

Chapter 1

Planning Practices of Mathematics Teaching Assistants: Procedures and Resources

Dale Winter, Matt DeLong, & Joe Wesley

What university?

This study reports the results of a qualitative, empirical investigation of the lesson planning practices of a group of seven novice mathematics teaching assistants (MTAs); the activities that they engaged in while planning their lessons; and the main resources they used. The MTAs typically determined what they should teach (in some cases formulating explicit objectives); consulted resources and selected and modified activities; thought about how they could explain mathematical concepts; and attempted to manage instructional time. The major resources that they consulted included prepared lesson plans (created and distributed by a course coordinator), the course textbook, their own personal experiences, and the experiences of other MTAs teaching the same course. This work is of interest to other researchers working on MTAs' development as teachers and to graduate and professional student developers who create or adapt training activities for MTAs.

Suggestions and procedures abound for lesson planning in college mathematics (Rishel, 2000) and in higher education more generally (Cabe, 1996). Although potentially useful, such publications are rarely based in empirical research on teaching and learning, much less research on mathematics teaching assistants (Speer, Gutman, and Murphy, 2005). In addition, their effectiveness for mathematics teaching assistant (MTA) training is a largely unexplored area, and their application to the development of MTA skills is likely to be a “hit or miss” affair, as the rather dismal record of TA training interventions suggests (Shannon, Twale, and Moore, 1998). To begin to lay an empirical foundation for the development of interventions, Speer, Gutman, and Murphy (2005) called for descriptions of MTA practice. The study described in this paper documents the procedures and resources that a group of novice MTAs used while planning lessons and, to that end, initiates empirical research into MTA lesson planning.

A common idea in teacher training is that careful planning makes a lesson more valuable (Krantz, 1999). Failure to plan for instruction has been cited as one of the top examples of unprofessional behavior in college teaching (Braxton, Bayer, and Finkelstein, 1992). Empirical research at the K-12 level also sug-

gests a critical role for planning. For example, studies of teacher planning have linked teachers' difficulties with innovative curricula to their planning processes (Yinger, 1980). Some have suggested that poor planning may also contribute to problems implementing student-centered instruction in college mathematics (DeLong & Winter, 2001). Researchers at the K-12 level (Sardo-Brown, 1993; 1996) have demonstrated that an understanding of what novice teachers do while planning can lead to more effective training interventions. We suggest that creating a picture of MTA planning practices might similarly contribute to more effective professional development for MTAs.

The following research questions were investigated:

1. What do novice MTAs actually do when they prepare for their lessons? What are some planning procedures that MTAs follow when preparing their lessons?
2. What resources (cognitive, such as knowledge, and physical, such as textbooks) do novice MTAs use when they prepare for their lessons? How are these resources used during the planning process?

Literature Review

A large amount of research has been done on planning in K-12, while relatively little has been completed in higher education. The research that has been completed on planning in higher education focuses on faculty rather than MTAs (Lowther, Stark, Genthon, & Bentley, 1990) and/or focuses on course planning rather than lesson planning (Stark, 2000). The following telegraphic review of the K-12 literature concentrates on empirical and theoretical investigations of planning that relate to the two research questions stated above.

Teachers' Planning Processes

Teachers typically engage in different types of planning—weekly, daily, unit, long-range, lesson, short-range, yearly and term—that relate to each other and are “nested” in the obvious way (Clark & Yinger, 1979). Teachers' decisions on instruction have been categorized as pre-active—made before instruction takes place; interactive—made while instruction takes place; and post-active—made after instruction has concluded (Jackson, 1968). Pre-active lesson planning is considered in this paper, as research suggests that the majority of decisions affecting a lesson are made in that phase (Bush, 1983).

Many of the lesson-planning processes recommended in the practitioner literature can be traced to the “Objectives First” model proposed by Tyler (1949). This model is often taught as the preferred planning method in teacher education programs (Doyle & Holm, 1998). However, Clark (1981) discovered that experienced teachers rarely follow a Tylerian process. For example, rather than first specifying objectives and then selecting activities that support these

objectives, many teachers begin by choosing activities that will fill the available instructional time (Leinhardt, 1983). These activities constitute the building blocks that are arranged in many teachers' planning processes (Shavelson, 1987). Other studies found that it is the content that forms the starting point of teachers' planning processes (Clark & Peterson, 1985). In this paper, we extend these studies by investigating the lesson planning processes of a population of novice MTAs for which the high-level planning is prescribed and lesson planning resources are provided as a starting point, common features of the settings in which many novice MTAs teach (Belnap & Allred, 2006).

