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EFFECTS OF TEACHER INDUCTION ON BEGINNING TEACHERS' TEACHING

A CRITICAL REVIEW OF THE LITERATURE

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Drawing on literature since 1997, this review explores the effects of teacher induction on beginning teachers' conceptions and practice of teaching, and it identifies three approaches to understanding such effects, as found in the literature. The first approach addresses the assumed effects of teacher induction components on beginning teachers' teaching using theoretical assumptions as a base. The second approach analyzes the effects through teachers' self-reports. The third explores the effects of using multiple data sources. Although teacher induction affects beginning teachers' ideas about teaching, few studies capture its effects on teaching practice and student achievement. Thus, this review suggests directions for future research.

Keywords: *teacher induction; novice teacher learning; teaching practice*

Since the early 1990s, scholars have advocated for beginning teacher support (Darling-Hammond, 1995; Feiman-Nemser & Parker, 1992; Huling-Austin, 1992). The establishment of national curriculum standards and federal legislation—namely, No Child Left Behind—created pressure to focus on beginning teachers' learning and the improvement of teaching quality. In response, states and school districts are moving the focus of teacher induction as socialization and emotional support (Feiman-Nemser, Schwille, Carver, & Yusko, 1998; Gold, 1996) to supporting learning consistent with national curriculum standards (Sweeny & DeBolt, 2000).

Underlying these responses is an assumption that a link exists among induction, beginning teachers' conceptions, teaching practice, and students' learning. In this review, we explore whether such a link is supported by the literature, and we suggest implications for research, policy, and practice.

CONCEPTIONS OF TEACHER INDUCTION AND LEARNING TO TEACH

Although learning to teach occurs in multiple stages of a teacher's career (Feiman-Nemser, 1983, 2001a), we focus on the teachers'

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first year because it is a crucial and problematic period for teachers. In fact, it has been found to shape teaching patterns and influence teacher retention (Ingersoll & Smith, 2004) and the influences of school context on teacher retention (Johnson & the Project on the Next Generation of Teachers, 2004). First-year teachers assume responsibilities similar to those of experienced teachers while learning their job with limited experience and preparation (Wildman, Niles, Magliaro, & McLaughlin, 1989), which results in attending to classroom management and procedures instead of learning how to teach well and improve student learning (Dewey, 1964; Kagan, 1992; Wideen, Mayer-Smith, & Moon, 1998). First-year teachers are encouraged to contextualize their subject and pedagogical preparation and concomitantly be members of a school community and adjust to its organization and culture (Griffin & Millers, 1987). How they are prepared to teach, which is often consistent with curriculum standards, is not always supported by their existing school cultures (Puk & Haines, 1999; Sykes & Bird, 1992).

In our review, we focus on the effects that teacher induction programs have on beginning teachers' teaching, instead of on how comfortable beginning teachers feel about and how well they are adjusting to their local contexts. Teacher induction programs have historically focused on the personal comfort levels of novices (Feiman-Nemser et al., 1998; Gold, 1996). Feeling comfortable does not necessarily lead to effective teaching and student learning (Anyon, 1981).

We recognize that a focus of many induction programs is that of helping novices adjust to the cultures of their schools (Huling-Austin, 1992), but simply adjusting to the existing context does not automatically lead one to be an effective teacher (Cochran-Smith & Lytle, 1999). As Wang and Odell (2003) showed, two interns developed strikingly different ways to adjust to a context, which led to different teaching and different consequences for students' learning even when offered opportunities to follow their own agendas in the same classroom, working with the same mentors.

We also examined the effects of formally structured components of teacher induction on beginning teachers given that conceptually based induction programs that focus on support for learning to teach are rare (Feiman-Nemser, 2001a), as are studies on program effects. These components include teacher mentoring relationships, which are a major supporting structure for beginning teachers in induction programs (Odell & Huling, 2000); different kinds of collaboration among beginning teachers and colleagues; and professional development activities designed to affect teaching and student achievement (Moir & Gless, 2001).

We assumed that any analysis of the effects of induction on beginning teachers' learning to teach is not adequate without a proper theorization of teaching. In this review, we examine the effects of teacher induction on beginning teachers' thinking about teaching, their teaching practice, and their students' learning. *Teaching* here means a professional practice that involves conceptions of knowledge, learning, and teaching (Richardson, 1996); relevant pedagogical reflections that move teachers through various contexts of teaching (Lampert & Clark, 1990); and the development of student knowledge, skills, and dispositions.

Specifically, we focus on the effects of induction on beginning teachers' learning to teach the kind of teaching envisioned by national curriculum and teaching standards (Interstate New Teachers Assessment and Support Teaching Consortium, 1992; National Council for the Social Studies, 1994; National Council of Teachers of English & the International Reading Association, 1996; National Council of Teachers of Mathematics, 2000; National Research Council, 1996). Although varied in their objectives, foci, and content, these standards project learner-centered instruction where knowledge is seen as being constructed individually and collaboratively (Brown, Collins, & Duguid, 1989); where learning is viewed as active sense making (Cobb, 1994) through collaborative inquiry (E. G. Cohen, 1984); and where teacher is regarded as organizer, challenger, and facilitator of student learning (Bigelow, 1990). Its goal is to meaningfully connect student learning with personal

experiences (Resnick, 1987), challenge students' misconceptions, and nurture their deep understanding of concepts and conceptual relationships within and across different subjects (D. K. Cohen, McLaughlin, & Talbert, 1993). In addition, it urges students to discover, share, and examine their ideas (Bruner, 1960; Leinhardt, 1992), and it helps all students reach excellence regardless of their gender, race, cultural, social, and economic backgrounds (Kennedy, 1991a). We recognize that current standardized tests may not represent the visions and goals of the national curriculum and teaching standards, which clearly complicates the examination of the connections among teacher induction, teaching practice, and student achievement.

LITERATURE SELECTION AND REVIEW PROCESS

Literature was selected in three steps. First, we completed three ERIC¹ searches using keywords *teacher induction* and *beginning teacher* from 1960 to 2003 and *teacher mentoring* since 1997, given that the literature on mentoring before 1997 was reviewed and published by the first and second authors in 2002 (Wang & Odell, 2002b). Second, we selected relevant articles, books, and book chapters referenced in the studies from our initial ERIC searches. Third, we included articles, book chapters, and conference presentations from our personal collections.

We divided the literature into empirical and case studies, program and personal descriptions, and literature reviews and position papers. We selected the literature for further review on the basis of (a) whether it addressed issues of first-year teachers' learning to teach and induction program components that promote beginning teachers' learning and (b) whether it presented evidence of teachers' conceptual and practice changes or students' learning as influenced by the induction components.

