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Investigating the role of the written curriculum on lesson planning for first-year elementary mathematics teachers

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INVESTIGATING THE ROLE OF THE WRITTEN CURRICULUM ON LESSON
PLANNING FOR FIRST-YEAR ELEMENTARY MATHEMATICS TEACHERS

A Thesis Submitted
in Partial Fulfillment
of the Requirements for the Designation
University Honors with Distinction

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This Study by: Anna Kron

Entitled: Investigating the Role of the Written Curriculum on Lesson Planning for First-Year
Elementary Mathematics Teachers

has been approved as meeting the thesis requirement for the Designation University Honors with
Distinction.

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While studies have previously explored aspects of lesson planning from the perspective of experienced teachers, there is a lack of research investigating how this process is different for brand new educators. The researcher, a preservice elementary teacher studying at the University of Northern Iowa, wanted to learn more about the available resources and how she would utilize them when planning for mathematics instruction in her first elementary classroom. At the completion of this project, the researcher hoped to have a better understanding of the process first-year elementary teachers experience when transforming written textbook materials into a mathematics lesson plan. The purpose of this study was to investigate the role of the written curriculum, pacing guide, and timing in influencing the way a first-year elementary teacher creates lesson plans. In particular, the work expected to shed light on the textbook features that teachers use to create their lesson plans, as well as how time restricts the lesson planning process (from the moment new teachers have access to their written curriculum materials to the planning of lessons to be taught in the classroom). It is hoped that the insights found through this research will help preservice elementary teachers better understand the process first-year educators experience when creating their mathematics lesson plans from the written materials.

Literature Review

There are many ways to define and categorize curriculum. According to the National Council of Teachers of Mathematics (2014), the curriculum as a whole is “the program used to help students meet the standards, including instructional materials, activities, tasks, units, lessons, and assessments” (p. 70). However, based on what phase of the teaching and learning process one is focusing on, the curriculum can be broken down into different categories. Stein, Remillard, and Smith (2007) categorized the phases of curriculum use into written, intended,

enacted, and attained curriculum. The written curriculum is the “printed page” and typically refers to the school’s or school district’s mandated textbook series, though it also may include other supportive teaching materials. Intended curriculum refers to a teacher’s lesson plans for carrying out instruction in the classroom. Enacted curriculum is what instructional tasks the teacher actually implements with his or her students. Lastly, attained curriculum (also known as experienced curriculum) refers to the knowledge and skills students acquired or practiced by participating in the lesson.

Though written curriculum could refer to any authored materials or texts that teachers use to create their own lesson plans, for the purpose of this study, the written curriculum refers to the textbook that is provided for the teacher’s use in the classroom. Textbooks vary widely and can include different combinations of curricular features that teachers may or may not use when creating lessons. Besides the actual content knowledge, these curricular features include assessments for determining students’ prior knowledge, embedded formative assessments to verify what progress students have made through the lessons, suggestions for differentiation (or altering the material to fit each individual student’s needs), recommendations for facilitating student group work and discussions (or other pedagogical guidance that helps the teacher understand how to implement activities and other portions of the lesson), and resources to help the teachers learn the content themselves (sometimes referred to as educative curricula) (Stein, Remillard, & Smith, 2007). In this study, it was crucial to identify which of these features first-year teachers’ mathematics textbooks included, as well as which of these features they perceived they used when planning for instruction.

One significant influence on the context of instructional planning and implementation is time. According to Bay-Williams, Reys, and Reys (2003), one of the most common issues

teachers encountered when attempting to adopt new mathematics curricula in their middle school classrooms was correct pacing. The time available for teachers to design and execute instruction influences how they use materials, particularly those that require flexibility (Stein, Remillard, & Smith, 2007). While the textbook is a primary influence on teachers' math instruction, it must be adapted to fit mandates assigned by the district and school administrators (Drake, Cirillo, & Herbel-Eisenmann, 2009). One commonly dictated aspect that changes the use of the text within specific schools and school districts is a pacing map (also known as a curriculum guide). This material governs which topics, activities, or even page numbers should be addressed on each day of the school year. While following a pacing map may ensure that all classes in a certain grade level are learning the same material and progressing through all of the lessons within an academic year, pacing guides have been criticized for rushing teachers and students and preventing them from cultivating deeper mathematical knowledge (National Council of Teachers of Mathematics, 2014). Because timing is such a controlling factor in the lesson planning process, this study investigated not only whether or not the new teachers had a pacing guide, but also how they timed the planning and implementation of their lessons.