Resources for Planning

The personal resource of prior teaching experience is generally considered to be an important determinant of teaching actions (Fennema & Franke, 1992), although for most novice MTAs this resource would be, by definition, unavailable. A number of other resources have been identified as important for at least some teachers' planning, including information about students, curricular materials, textbooks, teacher guides or standards, and the physical environment in which instruction will occur (Bellon, Bellon, and Blank, 1992; Brophy, 1982). According to Sardo-Brown (1988, 1993), when planning at detailed levels (e.g., daily planning) teachers draw most heavily on available materials, perceptions of student interest, the school calendar, local curriculum guides, textbook content, classroom management considerations, perceived "flow" of classroom activities, and prior experience with the particular lessons to be taught.

Currently no published research elucidates the resources that MTAs utilize when planning their lessons. This study begins to address that subject by providing a description of the resources used by the group of novice MTAs described below.

Methodology and Design

Institutional Setting of the Study

This study involved novice MTAs teaching a precalculus course at a large Midwestern university in the Fall of 2005. The intended pedagogy of the course was a mixture of group work, active learning, and short lectures. The textbook was Connally et al. (2004), and all sections of the course followed a uniform syllabus and took common exams. The MTAs participated in a professional development program, similar to that described by DeLong & Winter (2002), which included a weeklong pre-semester training workshop, two class visits by experienced instructors, and weekly pedagogical seminars. The MTAs were provided with ready-made lesson plans, although they were not required to follow them. The plans included lists of homework problems, key points to emphasize, suggested examples and in-class problems, and minute-by-minute

guides for using class time. Based on formal observations, some of the MTAs did not follow these suggested plans at all, electing to devise plans that were completely their own. Others used these suggested plans as a starting point for their own plans. The wide variety of lessons evident during class visits raised the question that inspired this study: If the MTAs were not simply following the prepared plans, then what were they doing to plan their lessons?

Participants

There were 24 instructors of precalculus at the university during the Fall semester of 2005. Of these, 19 were novice MTAs teaching mathematics at the university for the first time, and the rest were faculty. Seven of the MTAs, all male, volunteered for this study. Five were in their first year of graduate study at the university. Five were international graduate students. Two had prior college mathematics teaching experience elsewhere.

Data Collection and Analysis

The volunteers participated in three clinical interviews, each following an established protocol and lasting approximately one hour. The goal was to elucidate characteristic practices and thought processes that each MTA engaged in while planning with minimal influence from the interviewer (Hunting, 1997). The interviews were audiotape recorded, transcribed, and analyzed. The data analysis methodology was a two-phase variant of classical content analysis (Holsti, 1969). The first phase was open coding intended to identify and define categories of response to each of the questions in the protocol (Strauss, 1987). The purpose of this phase was to create a set of coding frames that could be used to organize responses in the second phase. The second phase involved sorting individual responses to questions into the categories defined by the frames.

Results of Content Analysis and Discussion

Procedure

Content analysis revealed twelve categories of activities in response to the question, “If you had to describe a procedure that you followed in planning the lesson, what would it be?” They are listed in Table 1 in order of decreasing frequency. Also recorded in Table 1 are, for each activity, the number of MTAs (out of 7) who mentioned the activity and the number of interviews (out of 21) in which the activity was mentioned.

Further analysis showed that the categories could be grouped into five core elements (Table 2). These core elements constitute a “typical” planning procedure for these novice MTAs.

Each of the core elements includes a category that was mentioned by over half of the MTAs in response to the interview question, “If you had to

describe a procedure that you followed in planning the lesson, what would it be?” Less commonly mentioned categories are included in Table 2 if analysis of the interview as a whole provided strong evidence to suggest that some kind of activity closely related to the category was universally followed by the MTAs, with the exception of time management, which was attended to by slightly more than half of the MTAs. The novice MTAs’ planning processes were by

Table 1. Twelve Categories of Activities

Activity described	# MTAs	# Interviews
Read provided plans	7	19
Read course textbook	5	12
Write lesson plan	5	10
Solve suggested in-class problems	5	9
Modify prepared plans	5	9
Create new explanations	5	8
Budget available time	4	6
Solve homework problems	3	3
Create new examples	2	2
Organize procedural details	2	2
Modify suggested in-class problems	1	1
Rehearse lesson	1	1