Empirical and case studies fell into three categories based on how the influences of induction program components on beginning teachers' conceptions and practice were determined in each study. The first group of

studies assumed the effects of induction components based on theoretical assumptions of effective learning, teaching, and mentoring. The second group identified the effects of induction components based on novice teachers' reports. The third group directly captured the relationship between particular program components and novice teachers' beliefs and teaching practice.

We used these three categories to organize the body of our review because they represent popular approaches to identifying the effects of induction on beginning teachers and because they illustrate the complexity of this work. We read the program and personal descriptions and the position and review papers, and we used all of these as a basis to develop conceptions, identify assumptions, make comments, offer implications, and point to future directions for research.

ASSUMED EFFECTS OF TEACHER MENTORING IN TEACHER INDUCTION

One approach to identifying effects of teacher induction on novices' teaching is to analyze what mentors do and to identify impacts on novices' practices based on theoretical assumptions of effective mentoring. Studies in this category included case analysis, discourse analysis, surveys, and interviews.

Assumed Effects of Mentors' Beliefs and Practice

Three studies examined exemplary mentor teacher beliefs and practices and discussed the effects of mentoring on beginning teachers. Feiman-Nemser (2001b) analyzed 20 hours of observations and 10 hours of interviews collected over 2 years from a mentor teacher with 30 years of teaching experience who was reassigned from classroom teaching to work with 14 beginning teachers in an induction program. She identified the mentor's dispositions and skills that were consistent with assumptions of educative mentoring from Dewey's concept of experience (1938), where the educator is responsible for arranging conditions so that

learners have growth-producing experiences. These conceptions and skills included the following: co-thinking with beginning teachers about teaching, instead of being an expert who imposes ideas; focusing beginning teachers' on basic instructional issues that they may not have recognized, such as how children think, and connections between theory and practice; helping beginning teachers' frame their self-identified teaching problems and articulate reasons for them; and modeling teaching that demonstrates principles of good teaching. The author argued that these mentoring conceptions and skills are crucial in effecting beginning teachers' teaching and that learning to teach is an inquiry process contextualized in beginning teachers' practice that needs to be assisted by an experienced other.

Drawing on surveys of 37 teacher induction program coordinators, Athanases and Achinstein (2003) stated that beliefs about children's thinking was important to developing effective teaching. They also affirmed that mentors should help novices focus their attention on children's thinking. Observations of mentor–novice conversations and interviews with two mentor–novice pairs over 1 year demonstrated how the mentors in these cases were able to focus beginning teachers' attention on student learning, especially, that of low performers. The authors identified skills for mentors that included analyzing and assessing students by using rhetorical questions, follow-up probes, and suggestions as a co-thinker during conversations. The assumption was that if it is crucial for novices to understand children's learning to develop student-centered instruction, then a substantial focus on student learning in mentor–novice discussions is necessary.

Drawing on data from 23 mentor teachers in the United States, the United Kingdom, and China, Wang (2001) explored the relationship between mentoring contexts and mentoring practice and learning opportunities for novices. Through comparative analysis, he found that mentors in different countries hold different beliefs about what novices need to learn. U.S. mentors, influenced by the decentralized curriculum and individualistic culture of teaching,

tended to believe that learning about individual students and establishing purposes for teaching were important. Chinese counterparts believed that novices should develop a deep understanding of subject matter, curriculum, and professional ethics, as suggested by their centralized curriculum and subject-based teaching. U.S. mentors spent less time talking with novices, and when they did interact, they focused on issues of curriculum materials, whereas Chinese mentors spent more time interacting with their novices, with a focus on pedagogical issues. Even though mentors developed reform-minded teaching practices, they did not necessarily provide mentoring that supported beginning teachers' learning in ways expected by the reformers. The study argued that good teaching practice is not automatically transferred into good mentoring practice.

The first two studies help to conceptualize effective mentoring practice by specifying mentors' beliefs and skills that are consistent with theories of learning and teaching, and they offer a framework for mentoring practices that focuses on teacher learning and teaching practice. The last study points out that being able to teach in reform-minded ways does not necessarily enable mentors to guide beginning teachers to teach in the same ways. The study suggests that mentoring is a contextualized practice shaped by culture, curriculum, and teaching organization (Hiebert, Gallimore, & Stigler, 2002). The three studies paid little attention to the role of beginning teachers' ideas and behaviors in the mentor–novice relationship. Following a constructivist view of learning (Von Glasersfeld, 1995), beginning teachers, like all learners, have ideas and dispositions of what and how to learn that influence their learning and classroom instruction. The above studies limit their focus on the identification of mentors' beliefs and practice without attention to the influences of novices' beliefs on the mentor–novice relationship. This could lead to mentor-centered practice that inappropriately assumes that effective mentoring conceptions and practices can be identified and developed for all beginning teachers.

Assumed Effects of Mentor–Novice Interactions

Researchers have explored the effects of mentor–novice discussions about novices' lessons on teaching by considering mentoring practices and novices' reactions. Achinstein and Barrett (2004) analyzed three mentor–novice case study vignettes, classroom observations of novices, and interviews from 15 mentor–novice pairs working with culturally and linguistically diverse elementary students, and they explored influences that mentors exert on novices' conceptions of student diversity and learning. Their assumption was that beginning teachers, instead of seeing learning and diversity through a managerial frame that highlights issues of controlling student behavior and maintaining order, needed to learn to view issues from more meaningful frameworks. Alternative frameworks include the human relationship perspective, which regards classrooms as social systems with caring interactions among teachers and students, or the political perspective, which acknowledges the struggle between forces for social change and those that reproduce inequalities in the larger society. The study found that in mentor–novice discussions about lessons, novices tend to see individual student behaviors from a managerial framework whereas their mentors are more likely to frame issues from either the human relationship or the political perspective. The researchers further analyzed three mentor–novice conversations and suggested that although it was possible for mentor teachers to help novices identify the complexity of classroom life and student learning by reframing the problem by using alternative perspectives, it was not always easy for mentors to do. Challenges emerged, including having mentors directly confront novices' beliefs and practices, maintaining frames that differed from those of beginning teachers and school cultures, and resolving the conflicting frames that the mentors themselves held.

Drawing on 64 conversations about teaching between mentors and beginning teachers ($N = 16$), Strong and Baron (2004) analyzed the kinds of pedagogical suggestions that mentors offered and novices' responses to suggestions. The study

assumed that mentors' pedagogical suggestions were important sources for beginning teachers' learning and that once accepted by novice teachers, these suggestions would influence novices' teaching practice. The study revealed that in more than 30 hours of conversations, there were 10 instances where the mentor made a direct suggestion and where only one third of these produced elaborated responses from the beginning teachers. The rest were indirect suggestions that failed to produce beginning teachers' responses. Mentor suggestions may not have had substantial effects on beginning teachers.