Some individuals claim that the textbook and other curriculum materials should be followed and executed exactly as written, while others assert that they are a resource teachers use to build off of in the creation of their own lessons and units (Stein, Remillard, & Smith, 2007). Remillard and Bryans (2004) established three categories of orientation toward curriculum materials: intermittent and narrow, adopting and adapting, and thorough piloting. Intermittent and narrow users of the curriculum rely on teaching methods and tasks that are familiar and comfortable to them, so they often introduce and implement activities in their own ways and follow their own curriculum maps. Adopting and adapting teachers use the written curriculum as

a guide for the general structure, sequencing, content, and tasks of their instruction, but they alter the curriculum to varying degrees in order to reflect their own views about mathematics and the teaching styles with which they are acquainted. Lastly, teachers who thoroughly pilot the curriculum tend to read and use all parts of the text as intended by the curriculum writers and allow it to provide most or all of the structure for their lessons. While experienced teachers may fall into any category (Remillard & Bryans, 2004), preservice teachers have been shown to associate textbooks with unsatisfactory pedagogical practices and are generally more reluctant to use textbooks in their lesson planning (Stein, Remillard, & Smith, 2007). These different ways in which the curriculum is used to plan lessons can lead to varying opportunities for the students to learn in the classroom, so it is important to determine how oriented teachers are toward their curriculum materials.

Student-centered learning is an instructional approach in which students learn autonomously through scaffolded activities that extend the focus outside of the classroom. At the heart of student-centered learning is the recognition of students as responsible for their own learning processes and outcomes. Student-centered learning is rooted in theories based on constructivist, constructionist, and self-determination ideas and has been recommended as an ideal way to help students build the skills necessary to function competently in the 21st-century world (Lee & Hannafin, 2016). Of the eight characteristics identified as promoting student-centered learning, five of them could be reflected in the way the teacher intends to use the curriculum materials: the teacher's role as a scaffolder and facilitator, scaffolded learning methods, students constructing knowledge by exploring and analyzing, the students' role as knowledge generators and evaluators, and learning goals that are negotiated and endorsed by students (as opposed to defined by the curriculum) (Lee & Hannafin, 2016). Based on those five

characteristics, this study assessed how the first-year elementary teachers' evaluations of their lesson plans sustained the ideal of student-centered learning through the lesson planning supports used.

Previous studies conducted by education professionals provided the researcher with guidance regarding what to examine about the mathematics lesson planning of first-year elementary teachers. Stein, Remillard, and Smith (2007) identified the written curriculum features that may be available to first-year teachers so the researcher could determine the teachers' perceived uses of the features when planning for mathematics instruction. Remillard and Bryans' 2004 study identified three categories of adherence to the written curriculum by all teachers, but because preservice teachers are more reluctant to use textbooks in their lesson planning (Stein, Remillard, & Smith, 2007), the researcher hoped to evaluate the orientation of first-year elementary teachers toward their mathematics curriculum materials. Because adhering to the timing of a pacing guide can significantly affect student learning (National Council of Teachers of Mathematics, 2014), it became important for the researcher to investigate the timing of the planning and implementation of first-year teachers' lessons. Additionally, Lee and Hannafin (2016) identified characteristics of lessons that promote student-centered instruction, some of which could be applied to the first-year teachers' lesson planning. These studies provided the researcher with the knowledge necessary to write appropriate research questions, and later analyze how first-year teachers responded to those questions, to investigate the role of the written curriculum, pacing guide, and timing in influencing the way a first-year elementary teacher plans for mathematics instruction.

Research Questions

In order to investigate a first-year mathematics teacher's creation of the intended curriculum, the following questions provided focus to the investigation:

1. How do the written curriculum components support teachers in their planning for student-centered instruction?
2. What role does the curriculum (or pacing) guide play in teachers' planning?
3. How do teachers engage in aspects of planning?
 - a. What opportunities does a teacher have to learn about the curriculum text from the day he or she is hired to the first day of the school year?
 - b. For what interval of time does the teacher plan?
 - c. How many days in advance of enactment does the teacher plan the lesson?

