordination practices, and why?

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