Wang, Strong, and Odell (2004) analyzed mentor–novice lesson-based discussions from two U.S. and two Chinese mentor–novice pairs and explored the conversation foci and how the topics in the conversation were initiated. The study found that the foci and forms of discussions between the U.S. and Chinese mentor–novice interactions were different. The two Chinese cases had a significant number of topics devoted to subject content, whereas the two U.S. cases had few on subject matter but more on individual students. The two U.S. pairs tended to deal with issues of teaching, students, and subject matter in isolation, whereas the two Chinese cases were more likely to discuss these issues in relation to one another. The U.S. mentors and novices had almost equal opportunities to initiate conversational topics, whereas the Chinese mentors tended to dominate the conversation. U.S. mentors also tended to ask questions about their novices' lessons, and then novices tended to explain more in response to mentors' questions; however, Chinese mentors were more likely to critique and make direct suggestions. In most instances, U.S. mentor–novice pairs did not elaborate with reasons or examples, but Chinese pairs did. The study assumed that pedagogical content knowledge, deep understanding about students, and contextualized reflection with colleagues were important areas for beginning teachers to learn. Opportunities to develop this important knowledge and skill set were different in each country and were likely related to curriculum structures and organization of teaching and mentoring in each country.

These studies differ from those in the previous section in that beginning teachers' voices became an important consideration when conceptualizing the influences of mentoring on beginning teachers. Not only did the studies pay attention to what the mentors did, but they also focused on beginning teachers' responses and the ways in which both contributed to the results of their conversations, although each study focused on particular aspects of conversations. The studies focused on changing how beginning teachers looked at students' behaviors in classrooms, how mentors offered suggestions, how novices reacted to suggestions, and what the foci and forms of their conversations were.

The effects of mentoring on novices' teaching, like those in the above section, were assumed on the basis of theory. For example, Achinstein and Barrett (2004) assumed that when novice teachers were able to look at student learning and diversity from a humanist or political perspective instead of a managerial framework, it would help them learn to teach with a focus on student learning. Strong and Baron (2004) assumed that mentoring would be useful in influencing beginning teachers' instruction if mentors offered suggestions and had their suggestions accepted by beginning teachers. Wang et al. (2004) assumed that pedagogical content knowledge, student learning, specific reflections, critiques, and suggestions were important for beginning teachers' instruction and should occur in mentor–novice discussions. However, what beginning teachers think about teaching and do in their classrooms as a result of lesson-based mentor–novice interactions were not explored in these studies. Thus, the effect of these influences on beginning teachers' teaching and on students' learning is still a question for further research.

Assumed Effects: Section Summary and Comments

Although mentoring has been used as structured support in many induction programs, scholars have argued that its potential impact on what and how beginning teachers learn to teach

may be qualitatively different and that not all structured mentoring relationships necessarily support reform-minded teaching practice (Cochran-Smith & Paris, 1995; Feiman-Nemser & Parker, 1992; Hargreaves & Fullan, 2000). Our review contributes to this line of thinking. First, it helps to identify mentors' dispositions, behaviors, and processes of mentoring that are potentially useful in shaping beginning teachers' learning and their conceptions and practices. Examples include co-thinking with beginning teachers, focusing beginning teachers' attention on issues of instruction, modeling teaching and analysis of teaching (Athanases & Achinstein, 2003; Feiman-Nemser, 2001b), and engaging novices in discussing subject content and its relationship to teaching and student learning, reasoning, critiquing, and offering suggestions for teaching practice (Wang et al., 2004).

Second, our review indicates that mentors can work to challenge those taken-for-granted needs and concerns of beginning teachers by reframing them from different perspectives or by shifting beginning teachers' attention to more important issues of teaching in their interactions with beginning teachers (Achinstein & Barrett, 2004). Third, it suggests that even if mentor teachers are teaching in ways consistent with reform standards, then the potential effects of these mentoring behaviors are limited by how beginning teachers respond to them and by the mentoring and instructional contexts in which mentoring relationships are situated (Strong & Baron, 2004; Wang, 2001).

The effects of mentoring on beginning teachers addressed here are all based on assumptions of various theoretical perspectives of learning, teaching, and mentoring, rather than on direct observation. None of the studies that we review in this section identified any actual effects of these mentoring behaviors and processes on what beginning teachers think and do in their classrooms and, thus, any influence on student learning.

Methodologically speaking, the findings from these studies are based on either case analysis or analysis of a limited number of mentor–novice relationships from limited programs and locations. Thus, generalization of these findings to

broader contexts of teacher induction should be made with considerable caution. Two useful directions for future research are (a) to verify and further identify the emerging mentoring dispositions and skills in a range of teacher induction contexts and (b) to explore the connections between these mentoring practices and what beginning teachers think and do and the influences that these practices have on student learning in these classrooms.

EFFECTS OF TEACHER INDUCTION IDENTIFIED BY BEGINNING TEACHERS

Beginning teachers' self-reports provide another approach to identifying the effective components of induction programs and the influence that these components have on beginning teachers' practice. Data sources include surveys of beginning teachers, journals, and structured interviews with beginning teachers in various national contexts. These studies often involve a relatively larger population of participants.

Self-Reported Effects of Lesson-Based Observation and Conversations

Two studies in U.S. contexts were designed to identify effective components of teacher induction on novices' teaching based on novices' perspectives. Both pointed to lesson-based discussion with mentors as an effective component.

Luft and Cox (2001) conducted a statewide postinduction survey including closed and open-ended questions related to demographic information, preservice program, and induction program with 186 beginning science and mathematics teachers who participated in a variety of formal and informal induction programs offered by various districts. The analysis suggests that beginning teachers overwhelmingly regard having interactions with and feedback from mentors as important support for their learning to teach science and mathematics. The more often that beginning teachers had lessons observed and discussed by mentors, the higher they rated their induction programs.

In a series of studies on new teachers, Hall, Johnson, and Bowman (1995) explored learning to teach by analyzing participant journals. The analysis included formal and informal weekly journals written during a semester by 11 first-year teachers who were teaching various school subjects in elementary and secondary school contexts. The study led to the conclusion that what beginning teachers value most is the opportunity to observe others' teaching and to be observed by colleagues. Observations helped them reflect on their own teaching and how students learn.