Table 2. Five Core Elements

Core elements of procedure	Categories from Table 1
Peruse provided resources	<ul style="list-style-type: none"> • Read provided plans • Read course textbook
Ensure own understanding of mathematical problems	<ul style="list-style-type: none"> • Solve suggested in-class problems • Solve homework problems
Tailor explanations	<ul style="list-style-type: none"> • Modify prepared plans • Create new explanations • Create new examples • Modify suggested in-class problems
Write out a lesson plan or an outline	<ul style="list-style-type: none"> • Write lesson plan • Organize procedural details
Time management	<ul style="list-style-type: none"> • Budget available time • Rehearse lesson

no means linear progressions through the five core elements of Table 2. For example, Uday¹ described his procedure as a back-and-forth process: “I guess it’s more like back and forth, I go [to the] lesson plan, a little bit of book, writing, then back to lesson plan.”

The remainder of this section provides elaboration of the core elements of the MTAs planning procedures, with one exception. Discussion of the element “peruse provided resources” will be deferred to the next subsection, since it is more directly relevant to the second research question.

1. Ensure own understanding of mathematical problems

The MTAs were given prepared plans that included suggested problems for in-class use. Most of the instructors mentioned working these problems as part of their planning procedure. Their main reason for doing so was to determine which, if any, of the suggested problems to include in their lesson. From the content analysis, we identified four criteria that the instructors used to determine which suggested problems to include. These were concerns about time management, completeness of the lesson coverage, suitability of the problems for clearly illustrating mathematical points, and the MTA’s comfort level with the non-mathematical aspects (e.g., “real world” contexts) of the problems. For example, the following quote from Xavier illustrates the first three of these concerns:

I would ... [go] through the suggested lesson plan and [look] at the problems that have been recommended ... because I find that of the problems that have been recommended, I have time for maybe half of them ... I look at the problems and see which ones ... are particularly worthwhile; which ones are repeated. So I try to avoid in class giving two consecutive group exercises which have the same outcome.

Xavier did not solve the problems because he was concerned about his own ability to solve them; rather he sought to understand the core mathematical elements of each problem in order to make decisions of priority when pressed by time considerations.

2. Tailoring explanations

In addition to suggesting problems for in-class use, the provided plans included ways to explain the mathematical content. All of the instructors indicated that, to some extent, working out explanations was a part of their lesson planning process. The two primary resources for the basis of these explanations were the lectures given in the provided plans and the explanations provided in the textbook. The instructors modified these explanations, drawing primarily upon their own intuition about how to present the material most clearly,

¹ As with all names used in this paper, this is a pseudonym.

and to a lesser extent the experiences of other MTAs concurrently teaching the same course.

3. Writing out a lesson plan or an outline

The MTAs produced three types of written product: detailed lesson notes, outlines, and annotations directly on the provided plans. All of the instructors mentioned writing some kind of outline or plan; the two MTAs who did not mention writing their own notes mentioned annotating the provided lesson plans. The amount the MTAs wrote varied considerably from person to person and from lesson to lesson, depending on the material to be covered in each individual lesson.

For some MTAs, the purpose of this activity was not to produce the written product itself, but instead to mentally organize the material and the lesson. Zeke spoke to this when he described his reason for writing his brief lecture outline: "... the point of writing things down in the first place is just to make sure that it's all somewhere in my brain in an organized fashion."

4. Time management

The provided plans gave the MTAs a suggested schedule for each lesson. Perhaps as a result, the MTAs only sometimes mentioned time management as part of their planning procedure. The three circumstances under which they mentioned time management were when their class's schedule administratively diverged from the suggested plan (e.g., scheduling a quiz for a different day), when their section needed to catch up from being behind the syllabus, and when they had thought of a way to conduct part of the class more efficiently than the provided plans.

Resources

Content analysis revealed nine resources mentioned in response to the question, "When planning your lessons, where do you normally look for information about what the lesson should be about, what to include in the lesson, inspiration, etc.?" The resources used are listed in Table 3 (following page), which is similarly organized to Table 1 above.

Again, further analysis of the individual responses showed that the nine resources could be grouped into five categories of resources used by the MTAs, as shown in Table 4 (following page).

The remainder of this section provides elaboration of the MTAs use of resources, and it is organized by the categories given in Table 4.

1. Provided resources

Although the provided lesson plans were almost universally mentioned as a resource, the instructors generally did not follow the plans exactly. Our analysis identified five ways in which the prepared plans were used by the MTAs. These were: literally (i.e., the MTA did not deviate from the prepared lesson),

as a starting point for developing the MTA's own plans, as a guide to what topics should be taught, as a source of problems to be used in class, and as a guide to the intended learning outcomes. For some MTAs who did closely follow the prepared plans, the motivation was not improved student learning. Rather, it was to minimize preparation time, in order to allow more time for personal coursework and mathematical research.