Methodology

To answer the research questions, the investigator prepared to conduct interviews with elementary teachers to better understand their use of written curriculum materials in their lesson planning. Prior to the interviews, the application for human participants review was approved by UNI's institutional review board (IRB), and requests for permission to conduct research in the specific school districts were accepted by the necessary parties. The researcher interviewed two first-year elementary teachers in the Cedar Valley region of Iowa. To analyze how written curriculum components support teachers in their planning for student-centered instruction, the researcher asked which curricular features first-year teachers' mathematics textbooks included as well as which of these features they used when planning for instruction. Then, the teachers were classified based on Remillard and Bryans' categories of orientation toward curriculum materials:

intermittent and narrow, adopting and adapting, or thoroughly pilot (2004). Lastly, the teachers' responses about their lesson plans were compared to the five characteristics of student-centered instruction that identified from Lee & Hannafin's 2016 study: the teacher's role as a scaffolder and facilitator, scaffolded learning methods, students constructing knowledge by exploring and analyzing, the students' role as a knowledge generator and evaluator, and learning goals that are negotiated and endorsed by students. To examine the role of the curriculum guide and other timing-related aspects on teachers' lesson planning, conclusions were drawn based upon identified themes from the teachers' answers.

Results

The responses from each first-year elementary teacher interviewed are presented as individual case studies to provide a comprehensive view of the perceptions of each teacher on her lesson planning. The information is then analyzed and discussed to address the intended research questions. Note that to protect the identities of the participants, names have been changed.

Case 1 – Isabelle

As reported by Isabelle, each daily lesson plan in her kindergarten classroom begins with an entry activity related to the calendar. Next, the students delve into the launch (an opening activity or discussion that allows Isabelle to introduce the mathematics content the students are about to explore). After the lesson has been introduced, the class splits into groups of three or four students to participate in activities that will help them more deeply investigate the content of the lesson. These "independent groups" or "stations," as Isabelle calls them, allow the students to work with various materials (such as blocks or clay) to develop their own ideas about the

mathematics concepts they are learning. After the students complete multiple activities in their groups, the class comes back together for a discussion related to what they learned during their investigative activities. During this time, Isabelle wraps up the lesson using carefully-phrased questions to assist the kindergarteners in making connections between their activities and the mathematics content.

Isabelle stated that her school uses the *Investigations* written curriculum. The teacher's textbook provides a series of lessons that inspire the kindergarten teachers' lesson plans. When asked if the textbook includes assessments for determining students' prior knowledge, Isabelle stated that while the text does include pre- and post-assessments, they are not used in her school. Instead, the school district requires the teachers to administer CFAs (common formative assessments) that are based off of the content in the *Investigations* text. Isabelle shared that she was not involved in the creation of the CFAs; she simply administered them. Though the CFAs are not directly referenced while Isabelle plans her lessons, she knows that the content in these assessments will be covered if she uses the text to inspire her lessons because the CFAs and the textbook cover the same content.

According to Isabelle, the *Investigations* text contains formative assessments. These assessments are checklists that the teachers use to take note of which students appear to understand the targeted mathematics concepts while observing during independent group time. Isabelle stated that the kindergarten teachers make their own checklists because they are easier to use than those provided by the text; however, the teacher-created formative assessments are based off of those in *Investigations*.

Isabelle perceived that *Investigations* includes suggestions for differentiating (adapting) instruction to meet the needs of students who need extra help with the content as well as those

who need an additional challenge. Isabelle reported that these suggestions are denoted in the text with a special symbol. When asked if she uses these suggestions for differentiation, Isabelle said that she incorporates them when she enacts the lesson but does not use them in her lesson planning stage. Isabelle admitted that this is something she would like to do in the future.

When asked if the textbook includes pedagogical guidance to advise the teachers on how to enact the activities, Isabelle responded that each discussion includes recommendations. But Isabelle remarked that while some suggestions for discussion were helpful, others were not useful. She continued to comment that as a kindergarten team, the teachers have been working with their mathematics coach to be more intentional about including specific points for discussions in their lesson plans. However, these efforts do not seem to be supported by the text.

Isabelle mentioned that the *Investigations* teaching guide provides in-text notes, as well as an additional CD-ROM, to help teachers refamiliarize themselves with the content they will teach. However, Isabelle stated she has never used these resources. As she said, “If I was at a higher grade level, I might need to. But with kindergarten concepts, I haven’t really needed to.”

When asked about the teacher’s role in her lesson plans, Isabelle identified that she acts as a facilitator and evaluator. She said that at the beginning of the lesson, she introduces the concepts and instructs the students on what they are to do and explore. Isabelle also noted that as she walks around the room during independent group work later in the lesson, she’s evaluating the students (such as their abilities to work with others and their understandings of the concepts). While sometimes the students evaluate themselves or their peers, Isabelle acknowledged that she is the main evaluator of students’ performances.