Findings from studies based on beginning teachers' self-reports echo those from the analysis of mentoring practice. Lesson observations and lesson-based discussions with a mentor are identified as valuable components in teacher induction. These findings are consistent with a sociocultural perspective of learning to teach where lesson-based discussions offer novices opportunities to develop teaching knowledge in context (Brown et al., 1989; Rogoff, 1984). Novices reflect on their practice and internalize new ideas about teaching (Bakhtin, 1986; Vygotsky, 1994). Experienced teachers help novices achieve a level of learning beyond what novices achieve by themselves (Tharp & Gallimore, 1988; Vygotsky, 1978).

The studies reviewed in this part had limitations. They failed to clarify what kinds of induction components were included. Thus, it was impossible for us to judge the relative importance of the kinds of lesson observations and lesson-based discussions that influenced beginning teachers' practice. The studies also did not analyze how discussions addressed those areas of teaching that were important and what kinds of teaching these discussions influenced. Additionally, these studies did not capture what beginning teachers thought about teaching and what they did in their classrooms.

Self-Reported Effects of Various Induction Components

Three British studies based on self-reports of beginning teachers and mentors contribute to understanding the effects of various components

of teacher induction programs on novices' teaching. Oberski, Ford, Higgins, and Fisher (1999) surveyed 42 teachers at the beginning of their first year and 24 of them at the end of their first year, and then they conducted a semistructured interview with 11 of them at the beginning of their second year. The study compared the effects of several induction components on beginning teachers' teaching as envisioned by the British national curriculum standards. These components included university tutors' classroom visits, mentor teachers' support, school district personnel school visits, and relationships with other colleagues. The study found that beginning teachers identify their relationships with colleagues and their university tutor visits as being most useful in supporting their learning to teach. However, when asked about their achievements in the first year, these beginning teachers judged their achievement by focusing on classroom management instead of on the teaching or student learning that was relevant to national curriculum standards and assessment.

Another British study (Moran, Dallat, & Abbott, 1999) surveyed 130 beginning teachers regarding their experience in their preservice and induction programs and then interviewed 6 beginning teachers. The study showed similar results to those in the study above. Most beginning teachers reported that although they could see their students learning, they felt frustrated with classroom discipline problems. The follow-up interviews suggested that the formal, structured induction program supported the observations conducted by their department head and mentors, as well as the formal discussions about their teaching. However, effects of these formal events on teaching were limited to issues of classroom management and to providing teaching resources rather than to learning the kind of teaching that was consistent with national curriculum standards.

Other British scholars (Williams, Prestage, & Bedward, 2001) interviewed 18 beginning teachers, 17 mentors, 11 induction program heads, and 5 principals at the beginning and end of the novices' first year of teaching. The authors examined the experiences of beginning teachers

who received structured support from mentors, induction program heads, and school principals in schools with individualistic cultures and those with collaborative cultures. The study found that the structured collaboration between mentors and beginning teachers did affect the teaching practice of beginning teachers. Beginning teachers in a collaborative school environment reported that their mentors made greater impacts on their professional development, which were further sustained by the collaborative culture. Those in the individualistic school culture reported that the influence of mentors on beginning teaching was limited because the relationships were not supported in the school culture.

These self-report studies of beginning teachers in British schools addressed an issue not well addressed by U.S. studies. They focused on the effects of lesson observation and lesson-based interactions with mentors and other persons on beginning teaching. The structured mentor–novice relationship with a focus on lesson observation and discussions influenced novices' classroom management skills (Moran et al., 1999; Oberski et al., 1999) and in some cases, their teaching practice as expected by the induction program (Williams et al., 2001). Such influences were limited or further extended by the nature of school culture in which such structured relationships were situated (Williams et al., 2001).

None of the studies in this part conceptualized the kind of teaching that the induction program expected beginning teachers to develop. None examined the relationship between structured induction components and what beginning teachers were able to think and do. They did not provide a detailed analysis about the kinds of teaching that beginning teachers were able to learn. In addition, self-reports based on postsurveys and postinterviews are problematic in identifying what beginning teachers actually think and do in their classrooms. Careful observation and analysis of actual teaching practice are necessary to determine teacher behaviors. Self-reports are more likely colored by beginning teachers' initial concerns about their teaching instead of theoretical conceptions (Wilson, Shulman, & Richert, 1987).

Beginning Teacher Self-Report: Section Summary and Comments

Studies in this section that examined induction effects as reported by beginning teachers and their mentors contribute to understanding the structured components of teacher induction and its effects, in several ways. First, our review in this section shows that beginning teachers view their induction program—especially, the mentor–novice relationship—as supporting classroom management, curriculum resources, and their relationship with students (Moran et al., 1999; Oberski et al., 1999). These findings are consistent with the concerns of beginning teachers who received little or no support during their first year, as identified in several literature reviews related to teacher induction. Concerns include classroom management, curriculum resources, and beginning teachers' relationships with students, instead of the quality of their teaching and student learning (Gold, 1996; Kagan, 1992; Veenman, 1984). The studies in this section failed to analyze whether these effects were the intended results of the structured mentor–novice relationship in their induction program or the result of novice teachers' primary concerns in the first year. These concerns may have pushed mentor–novice relationships to follow what novices needed rather than the expectation of the induction program for beginning teachers to learn to teach as envisioned by curriculum standards.

Second, studies in this section suggest that beginning teachers highly regard and expect a formally structured mentoring relationship that focuses on lesson observation and lesson-based discussions and that they identify that such activities in their induction affect their teaching practice and learning (Hall et al., 1995; Luft & Cox, 2001; Williams et al., 2001). Such findings challenge the theoretical assumption that contrived relationships among teachers destroy trust among teachers, which is necessary for the development of professional collaboration (Cochran-Smith, 2001; Hargreaves & Dawe, 1990). However, the quality of these effects on beginning teachers' teaching as envisioned by the curriculum standards were not clearly captured and analyzed. None of the

studies in this section were devoted to analyzing what beginning teachers are able to think and do in their classroom as a result of induction components.

Third, the studies suggest that the effects of lesson observation and lesson-based discussions with mentors on novice teachers' learning to teach and teaching are shaped by the kinds of school cultures in which they teach (Williams et al., 2001). The individualist culture limits the effects of structured induction components on beginning teachers, whereas the collaborative culture further extends such influences. This finding echoed the suggestion that teaching practice is a culturally scripted activity (Stigler & Hiebert, 1999) and that learning to teach is influenced by the school culture. Only one study in this section explored the relationship between the effects of structured mentoring relationships in an induction context and the type of school culture. Thus, it was difficult to weigh the prevalence of this relationship in the various school culture contexts that may exist in different countries.