We identified four ways in which the MTAs utilized the textbook as a resource. Some used the book to determine what the students were supposed to know as a result of the lesson. Others used the book as a source of examples, even though this was recommended against in their initial training. (In

Table 3. Nine Resources for Lesson Planning

Resource Utilized	# MTAs	# Interviews
Provided plans	7	19
Course textbook	7	18
Own experiences as learners	2	4
Creating examples from own knowledge	2	4
Homework problems	2	2
Students' performances on assessments	2	2
Interaction with students outside of class	1	1
Talking with other instructors	1	1
Previous teaching experience	1	1

Table 4. Five Categories of Resources

Resource Categories	Resources from Table 3
Provided resources	<ul style="list-style-type: none"> • Provided plans • Course textbook
Instructor's own knowledge or experiences	<ul style="list-style-type: none"> • Own experiences as learners • Creating examples from own knowledge • Previous teaching experience
Assignments	<ul style="list-style-type: none"> • Homework problems
Information from or about students	<ul style="list-style-type: none"> • Students' performances on assessments • Interaction with students outside of class
Other instructors	<ul style="list-style-type: none"> • Talking with other instructors

this program, students were expected to read the book before coming to class, and literally repeating examples out of it would serve as a deterrent to that.) Some used the book as a source of explanations, or to gauge how difficult it might be for the students to grasp the material. Finally, some compared the sequencing and content of the section in the book with that suggested in the provided plan. Not all of the MTAs interviewed found the textbook to be a useful resource. In fact, by the end of the semester, one instructor had completely abandoned reading the textbook as part of his planning.

We note that none of the MTAs interviewed used either the provided lesson plans or the course textbook exclusively. Instead they used these two resources in tandem, either one to inform the other, or sometimes in a back-and-forth process of consulting them both.

2. Instructor's own knowledge or experiences

One interesting but uncommon response to the question on resources was creating examples from the MTA's own knowledge and personal experiences. For example, and somewhat atypically, Yann mentioned his own experience as a learner in each interview. In fact, he stated that this was his most frequently used resource, as he tried to recollect both his own state of mind when learning the material, and also what he wished his own instructors would have done in order to help him understand it more clearly at the time:

Well, the most common resource that I look for was how I learned it ... And I try hard to remember what it was like when I learned it for the first time ... and what did I wish for at the time, my instructor would have done to explain it so that I could understand it easily without being confused.

Although some of the MTAs had previous teaching experience, only one mentioned this as a planning resource. The fact that only two MTAs drew upon their experiences as learners and only one MTA drew upon his experience teaching the material is striking. MTAs might be expected to have a wealth of experiences as mathematical learners, and in some cases as mathematical instructors, that would be relevant for assisting others in learning the same material. Remarkably, either this is not the case or they are not utilizing such insights from their own experiences in their teaching.

3. Assignments

Although only two MTAs mentioned the assigned homework as a source of inspiration for planning, solving homework problems was mentioned by several MTAs as a part of their planning procedures. There was a distinction here in the manner in which the assigned homework was being utilized by the instructors. Many of them worked the homework that was assigned the previous class in order to be prepared for the homework review that typically began each class. However, the two who mentioned the homework as a source of

inspiration for planning stated that they wanted to know what the students were expected to be able to do as a result of the lesson that they were planning.

4. Information from or about students

Interactions with students was mentioned twice as a planning resource, both times by the same MTA. Yann, who also drew on his own experience as a learner, mentioned questions that came up in conversations with students in the Mathematics Department's tutoring lab and questions that he had received from students via email as informing his understanding of possible student pitfalls and thereby what to emphasize in class.

In contrast, although some of the other instructors alluded to students in discussions of their planning procedures, the typical response was centered on their impression of what the students ought to be able to do, what the students would like, or what might "work" or "not work." These thoughts focused on gauging the right level of the lesson, rather than on what to actually do when teaching the class. For example, Uday said:

I pretty much read the lesson plan and kind of imagine how it will go, and if there is something that I feel they won't understand, then. ... like, if there's something that I feel will be too easy, I'll make them do it right away.

Although Uday said that he was trying to use some information about the students when planning his lesson, it does not appear that it was feedback directly from or about the students. Rather, it seemed to be what he had imagined going on in the students' minds.