Isabelle said that encouraging students to explore is “the main objective” of her lesson plans. She added that most units begin with the teacher showing the students how to explore

different mathematical concepts, but that they eventually find their own ways of exploring to make discoveries and connections. Additionally, the investigations that the students participate in get increasingly more in-depth so that students continuously build on their prior knowledge to comprehensively examine an idea.

According to Isabelle, there are three types of goals considered during her lesson planning for mathematics instruction. Broad learning goals are determined by the school district and are highlighted in the CFAs; these are applicable for weeks, and sometimes months, at a time. The kindergarten teachers and mathematics coach write I-Can statements before every unit. They display these in the room for the students to reference during each unit. Lastly, each day of the lesson plan has a learning goal that Isabelle writes by rephrasing the focus points provided in the text.

Isabelle stated that she does not have a curriculum or pacing guide for the mathematics curriculum. She said, “We just follow each lesson every day, in the order that it’s written, and based on our team leader and the other experienced teachers’ [input].” She added that the CFAs have due dates, so those assessments must be completed and turned in according to the school district’s deadlines. But Isabelle said she is not required to teach certain lessons on certain dates, and she is allowed the flexibility to teach more quickly or slowly depending on her students’ needs. As Isabelle said, “With kindergarten it feels like everything moves too slow, just because their attention spans are so short. But there are so many activities that they can do, which makes it easier to move quickly.” She also added that if she had the choice to continue using the CFAs, she would. Isabelle said that these assessments help all of the teachers stay “on track,” and the information collected from the CFAs is good to know.

When asked about how much time Isabelle had to learn about *Investigations* from the day she was hired to the first day of the school year, Isabelle laughed. She shared that her experience was unique because she was hired at the end of September after the school year had already started. Therefore, she only had a weekend to learn about her text before beginning to use it. Isabelle stated that this was not ideal, and she plans to use the upcoming summer to investigate her classroom resources more fully.

Isabelle shared that she is one of four kindergarten teachers at her school. The kindergarten teachers take turns writing the mathematics lesson plans for one-week intervals. Though each lesson plan covers one week of instruction, the plan is broken down into the standards, goals, and activities that should be enacted on each day of the week. Isabelle said that when it is her turn to write the lesson plans, she writes them two weeks before they are to be enacted by the teachers. These lesson plans are reviewed and adjusted during the kindergarten teachers' meeting with their school mathematics coach at the beginning of the week before being implemented.

Case 2 – Jennifer

According to Jennifer, her second grade lesson plans come straight from her textbook and accompanying student workbook, *Everyday Math*. She explained that when the students arrive they work on a page of “math boxes,” five or six questions that review mathematics content they have already learned and help the students transition into their math lesson. Jennifer starts her instruction with a warmup activity, which reviews concepts that will be important for the rest of the lesson. Next, Jennifer teaches the day’s “math message,” or the new content and skills the students are expected to learn. Jennifer explains the mathematics and models how to complete it, and the whole group does a problem together. Then they participate in “guided practice” in

which the students are given problems to work on together with assistance from Jennifer as needed. When she believes most of the students can complete the tasks on their own, the students have independent work time to complete an assigned page in their workbook or other culminating activity. The final part of the lesson is the “home link,” a page that the students take home to their adults to explain the mathematics content that was learned that day and provide additional practice problems.

When asked about her written lesson plans, Jennifer revealed that she strictly follows what is included in the *Everyday Math* text. Every Thursday she plans which lessons will be taught on each day of the following week. Then she reads through the lesson in the teacher’s guide and familiarizes herself with it the day before she implements it. During this time, Jennifer makes notes throughout the textbook’s lesson to ensure that she doesn’t forget certain ideas while she is teaching and doesn’t appear to be reading out of the book in front of the students. However, Jennifer stated that she rarely writes her own lessons outside of the text. According to Jennifer, her *Everyday Math* teacher’s guide provides all of the activities she needs to do for each day in the order that they should be taught.

When asked if the textbook includes assessments for determining students’ prior knowledge, Jennifer said that she administered a test at the beginning of the year to assess students’ understanding. This test was from *Everyday Math*. Additionally, the math boxes occasionally include questions involving content that the students haven’t learned yet, providing them with a preview of what they will be learning next. According to Jennifer, these are the only prior knowledge assessments in the text.