Although covering substantial numbers of beginning teachers from different school contexts, studies in this section share two methodological problems. First, although useful in determining what and how beginning teachers felt about their induction programs, surveying and interviewing beginning teachers about their feelings does not capture what beginning teachers are able to do in their classrooms. Second, although interviews and surveys are often used to explore teachers' conceptions and knowledge, the existing studies are unable to identify beginning teachers' conceptions about teaching as envisioned by national curriculum standards. One reason for these shortcomings is that few studies include surveys and interviews that are conceptualized by keeping the tenets of curriculum standards in mind and collecting information along these lines.

EFFECTS OF VARIOUS COMPONENTS AND FOCI OF TEACHER INDUCTION

The last group of studies identified the effects of various components or foci of teacher induction programs by directly examining the

relationship between a component or focus of teacher induction and novices' conceptions or practice of teaching. These studies were conducted in multiple national contexts and involved various research approaches, such as case studies, surveys, and multifaceted research methodologies.

Effects of Teacher Induction Workshops and Relevant Ongoing Supports

Workshops are a commonly used component in teacher induction. Several case studies explored the effects of this component on novices' conceptions and practices.

Barrett et al. (2002) explored the influences of a workshop-based induction project on conceptions and practice of mathematics teaching, following two elementary first-year teachers who received a weeklong workshop on inquiry-based curriculum to teach geometric concepts. The novices received ongoing support through researchers' feedback based on observations of children's thinking in their classrooms over a year. The study collected and analyzed data from each teacher. Data sources included two lessons observations, student assignments, field notes about the six lessons, and interviews about these lessons. It revealed that one of teachers was able to understand and articulate premises developed in the workshop in the interview whereas the other held onto initial beliefs that were consistent with her existing classroom practice. Neither teacher was able to develop worthwhile mathematics tasks, use discussions to engage students in thinking about mathematics concepts, or follow up on what students said in their teaching. The study concluded that the workshop-based induction exerted little substantial impact on both teachers' mathematics teaching practices. Yet, the reasons for such results were different between the two participants. For one, the resilience of initial conceptions was too strong to be changed by the workshop and relevant ongoing supports; for the other, the conceptual changes were not able to lead to changes in practice.

Another case study (Franke, Carpenter, Fennema, Ansell, & Behrend, 1998) reached a similar conclusion using formal and informal lesson observations of a beginning teacher and

two experienced teachers, postlesson interviews, and interviews on general beliefs of mathematics teaching, as well as informal interactions over 4 years. The teachers participated in workshops that focused on developing mathematics instruction based on inquiry into students' thinking during the first and second years of the study, and they received ongoing support from colleagues and researchers in the form of lesson observations and discussions over 4 years. The study found that the effects of regular workshops on teachers' use of children's mathematics thinking was not substantial for the beginning teacher. The teacher was able to build on children's ideas to generate mathematics problems or questions, but when her ideas and children's ideas were in conflict, she guided children using only her own way of thinking. Over the years of the study, she changed neither her teaching nor her ways of inquiry into her students' learning. One experienced teacher was able to change initial ideas about mathematics teaching and implement new ideas in his teaching, but he was not able to demonstrate inquiry into children's mathematics thinking. The other experienced teacher was able to change initial ideas and practice and use inquiry into his students' learning to continually inform teaching practice.

Whereas a workshop approach for professional development was popular because of its cost-effectiveness (Wang & Odell, 2002b), we were surprised to see that little research has been done to explore the effects of this approach on beginning teachers' practices. Thus, it was difficult to generate any representative findings from existing studies.

Nonetheless, the two case studies that we reviewed addressed several issues related to the effects of a workshop approach to induction on beginning teachers' conceptions and practice. First, beginning teachers' initial beliefs of teaching may play an important role in shaping the influence of workshops on beginning teachers' beliefs and practices, especially when they conflict with those underlying the workshops. This suggestion seems consistent with the constructivist nature of teacher learning in the general teacher education literature (Darling-Hammond, 1998; Richardson, Anders, Tidwell, & Lloyd, 1991; Wideen et al., 1998).

Second, the direction of workshop influences, if any, may not be universal for all beginning teachers. Instead, it may be specific to a beginning teacher depending on where he or she is in terms of learning to teach (Barrett et al., 2002; Franke et al., 1998).

Third, the change of beginning teachers' beliefs about teaching may not lead to changes in their teaching practice (Barr, Barth, & Shermis, 1977) or guarantee their continual growth in learning to teach (Franke et al., 1998). Such changes could be related to the school contexts (Feiman-Nemser & Floden, 1986). The workshop approach to induction often functions as an additive approach, failing to consider or exert any influence on the ecological environment in which their teachers' teaching is situated (Wideen et al., 1998).

Effects of Collaboration Among Beginning Teachers With Shared Visions

Another induction structure that is used to support teacher learning is a collaborative relationship among beginning teachers. Two studies emerging from our literature search explored the effects of such collaboration among beginning teachers.

Data sources in one study included two interviews, 16 lesson observations, and a series of journal entries collected from two middle school first-year science teachers who partnered with each other in one classroom during their induction year. Eick (2002) examined whether and how such peer collaboration supported the participants in learning to teach science. The study found that the two teachers had different personalities, faced struggles in classroom management as many beginning teachers do, and experienced the pressure of teacher evaluation and surviving in a school culture of teacher-centered science teaching. However, they were able to implement student-centered science teaching as envisioned by the national science teaching standards and further develop their conceptions of science teaching. The study suggests that a shared philosophy of science teaching, as developed in their teacher education program, provided an important base for their joint learning to teach. Their shared working arrangement created opportunities for them to

learn from each other through mutual modeling, observation, and reflections on each other's practice.

Rolheiser and Hundey (1995) explored the effect of collaborative relationships among first-year teachers that started in their preservice years and regarded their teaching during the induction year. The study analyzed journals, questionnaires, interviews, and observations of their group discussions collected at both preservice and induction levels from 50 beginning teachers who graduated from a teacher education program in Canada. The study revealed that during their preservice years, the participants were able to develop a strong disposition toward collaboration. As they moved into first-year teaching, these beginning teachers were able to continue to collaborate with peers within and across schools even though many were teaching in individualistic school cultures. Because they highly valued the collaboration developed in their preservice period and shared similar visions and ideas for teaching, their collaborative relationship supported them as they continued to learn to teach in their induction year.

The two studies that we review in this section suggest the use of this collaboration in supporting beginning teachers' learning to teach from different perspectives. The first study showed that when beginning teachers share visions for teaching, their job sharing provides opportunities for them to rely on one another. Together, the teachers explore teaching by reflecting, observing, modeling, and supporting one another's teaching, which is otherwise difficult to sustain (Eick, 2002). The second study showed that a collaborative relationship that is developed in a preservice context can carry itself into induction if it is based on a shared vision for teaching and a shared inquiry into teaching. It can also continually support beginning teachers' learning to teach, even if such teachers are working in school contexts that are unsupportive (Rolheiser & Hundey, 1995).