5. Other instructors

Talking with other course instructors was mentioned as a resource twice (surprisingly, by only one MTA). This activity could have been more widespread, as all the interviewed MTAs shared a large common office, however very little evidence exists in the interview transcripts to support the widespread nature of MTAs drawing upon each others' instructional experiences.

Conclusion

The purpose of this report was to provide empirical data on the lesson planning practices of novice MTAs in order to contribute to the developing picture of what MTAs do when teaching and how they acquire the knowledge and skills necessary for effective teaching. We identified a typical procedure that was almost universally followed by the MTAs that we studied. We also identified the resource categories that were heavily utilized by the MTAs in their planning. We hope that these results will provide information valuable for the development and refinement of MTA training and support programs. Although the purpose of our study was not to evaluate training interventions de-

signed to help MTAs gain skills as instructional planners, some basic inferences can be drawn from our results that could be of immediate use to MTA trainers and overseers.

First, it could be useful to know that all of the MTAs consulted the suggested lesson plans, if for no other reason than to save time. However, very rarely were these plans literally followed, serving instead as starting points for MTA-written plans. The former seems to indicate that course directors can have some impact on what happens in the MTAs' classrooms by handing out suggested plans, if they are not already doing so. The latter, on the other hand, seems to indicate that just handing out suggested plans is probably not enough to shape the teaching in the course (Speer, 2001). Course directors could mold both the teaching practices of the MTAs and the learning in the course by training the MTAs to write their own lesson plans, using published training methods (e.g., DeLong & Winter, 2001) or self-developed methods reflecting the unique needs of their own institutions.

A related observation is that time management was only rarely a consideration for the MTAs when planning. If MTAs are going to be effective in implementing the lessons that they plan, then they may need guidance in this area, for example, by training them to use a planning procedure that explicitly gives attention to time management (e.g., DeLong & Winter, 2001). Similarly, and unlike Tyler's "Objectives First" model of lesson planning (1949), specifying learning objectives was not part of the MTAs' planning procedure. Two of the MTAs did work the assigned homework problems in order to determine what the students would be expected to do as a result of the lesson, but that seems to be the extent of the consideration that the MTAs gave to this matter. This seems to indicate that, just as with time management, MTAs will need explicit training and support if they are expected to develop learning objectives as a basis for their instruction and assessment (DeLong, Winter, & Yackel, 2005).

In addition to providing insight to MTA trainers, we hope that these results will stimulate other researchers to further investigate MTA planning. Our study did not attempt to produce a definitive characterization of all MTA planning processes. One line of further research will be to determine how representative the practices documented here are for larger, statistically robust MTA populations. We note that our sample also included a high proportion of international MTAs. Given this, a natural line of further investigation will be to determine the extent to which international MTAs' cultural perspectives influence their planning practices. Another future direction of research will be to compare MTAs' planning with that of pre-service K-12 teachers. Given the extensive literature on K-12 teacher preparation, and its relatively rich body of research on effectiveness, such a comparison could facilitate the development of interventions that would help MTAs more effectively plan their lessons.

Acknowledgement

The authors wish to thank Provost Courant, Associate Dean Megginson, and Associate Vice Provost Cook of the University of Michigan for their support of this project, which was supported through the Gilbert Whitaker Fund for the Improvement of Teaching.