Jennifer stated that there are multiple types of formative assessments in the book that she uses with her students. Besides those previously mentioned, she also uses the open response

problems, chapter tests, and cumulative assessments in her book. Each chapter contains an open response problem that requires the students to critically think about the mathematics they have learned and explain their reasoning more deeply than the typical lesson. At the end of each chapter the students take a chapter test. They also complete a cumulative assessment at the end of every other chapter to review content the second graders have learned throughout the year. Additionally, Jennifer reported that there are standards on the district's report cards that are not included in the text or are only briefly mentioned (such as time and money) that the students should already know. To assess the knowledge and skills that are added to the report card by the school district, Jennifer said she uses an evaluation that other second grade teachers created.

Jennifer reported that *Everyday Math* includes suggestions for differentiation for each lesson: one for extra practice and one for enrichment. She said that she only uses these if there is "a big need." Jennifer does not plan in advance to use these suggestions; she only uses the resources if she realizes the students need them during the lesson's implementation.

When questioned about the text's inclusion of pedagogical guidance, Jennifer said that most of these suggestions were located at the beginning of the book, and occasionally the text refers the reader back to those pages for help. The only elements of pedagogical guidance that she mentioned are located throughout the book are suggestions for developing the students' academic language. Jennifer said that she sometimes uses the book's suggestions as reminders for her students in her lessons, but usually she adapts these suggestions to better fit the needs of her students.

According to Jennifer, *Everyday Math* does not include resources for the teacher to refamiliarize themselves with the content they will teach in the lesson. She noted that her text often requires her to teach the content in a way that is different from how she learned it in school.

Therefore, she said that she learns the content by reading the textbook's guidance on what she is to teach during each lesson and viewing the completed examples that the book provides. Jennifer reads through this text before implementing her lessons.

Jennifer commented that she acts as a scaffolder in her lesson plans. She said that the textbook's lessons follow the gradual release model because she begins by directly instructing students on the mathematics concepts and solving example problems. Next, the students complete assigned problems with assistance from Jennifer. Throughout the lesson the students rely increasingly less on the teacher until they are able to successfully attempt the mathematics independently. While Jennifer did not explicitly identify herself as an evaluator, she also mentioned her assessment of the students during their work time to determine if they understand the content.

Jennifer recognized her students as active participants in her class. She stated that they are active because they are "to be responsible and be in charge of their own learning." She said that her lessons encourage this because the students are held accountable for completing their work. Another way the second graders in Jennifer's class are active is in their opportunities to evaluate their knowledge. Jennifer mentioned that she asks the students to "give [her] a thumbs up, thumbs down, or thumbs sideways" to indicate their comfort with the math they are learning. They also evaluate their own knowledge using a self-assessment during their chapter testing time. Jennifer's students are involved in the lessons; lecture is not the only component, and students are encouraged to participate.

When asked if the lesson plans encourage students to explore and analyze for understanding, Jennifer said, "I would say some do... not all, but some." She then explained that in some lessons, the students explore the content by participating in various activities as opposed

to listening to Jennifer explain the mathematics. During these lessons, students create a basic understanding of the content that can be referenced in later lessons. However, Jennifer said that for most lessons, the students explore in the textbook's traditional instructional format.

According to Jennifer, the learning goals for her mathematics instruction are determined by the text. She knows the lessons are aligned to the required standards and benchmarks she is to teach because *Everyday Math* creates the lessons. Jennifer added that her second graders do not know what they are expected to have learned by the end of the year; she hopes to become better at sharing the learning goals with the students each day.

Jennifer mentioned that the *Everyday Math* curriculum includes an online pacing guide for her use. This guide shows which textbook lesson should be taught on each day over the course of the academic year, and it is editable by the teacher. Jennifer said that if she was able to teach four complete math lessons a week every week, she would be finished with the curriculum in the middle of April. However, she sometimes adjusts the guide to account for incidences such as snow days, schedule changes, and the class needing an extra day to grasp the content. Jennifer disclosed that the school district's expectation is that each class reach the end of the curriculum by the end of the year to be able to take the end of the year assessment from the book. She and the other second grade teacher in her school check in with each other frequently to make sure they are progressing at about the same pace and will be able to accomplish the school district's goal.

Jennifer reported that she tries to follow the pacing guide "as true as [she] can." She said that when she deviates from the guide, it is usually because something occurred during the day to interfere with the class's math time, not because her second graders need an adjusted pace. Sometimes she also adjusts the guide to break up multiple testing days in a row because "that

would be a lot for seven-year-olds.” Overall, Jennifer is satisfied with the pacing of the guide and would prefer to use it if given a choice.