The research is still quite limited in understanding the functions, limitations, and barriers of using collaborative relationships among beginning teachers who have different kinds of conceptions and ideas about teaching in various school contexts. More research in this area is certainly warranted.

Effects of Content-Focused Teacher Induction

Two additional studies in our review examined the effect of content-focused teacher induction. Both studies compared programs focusing on subject-specific pedagogy with those focusing on general pedagogy to identify the differences in their effects on beginning teachers' conceptions of teaching and their practice.

Maloch and Flint (2003) followed 101 secondary preservice teachers from three types of reading programs through their first year of teaching to explore differences in novice teachers' understandings, beliefs, and decision making about reading instruction. In sum, 40 participants were from reading specialization programs, 33 were from programs where reading was embedded, and 28 graduated from general education programs. Data sources included telephone interviews at three points during their first year of teaching. Compared with the participants from general education programs, the participants from reading specialization and reading-embedded programs tended to speak in clearer and more thoughtful ways about their reading instruction and were more likely to focus on assessing and meeting students' needs in reading. In addition, they were more willing to seek support for their teaching. As such, the study implied that induction support might need to focus on subject-specific pedagogy instead of general pedagogy.

Luft, Roehrig, and Patterson (2003) compared the effects of three kinds of induction situations on secondary science novices' conceptions and practice of teaching. These situations included six beginning teachers who were receiving induction support that attended to the unique pedagogical and content needs of secondary science teachers, six who were working in the induction program that focused only on teachers' general pedagogical training, and six who were working without formally structured induction. The study included surveys about their perceptions and teaching practices for 8 weeks, interviews on teaching philosophy, and three lesson observations collected from each participant in all three situations. Data show that the beginning science

teachers who participated in either the science-focused induction program or the general induction program used practices that were congruent with standards-based lessons more than those who received no support. However, the secondary science teachers in the science-focused support program were more likely than the other two groups of teachers to hold beliefs aligned with student-centered practices, implement more student-centered inquiry lessons, and feel fewer constraints in their teaching.

Our review suggests that subject-specific induction programs might be important for beginning teachers' learning—especially, learning to teach as envisioned by curriculum standards. This finding is consistent with assumptions in the literature that teachers' deep understanding and representation of this understanding to particular groups of students form a crucial part of their professional knowledge necessary for effective teaching (Grossman, 1990; Ma, 1999; Shulman, 1987).

The first study showed that preservice teacher education that focuses on subject-specific pedagogy can exert a lasting positive influence on beginning teachers during induction, as identified by the beginning teachers themselves (Maloch & Flint, 2003). The second study suggested that the induction program with a focus on subject-specific pedagogy is more useful in supporting beginning teachers' learning as envisioned by the curriculum standards than are those with general pedagogy as the focus (Luft et al., 2003).

The studies in this area are still underdeveloped and have several limitations that prevent any generalization to broad contexts of teacher induction. One failed to specify how subject-specific induction programs need to be organized and whether different program effects were reflected in novices' teaching practice and increased student learning (Maloch & Flint, 2003), the other had limited participants whose initial beliefs and practices were examined and compared (Luft et al., 2003). In addition, only beginning teachers in a few subject areas were addressed. Whether and to what extent the content-focused induction program influenced student learning was not analyzed.

Effects of Kinds of Mentoring in Induction

The final group of studies was devoted to examining the effects of kinds of mentoring practice on beginning teachers' conceptions and practice of teaching. Four studies emerged from our literature search.

Pourdavood, Grob, Clark, and Orr (1999) examined the effects of mentoring relationships on beginning mathematics teachers' teaching, drawing on three group discussions, one questionnaire, biweekly lesson observations, and lesson discussions from two experienced and two first-year secondary mathematics teachers who were paired with mentors in one high school during the induction year. The study found that although engaged in structured and regular lesson observations and reflections, the participants' failed to develop a mentor–novice relationship that supported beginning teachers' learning to teach mathematics as envisioned by the national standards. In particular, the two beginning teachers constantly struggled with classroom management problems. Such struggles usurped time and attention and prevented the mentor–novice interactions from focusing on understanding children's learning and looking for new ways of teaching mathematics. The study argued that to influence beginning teachers' learning to teach in ways that are consistent with national curriculum standards, mentors themselves must be engaged in conceptual and practice transformations.

In contrast, Wang and Paine (2001) reported a case from a Chinese elementary school in which an experienced mathematics teacher supported a first-year mathematics teacher through collaborative inquiry and reflection about teaching. By analyzing interview and mentor–novice conversations and observations of a novice's teaching practice over a year, the study documented the conceptual and practical changes of the novice from a positivist approach to a constructivist approach in a context where a positivist approach was popular. The study identified several features of mentoring practice that contributed to the novice's learning. First, the mentor was able to develop a clear and consistent notion of good teaching that aligned with a constructivist approach to

mathematics instruction, and the mentor used this notion to engage the novice in reflecting about teaching practice. Second, the mentor was able to practice, model, analyze, and reflect on such mathematics teaching and use these skills to help the novice develop her own ideas and approaches to teaching. Third, the mentor was able to define zones of the novice's proximal development (Vygotsky, 1978) in learning to teach and develop different kinds of support relevant at each stage.

Holahan, Jurkat, and Friedman (2000) explored the effects of intensive and ongoing mentor training on mentor teachers and their novice teachers' use of computer-based technologies for teaching mathematics. The researchers analyzed data from initial and ending surveys with the mentors who participated in mentor training. The training involved monthly workshops, two summer institutes, and monthly classroom visits that supported mentors in applying skills developed in training over 3 years. The study found that not only were the mentors able to use the computer-based mathematics teaching in their own classrooms, but they also learned to use more student-centered, cooperative-learning, and problem-solving approaches in their mathematics instruction. However, the impact of mentor teachers on 212 novice teachers' effective use of computer-based mathematics teaching varied. The follow-up interviews with administrators and beginning teachers in six participant schools showed that although beginning teachers in three schools were able to reach high levels of success, those in the other three schools reached a low level of success. The extent to which school administrators were able to support mentors' work and new teaching approaches substantially affected the quality of novice teachers' learning to teach with mentors.