References

- Bellon, J.J., Bellon, E.C., & Blank, M.A. (1992). *Teaching from a research knowledge base: A development and renewal Pprocess*. New York: Macmillan.
- Belnap, J., & Allred, K. (2006). Mathematics teaching assistants: Their instructional involvement and preparation opportunities. *Submitted for publication*.
- Braxton, J.M., A.E. Bayer, & Finkelstein, M.J. (1992). Teaching performance norms in academia. *Research in Higher Education*, 33(5): 533-569.
- Brophy, J. (1982). How teachers influence what is taught and learned in classrooms. *Elementary School Journal*, 83(1), 1-13.
- Bush, W.S. (1983). Preservice secondary mathematics teachers' knowledge about teaching mathematics and decision-making during teacher training (Doctoral Dissertation, University of Georgia, 1982). *Dissertation Abstracts International*, 43, 2264A.
- Cabe, P.A. (1996). ATOMIC: A course and lesson planning mnemonic. *College Teaching*, 44(3), 149-152.
- Clark, C. M. (1981). *Transforming curriculum in mathematics, science and writing: A case study of teacher yearly planning*, Research Series Number 99. East Lansing, MI: Institute for Research on Teaching, Michigan State University.
- Clark, C.M., & Peterson, P.L. (1985). Teachers' thought processes. In M.C. Wittrock (Ed.), *Handbook of research on teaching*. Third edition (pp. 255-296). New York: Macmillan.
- Clark, C.M., & Yinger, R.J. (1979). *Three studies of teacher planning*, Research Series #55. East Lansing, MI: Institute for Research on Teaching, Michigan State University.
- Connally, E., Hughes-Hallet, D., Gleason, A.M., Avenoso, F., Cheifetz, P., Davidian, A., et al. (2004). *Functions modeling change. A preparation for calculus*. Second edition. New York: John Wiley & Sons.
- DeLong, M., & Winter, D. (2001). An objective approach to student-centered instruction. *PRIMUS*, 11(1), 27-52.
- DeLong, M., & Winter, D. (2002). *Learning to teach and teaching to learn mathematics: Resources for professional development*, MAA Notes #57. Washington, DC: Mathematical Association of America.
- DeLong, M., Winter, D., & Yackel, C. (2005). Mental maps and learning objectives: The FAST-SLO algorithm for creating student learning objectives. *PRIMUS*, 15(4), 307-338.
- Doyle, M., & Holm, D.T. (1998). Instructional planning through stories: Rethinking the traditional lesson plan. *Teacher Education Quarterly*, 25(3), 69-83.
- Fennema, E., & Franke, M.L. (1992). Teachers' knowledge and its impact. In D.A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 147-164). New York: Macmillan.

- Holsti, O.R. (1969). *Content analysis for the social sciences and humanities*. Reading, MA: Allyn & Bacon.
- Hunting, R. (1997). Clinical interview methods in mathematics education research and practice. *Journal of Mathematical Behavior*, 16(2), 145-165.
- Jackson, P.W. (1968). *Life in classrooms*. New York: Holt, Rinehart & Winston.
- Krantz, S.G. (1999). *How to teach mathematics: A personal perspective* (2nd Ed.). Providence, RI: American Mathematical Society.
- Leinhardt, G. (1983). *Routines in expert math teachers' thoughts and actions*. Paper presented at the Annual Meeting of the American Educational Research Association. Montreal, Canada.
- Lowther, M.A., Stark, J.S., Genthon, M.L., & Bentley, R.J. (1990). Comparing introductory course planning among full-time and part-time faculty. *Research in Higher Education*, 31(6): 495-517.
- Rishel, T. (2000). *Teaching first. A guide for new mathematicians. MAA Notes #54*. Washington, DC: Mathematical Association of America.
- Sardo-Brown, D. (1988). Twelve middle-school teachers' planning. *The Elementary School Journal*, 89(1), 69-87.
- Sardo-Brown, D. (1993). Descriptions of two novice secondary teachers' planning. *Curriculum Inquiry*, 23(1), 63-84.
- Sardo-Brown, D. (1996). A longitudinal study of novice secondary teachers' planning: Year two. *Teaching and Teacher Education*, 12(5), 519-530.
- Shannon, D.M., Twale, D.J., & Moore, M.S. (1998). TA teaching effectiveness: The impact of training and teaching experience. *The Journal of Higher Education*, 69(4), 440-466.
- Shavelson, R.J., & Stern, P. (1981). Research on teachers' pedagogical thoughts, judgments, decisions, and behavior. *Review of Educational Research*, 51(5): 455-498.
- Shavelson, R.J. (1987). Planning. In M.J. Dunkin (Ed.), *The international encyclopedia of teaching and teacher education* (pp. 483-486). New York: Pergamon Press.
- Speer, N. (2001). Connecting beliefs and teaching practices: A case-study of teaching assistants in reform-oriented courses. (Doctoral dissertation, University of California, Berkeley, 2001).
- Speer, N., Gutman, T., & Murphy, T.J. (2005). Mathematics teaching assistant preparation and development. *College Teaching*, 53(2), 75-80.
- Stark, J.S. (2000). Planning introductory college courses: Content, context and form. *Instructional Science*, 28(5): 413-438.
- Strauss, A.L. (1987). *Qualitative analysis for social scientists*. New York: Cambridge University Press.
- Tyler, R.W. (1949). *Basis principles of curriculum and instruction*. Chicago, IL: University of Chicago Press.
- Yinger, R.J. (1980). A study of teacher planning. *Elementary School Journal*, 80(3), 107-127.

Please insert brief (one or two sentence bio for each author).