Jennifer shared that she was unsure about what opportunities teachers have to learn about the curriculum text from the day they are hired to the first day of school because she was only hired a week before school started. She said that she began looking at her materials right away so that she would be prepared for her students’ arrival. However, Jennifer could not speak about the length of time available for a typical teacher hired at her school to access the *Everyday Math* resources.

Discussion

Recall the curriculum features Stein, Remillard, and Smith (2007) identified may be present in a textbook: assessments for determining students’ prior knowledge, embedded formative assessments, suggestions for differentiation, pedagogical guidance, and resources to help the teachers learn or refamiliarize themselves with the content. Assessments for determining students’ prior knowledge include opportunities for the students to show what they know about a topic before they formally learn the content; for example, Jennifer mentioned that she administered a pre-test at the beginning of the year to establish what students already knew about the second grade math curriculum. Conversely, formative assessments are administered throughout the learning process so that teachers can evaluate what the students are understanding and modify their instruction to improve students’ learning. The learning centers and the checklists that Isabelle discussed are formative assessments. Suggestions for differentiation would be anything that the teacher can change in the lesson to better support learners of different abilities. An example of differentiating Isabelle’s lesson might be allowing a student to work

alone or in a pair rather than a small group if the student becomes anxious when working with others. Pedagogical guidance refers to supports or helpful hints the teacher may utilize to successfully implement portions of the lesson plan, such as suggestions for facilitating a whole class discussion. Lastly, resources to help the teachers learn or refamiliarize themselves with the content allow the educator to review and make sure they understand the lesson (in this case, mathematics) before teaching it to their students.

In response to the first research question (how do the written curriculum components support teachers in their planning for student-centered instruction?), the case studies showed that an interesting disparity exists between the curriculum features the teachers noted were present in their texts compared to the features that the teachers admitted to regularly utilizing during lesson planning. In some cases the teachers reported that, although their textbooks contain certain features, they do not need to utilize them. For example, though both teachers replied that their textbooks contain suggestions for differentiation, these suggestions were not used by the teachers during lesson planning; the suggestions were only referenced during the implementation of the lesson if needed. Overall, Jennifer used the curriculum features included in her *Everyday Math* textbook more than Isabelle used those features from her *Investigations* text. However, it is important to note that some of these features are only used by Jennifer sometimes; for example, she claimed to occasionally use the pedagogical guidance, but more often adapted the suggestions in the text to fit the needs of her own students. See the tables below for a comparison of the textbook features Isabelle and Jennifer detected in their texts to those that they used for lesson planning.

Isabelle's Perceptions of *Investigations* Curriculum Features Compared to Features Used when Planning for Instruction

	Perceived as Present in <i>Investigations</i> Text	Teacher Uses or Adapts in Planning for Instruction
Assessments for Determining Prior Knowledge	X	
Formative Assessments	X	X
Suggestions for Differentiation	X	
Pedagogical Guidance	X	
Opportunities to Refamiliarize Self with Content	X	

Jennifer's Perceptions of *Everyday Math* Curriculum Features Compared to Features Used when Planning for Instruction

	Perceived as Present in <i>Everyday Math</i> Text	Teacher Uses or Adapts in Planning for Instruction
Assessments for Determining Prior Knowledge	X	X
Formative Assessments	X	X
Suggestions for Differentiation	X	
Pedagogical Guidance	X	X
Opportunities to Refamiliarize Self with Content		

Though Isabelle and Jennifer varied in their use of the provided curriculum features, it is imperative to note that both teachers admitted to planning and implementing the lessons almost directly from the written curriculum. Recall Remillard and Bryans' three categories of orientation toward curriculum materials: intermittent and narrow, adopting and adapting, and thorough piloting (2004). Because they implemented the lesson plans exactly (or closely aligned) as suggested in their texts, both Isabelle and Jennifer are considered first-year teachers who thoroughly pilot their curriculum. The teachers read the text carefully and used most of the included recommendations to structure their lessons. While they may have incorporated resources outside of the text, these resources were almost always inspired by materials from the

written curriculum and were not created by the first-year educators. Researchers have found that preservice teachers associate textbooks with unsatisfactory pedagogical practices and are reluctant to use textbooks in their lesson planning (Stein, Remillard, & Smith, 2007). However, the findings of this research suggest that first-year teachers rely on the curriculum materials for most or all of their lesson plans.