In an experimental field study with 46 pairs of beginning teachers and mentor teachers from 12 schools in two school districts, Evertson and Smithey (2000) compared the influence of 23 mentors who received training in 3 days of workshops focusing on mentoring techniques and skills with 23 mentors who received no training on the classroom practices of their beginning teachers. The study collected and analyzed the pre- and postworkshop survey on mentors'

assessment on beginning teachers, three sets of videotaped mentor–novice conversations from each pair, weekly summaries of mentoring activities by each pair, a monthly goal setting for mentoring activities by each pair, as well as three to six lesson observations of beginning teachers' teaching. The study found that mentors who received the training developed better skills of conferencing with novices and were more likely to share their teaching experiences with novices. The beginning teachers of prepared mentors were able to organize and manage instruction more effectively and establish more workable classroom routines than were teachers who had mentors without training. In addition, the students of the former had better behavior and engagement. The study suggested that the presence of mentors in induction alone was not sufficient and that the mentors' knowledge and skills of mentoring were crucial for mentors to support beginning teachers' learning. It was important to provide mentors with proper training for the role that they were expected to play in teacher induction.

Our review in this section suggests several points related to the effects of mentoring on beginning teachers' conceptions and practice of teaching. First, mentor and novice teachers' initial conceptions of their relationships and beginning teachers' learning to teach may influence their relationships, mentoring practice, and, thus, what novices are able to learn in the induction period. This finding is consistent with the literature that states that teachers' initial beliefs of learning and teaching have a strong impact on what and how teachers learn to teach and, thus, their teaching practice (Feiman-Nemser & Remillard, 1996; Kennedy, 1991b; Thompson, 1982). As shown in the studies that we reviewed, mentors' beliefs of teaching and mentoring can exert both positive and negative impact on beginning teachers' learning, depending on whether mentors' beliefs are consistent with the kinds of teaching that beginning teachers are expected to learn.

Second, effective mentoring as envisioned by curriculum standards relies on mentors who have relevant conceptions and skills of mentoring. Such conceptions and skills do not naturally grow out of mentors' teaching experience (Evertson & Smithey, 2000; Holahan et al., 2000).

None of the studies in this part clearly identified necessary training for mentors to have mentoring practice exert the positive effects on beginning teachers' learning. The studies also failed to discuss and analyze how such effects could be enhanced or neutralized by different kinds of school cultures, organizations, and environments.

Induction Components Section: Summary and Comments

Our review in this section leads us to a better understanding of factors that may impede or promote the effects of various components of teacher induction programs on beginning teachers' teaching. First, the quality of conceptions of teaching and learning to teach that beginning teachers and their mentor teachers hold play an important role. This finding is directly reflected in the case studies on workshop approaches to induction (Barrett et al., 2002; Franke et al., 1998), peer collaborations (Eick, 2002), and mentoring relationships (Pourdavood et al., 1999; Wang & Paine, 2001). It is also consistent with the constructivist idea of learning, which suggests that initial conceptions and prior knowledge play an important role in shaping what and how people are able to learn (Von Glasersfeld, 1995).

Second, the quality of preservice teacher education can have lasting influences on what and how beginning teachers' learn to teach. This conclusion emerged from the studies on the structured components of subject-specific pedagogy induction (Maloch & Flint, 2003) and peer collaboration (Rolheiser & Hundey, 1995). It is consistent with the idea that teacher induction should be seen as part of a continuum instead of an isolated stage (Feiman-Nemser, 2001a; Odell, Huling, & Sweeny, 1999).

Third, mentoring as an induction support for beginning teachers' learning to teach may require mentor teachers to acquire necessary visions, foci, and skills that are consistent with the kind of teaching and learning that beginning teachers are expected to learn in induction. This point was demonstrated in studies of mentors who received training for their work and those who did not (Evertson & Smithey, 2000; Holahan et al., 2000).

The studies in this review section highlight subject-specific induction in reading and science education (Luft et al., 2003; Maloch & Flint, 2003). The research findings are consistent with research on teacher knowledge where pedagogical content knowledge plays an important role in shaping the quality of teaching (Grossman, 1990; Ma, 1999; Shulman, 1987). The studies also addressed the effects of a workshop approach to teacher induction, structured collaboration among peers, and structured mentoring relationships.

Our review reveals several limitations. First, the research on each structured component was not balanced. Whereas only a few cases were developed to understand the effects of a workshop approach, studies with relatively large numbers of participants and different kinds of data were developed for subject-specific pedagogy-focused induction. In addition, the cases and studies with relatively large number of participants collected different kinds of data for the collaboration among peers and for studying mentoring relationships. Doing so makes it hard to weigh the findings from different studies on a particular component. Second, the number of studies on each structured component addressed a few subject areas in a limited number of schools. This aspect prevents any generalizations across different school contexts and induction situations. Third, few studies carefully reviewed conceptualized teaching and then followed through with determining whether beginning teachers' conceptions and teaching practices were consistent with a particular conceptualization. This factor prevents us from making conceptual-based comparisons about effects of different induction components across different studies.

Finally, while examining the structured components and their effects, most of the studies failed to consider how the structured components were shaped by the broader contexts of the school culture. Even the case studies failed to attend to the deep social, cultural, and organizational connections and the contexts of schools, students, and communities. Instead, the images of the induction programs were generally projected as unilateral forces that exert influence on beginning teachers' conceptions and teaching practices.

DISCUSSION AND CONCLUSION

This review explores whether a link among kinds of induction, beginning teachers' conceptions, teaching practice, and student learning exists in the teacher induction literature. The limited number of studies, subject areas, grade levels, and school contexts prevents us from generalizing our findings to broad contexts and programs of induction. None of the studies addressed the effects of induction programs or their components on students' performance. Without this connection, claims that induction programs directly support teaching reform for novices are empirically premature. We focus here on unanswered questions in the literature and propose research that will help move the teacher induction field forward. First, teacher mentoring has been widely used to support goals of teacher induction, ranging from helping beginning teachers stay in their jobs, adapt to their school contexts, and learn to teach in ways consistent with curriculum standards. Our review suggests that working toward different goals and influencing beginning teachers' learning and teaching requires different visions, dispositions, and skills (Wang & Odell, 2002a).

The review uncovered some of these visions, dispositions, and skills (Athanases & Achinstein, 2003; Feiman-Nemser, 2001b; Wang et al., 2004) and identified ways that mentors might work (Achinstein & Barrett, 2004). We identified dilemmas and contextual barriers in using mentoring skills and working toward particular visions of mentoring and teaching (Strong & Baron, 2004; Wang, 2001). Examples of consequences when mentors possessed or did not possess particular dispositions and skills were also revealed (Evertson & Smithey, 2000; Holahan et al., 2000).

