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Theorizing coordination and the role of course coordinators

Chris Rasmussen¹, Jessica E. Hagman² and Naneh Apkarian³

¹San Diego State University, USA; crasmussen@sdsu.edu

²Colorado State University, USA; jess.ellis@colostate.edu

³Western Michigan University, USA; naneh.apkarian@gmail.com

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In the United States (US) improvement efforts at the school level have a long history of bringing teachers together to plan lessons, discuss issues of student learning, create assessments, etc. For example, lesson study has been implemented across American schools as one way to create community among teachers and improve teaching and learning (e.g., Lewis & Takahashi, 2013). Professional learning communities are another way of building community among teachers to improve instruction. At the university level, coordination of high enrolment introductory courses provides a similar opportunity for bringing faculty at the same institution together to improve student success. Coordination systems are particularly popular as a response to the large numbers of students enrolled in calculus courses and the wide range of instructors teaching them. Robust coordination systems, led by one or more coordinators (who are typically ladder rank faculty) consist of two major elements: uniform course elements (e.g., common text; exams) and regular instructor meetings. Regular meetings convened by course coordinators are important because they provide opportunities to bring faculty together to discuss issues of learning, assessment, pacing, etc. Robust coordination systems can, therefore, have the effect of turning calculus instruction into a joint enterprise, engendering a community of practice (Rasmussen & Ellis, 2015).

While coordination systems are widely used in the US, such systems are under-theorized. In this report, we draw on case study data from five universities to begin theorizing about coordination systems more broadly and the role of the coordinator in particular. More specifically, we address the following research goal: *How might we characterize coordination systems and the role of coordinators in these systems?* A better theoretical understanding of these phenomena will contribute to pragmatic efforts aimed at improving the teaching and learning of high enrolment, coordinated, undergraduate mathematics courses. The 2-3 day case study site visits we conducted were part of a larger national study of successful calculus programs in the US (Bressoud, Mesa, & Rasmussen, 2015). We employed thematic analysis (Braun & Clarke, 2006) of the data corpus, which included interviews with faculty, administrators, classroom observations, and student focus groups.

Our theoretical framing of coordination systems and coordinators draws on work in behavioral economics, thus bringing a novel point of view to university mathematics instructional systems. In particular, we draw on the work of Thaler and Sunstein (2008), who offer an insightful perspective on how libertarian views of free choice can be profitably combined with paternalistic structuring of choices for others in the marketplace. A central construct in their thesis of libertarian-paternalism is that of *choice architect*. A choice architect is someone who is responsible for organizing the context in which people make decisions. For example, the person responsible for arranging the way in

which school cafeteria food is displayed has the potential to influence the food choices that kids make. What should be placed at eye level, cookies or green beans? The power of a choice architect lies in focusing peoples' attention in a certain direction, and "nudging" them to make particular choices, rather than making the choice for them. Similarly, we argue, this is what effective course coordinators can do.

In our analysis of the five case studies, we came to see the coordination systems more broadly as an example of *coordinated independence*. The notion of coordinated independence, much like that of libertarian-paternalism, embraces the oxymoron that individuals can be part of a system that directs their choices, but maintains a certain level of autonomy. Our retrospective search of the literature for use of the term coordinated independence revealed the original coining of this phrase to describe the premier jazz drummer "Cozy" Cole in the late 30's. Cozy Cole was renowned for the way in which his hands and feet acted independently yet produced a harmonious sound that was highly coordinated. In a similar way, we theorize that effective course coordinators allow for instructor independence yet result in a harmonious calculus instructional system.

Drilling down into the particulars of what the course coordinator does to promote this culture of coordinated independence, we posit that the coordinator functions much like a choice architect as described by Thaler and Sunstein (2008). In our analysis we identified the following overlaps in the roles of a choice architect in the market place and the various roles of the coordinator in an educational setting: makes life easier by setting default options; provides feedback to users; makes mappings easy to understand; and provides information about what others are doing. For example, Thaler and Sunstein describe how a computer manufacturer functions as a choice architect by making life easier for users by pre-setting screen-saver default settings. A user can change the default options but doing so takes time and requires taking some action. We found that the calculus coordinator similarly sets a number of "default" options for instructors, including homework problems, exams, class activities, syllabus, and rubrics for exam grading. In our interviews with instructors we learned that the vast majority of instructors very much appreciated the coordinator taking care of these decisions, while still allowing for pedagogical autonomy and some choice within these default setting. Our poster presentation gives illustrative examples of this and other roles of coordinator as choice architect.

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