Of Lee and Hannafin's eight characteristics of student-centered learning (2016), five were investigated in this study: the teacher's role as a scaffolder and facilitator, scaffolded learning methods, students constructing knowledge by exploring and analyzing, the students' role as knowledge generators and evaluators, and learning goals that are negotiated and endorsed by students. Both educators believe that their lesson plans are moderately student-centered. Isabelle stated that she acts as a facilitator and evaluator in her lesson plans, she scaffolds the instruction so that the students are progressively challenged through the week, and student exploration is imperative to her lessons. However, Isabelle specified that while her students generate and evaluate their understanding sometimes, she shares this responsibility with the students. Additionally, Isabelle's students do not write the learning goals. Jennifer replied similarly; she believes her primary role is as a scaffolder and her students are active participants in the class. Jennifer also stated that her second graders are not involved in creating the learning goals. However, Jennifer said that her students explore and analyze in only some of her lessons, and they are more involved in self-evaluation. The teachers' opinions regarding the student-centered aspects of their lesson planning are summarized in the table below.

Isabelle's and Jennifer's Promotion of Student-Centered Learning in Mathematics Lesson
Planning as Defined by Lee and Hannafin (2016)

	Isabelle	Jennifer	
Teacher as scaffolder and facilitator	Y	Y	
Scaffolded learning methods	Y	Y	
Students explore and analyze	Y	S	Y = Yes
Students as knowledge generator and evaluator	S	S	S = Sometimes
Students involved with learning goals	N	N	N = No

Isabelle and Jennifer differed in regards to a required curriculum or pacing guide as discussed in the second research question [what role does the curriculum (or pacing) guide play in teachers' planning?]. While the due dates of the CFAs somewhat limit Isabelle's flexibility in lesson planning, she may otherwise execute lessons on whichever days she chooses; she does not work with a traditional pacing guide. Conversely, Jennifer has a pacing guide associated with the district's curriculum; while she does not have to adhere to the recommendations precisely, she is expected to remain relatively close to the pacing of the curriculum guide. Despite differences in the use of a pacing guide, both first-year teachers have a community of more experienced educators to help them stay "on track" and assist if pacing issues do arise.

Isabelle and Jennifer also differed in the structure and timing of their lesson planning as posed by research question three (how do teachers engage in aspects of planning?). Isabelle wrote lesson plans for a week of instruction two weeks before implementation. She only had to write these plans every fourth week because each of the teachers in her kindergarten team took turns writing the plans for the whole grade level. On the other hand, Jennifer did not have to write any lesson plans. She spent time on Thursdays reading through the lessons for the following week, and every evening she jotted notes to remember for the lesson the next day. Both teachers relied heavily on their written curriculum materials for the activities of their plans. While the teachers differed in the structure and timing of their lesson planning, both were hired

at unconventional times during the school year, thus preventing the researcher from fully investigating the opportunities a first-year teacher has to learn about the curriculum text from the day he or she is hired to the first day of the school year.

Recommendations

The researcher's own experiences in the teacher preparation program at the University of Northern Iowa provide a context for several recommendations that could be formed according to the findings of this study. These recommendations should assist institutions of teacher preparation to properly educate preservice teachers about the mathematics lesson planning process in which they will partake during their first years in the classroom.

While first-year teachers were able to identify multiple curricular features in their mathematics textbooks, these features were not always referenced when planning for instruction. Understanding why the written curriculum features are not used to their full extent by the first-year teachers will assist education professionals in determining how to best confront the situation. If it is an issue related to the user-friendliness of the curriculum features, the research may lead to suggestions for curriculum designers to make their textbooks more accessible to first-year elementary educators. However, it is also possible that the teachers do not recognize how to use all of the resources that their textbooks have to offer. Then, the responsibility falls on teacher preparation programs, the school or school district, and the textbook writers to be more intentional in educating the teachers about how to be effective consumers and appliers of the written curriculum. For example, a teacher preparation program could intentionally require its preservice teachers to explore mathematics textbooks to learn about what resources are available in the written curriculum and how teachers can use them when planning for instruction.