Additional case studies are needed to further conceptualize the dispositions and skills that mentors need to influence beginning teachers' learning and teaching. We recognize that case study methodology is especially useful in exploring deep knowledge and dispositions of individual teachers, although it may not be effective in providing findings that can be generalized across teachers and contexts, as is often desired by educational policy makers.

Studies using experimental design are recommended to compare and confirm dispositions and skills of mentors in different kinds of school contexts, grade levels, and subject areas. Identifying mentor dispositions and skills would provide important knowledge for mentor selection and preparation in induction programs. Such experimental studies have the advantage of identifying the contextual factors that influence teachers' dispositions and skills across educational settings, although controlling contextual factors in educational research is difficult.

Second, beginning teachers' initial beliefs and teaching practices play an important role in shaping, impeding, or facilitating what and how they learn in induction contexts. The review shows that beginning teachers prefer lesson observation and lesson-based discussion as components of induction (Hall et al., 1995; Luft & Cox, 2001; Williams et al., 2001). They also see issues and problems through a classroom-management frame (Achinstein & Barrett, 2004) and use this as one of the major standards for judging what they learn through induction (Moran et al., 1999; Oberski et al., 1999). The quality of beginning teachers' initial beliefs and practices shape the quality of their learning when a workshop approach to induction is employed (Barrett et al., 2002; Franke et al., 1998), when collaborative relationships among peers are encouraged (Eick, 2002), and when mentoring relationships are developed (Pourdavood et al., 1999).

None of the studies examined beginning teachers' beliefs and teaching practice and documented how these interacted with the structured components of teacher induction and whether the beliefs and practices were modified or transformed. To conduct such research, surveys and interviews of beginning teachers with different social and cultural backgrounds need to be conducted and grounded in a carefully developed conception of teaching and learning to teach. Survey research is limited because it does not offer the opportunity to deeply study the beliefs of new teachers. However, the understandings gleaned from survey research would help program designers develop effective structures for teacher induction, especially in those programs that are expected to support beginning teachers in

learning to teach against the grain (Cochran-Smith, 1991; Wang & Odell, 2007).

Third, teacher induction and its components are not isolated structures. Instead, induction is part of a teacher development continuum, whose processes and results are influenced by what and how beginning teachers learn in their initial teacher preparation (Feiman-Nemser, 1983, 2001a). As our review shows, the collaborative norms and dispositions that beginning teachers develop in their preservice teacher programs contribute to their learning to teach in the induction period (Rolheiser & Hundey, 1995). The subject-specific pedagogical training in their preservice program may have contributed to learning as envisioned by national curriculum standards in their induction year (Maloch & Flint, 2003).

Research in this area is emerging but is insufficient in determining what preservice preparation is useful for learning to teach in various induction contexts. Comparative studies of induction experiences among beginning teachers who are from different types of preservice and alternative licensure programs are needed. To conduct these comparisons, research should be designed to survey and interview beginning teachers and observe their teaching practice. Knowledge that grows out of studies on preservice and induction connections would help resolve the current policy debates regarding traditional teacher education and alternative routes to certification (Cochran-Smith & M. K. Fries, 2001; Cochran-Smith & K. Fries, 2005) and unify the limited resources and funding for teacher education and induction.

Fourth, this review helped us to understand that components of teacher induction will not be effective in supporting beginning teachers' learning without building their knowledge of effective teaching based on national standards. This conclusion is consistent with literature that shows that pedagogical content knowledge is a crucial part of teachers' knowledge that helps teachers learn to teach, as expected by the standards (Grossman, 1990; Ma, 1999; Shulman, 1987). When preservice preparation is focused on content-specific pedagogy and supported with an induction that focuses on content-specific pedagogy, beginning teachers are more likely to

acquire the instructional behaviors and dispositions that standards-based teaching demands (Luft et al., 2003; Maloch & Flint, 2003).

The existing studies were limited to a small number of secondary-school beginning teachers in reading and science. There was no control of initial conceptions and practices of the participants and no discussion of the ways in which the induction components influenced beginning teachers' conceptions and practice. To confirm this relationship, studies are necessary that compare beginning teachers from different subject areas, multiple grade levels, and a variety of induction programs. Comparative studies that explore this relationship need to incorporate survey, interview, and observation data on beginning teachers and their teaching. Again, the analysis of these data needs to be based on a carefully conceptualized vision of teaching and learning to teach. Doing so would contribute to teacher education and induction reforms that focus on the development of teachers' pedagogical content knowledge and relevant teaching assessment and evaluation (Darling-Hammond & Ball, 1998; National Board for Professional Teaching Standards, 2002).

Fifth, this review revealed that components of teacher induction do not independently influence beginning teachers' learning and teaching practice. The quality of influence is dependent on social, cultural, and organizational contexts of schools where such components are situated. In consideration of the diversity of contexts for teacher induction, it is inappropriate to generalize across settings when recommending induction strategies and practices. This conclusion is consistent with the assumption that teaching practice and teacher learning are culturally scripted activities (Hiebert et al., 2002; Stigler & Hiebert, 1999) and that what and how beginning teachers learn during induction grow out of the context (Brown et al., 1989; Lave & Wenger, 1991).

Our review found that what mentor teachers thought and did were shaped by the curriculum and teaching organization where mentoring relationships were situated (Wang, 2001). The effects of mentoring on beginning teachers' use of technology in mathematics teaching were also influenced by whether the school administrators

supported mentors' work (Holahan et al., 2000). The effects of structured lesson observations and discussions on beginning teachers' classroom management varied and depended on whether beginning teachers were teaching in an individualist or a collaborative school culture (Williams et al., 2001). This point is consistent with the findings of the study of three professional cultures that new teachers encountered in their schools (veteran oriented, novice oriented, and integrated; Kardos, Johnson, Peske, Kauffman, & Liu, 2004). New teachers were found to have strikingly different opportunities for professional development in these different school cultures.

To build knowledge for interpreting the contextual influences on any structured induction component, case studies on beginning teachers in various school contexts are necessary, as are comparative studies of induction experiences among beginning teachers from different kinds of schools in different kinds of induction programs. Additional studies are important to confirm or reject any generalization to other teacher induction contexts. Doing so would provide information about contextual influences in teacher induction programs.

By way of overall summary, we recommend additional teacher induction research related to mentoring relationships, beginning teacher beliefs, knowledge of effective teaching, preservice preparation, and school contexts, as well as all of the potential interactions that these induction components portend. Taken together, the research would help to establish the links among kinds of induction, beginning teachers' conceptions, teaching practice, and student learning, and it would guide policy makers and practitioners as they make important decisions related to the induction of beginning teachers in America.

NOTE

1. Education Resources Information Center (see <http://www.eric.ed.gov/>).

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