The first-year teachers interviewed in this study heavily relied on their written mathematics curriculum materials for lesson planning, yet Stein, Remillard, and Smith (2007) wrote that preservice teachers associate textbooks with unsatisfactory pedagogical practices and are reluctant to use textbooks in their lesson planning. The researcher consulted the literature to further explore reasons why preservice teachers may hold beliefs about textbook use that do not correlate to first year teachers' actual dependency on their textbooks. An article by Frid and Sparrow (2009) recognized dilemmas encountered by beginning teachers. According to Frid and Sparrow, the first-year teachers in this study may have been forced to choose between their personal beliefs and the expectations of others. It is possible that the teachers do not want to rely heavily on their textbooks, but they are coerced by the expectations of the other teachers in their grade level or school, principal, or other administrators. Another dilemma the first-year teachers may face is a pressure to effectively manage their time. They may rely on their written curriculum to efficiently plan the timing of their lessons, units, and entire mathematics course so that they are sure to cover all of the necessary information by the end of the year. They may also struggle to write lessons that fit the amount of time allotted for mathematics each day and therefore trust the lessons in the textbook to fit within the time given. One last dilemma the teachers may face from Frid and Sparrow's article is a fear of failure due to relative inexperience. These first-year teachers may not feel comfortable implementing their own lesson plans when they are given lessons that have been endorsed by education professionals in the textbooks. Preparing and mentoring preservice teachers to work through these dilemmas in teacher preparation programs may better educate future teachers about how to effectively use written mathematics textbooks for planning student-centered instruction.

Upon comparing Lee and Hannafin's characteristics of student-centered learning (2016) to the first-year teacher's perceptions of their lesson plans, these teachers' mathematics lesson plans seem moderately student-centered. But because some of the features of student-centered learning are not being considered in the teachers' lesson planning, it is possible for these teachers to implement a higher level of beneficial student-centered instruction in elementary mathematics. In particular, both teachers interviewed in this study mentioned that allowing the students to negotiate and endorse the learning goals is an area in which they need to personally improve. Teachers (and the learners in their classrooms) may profit from more intentional education on how to plan for student-centered instruction.

Previous to this project, the researcher had never heard of, nor been educated about, a curriculum or pacing guide. However, the pacing of curriculum implementation severely impacts the instruction in a classroom, and pacing guides drastically influence the teacher's management of lesson implementation. It is likely that first-year educators will be required to use some sort of pacing or curriculum guide, as shown by the two first-year teachers in this study. Therefore, institutions of teacher preparation (including the University of Northern Iowa) need to address and educate about pacing guides in their programs.

In addition, the researcher's educator preparation program has highly emphasized the importance of lesson planning before implementing instruction in any classroom. The future teachers at the University of Northern Iowa are required to write copious lesson plans that are rigorously critiqued and rewritten until perfection has been achieved. However, the teachers in this study rarely, if ever, wrote lesson plans for their mathematics instruction; furthermore, the lessons that were planned were taken almost entirely from the curriculum textbook. Why do

preservice teachers spend considerable time writing lesson plans when it seems as though they will hardly do so in the field?

The researcher asserts that the process of lesson planning as taught in teacher preparation programs needs to shift to reflect the nature of lesson planning in the first-year teacher's classroom. It is reasonable to expect preservice teachers to write lesson plan documents because doing so allows professors to assess what aspects of the lesson the preservice teacher has thought about and developed before the student enacts them in a classroom. However, the ultimate emphasis of lesson planning should not be to produce a written document; lesson planning should become an internal habit of mind. If first-year teachers are rarely writing lesson plans, teacher preparation programs need to guide preservice teachers through the transition from writing down every aspect of the lesson to planning as a mental process. It is the responsibility of teacher preparation programs to ensure that their graduates are prepared for the realities of lesson planning when they step into their first teaching positions.

Conclusion

The purpose of this study was to bring light to the role of the written curriculum, pacing guide, and timing in influencing the way a first-year elementary teacher creates mathematics lesson plans. This was accomplished through interviews of two first-year teachers in Iowa's Cedar Valley region. The teachers' responses to questions about their lesson planning procedures allowed the researcher to draw conclusions to help preservice elementary teachers better understand the process of creating their lesson plans from the written materials, as well as help teacher preparation programs better educate their students on what to expect during this process.

The results of this study show that while first-year teachers recognize that their textbooks contain features to help them plan student-centered mathematics instruction, the educators do not always utilize these features. However, the two teachers interviewed admitted to planning and implementing the lessons almost directly from their written curriculum, categorizing them as thoroughly piloting the curriculum according to Remillard and Bryans (2004). Both educators believe that their lesson plans are moderately student-centered, using the characteristics of student-centered learning from Lee and Hannafin (2016). The interviewed educators differed in their use of a pacing guide; one had a fairly adjustable guide, while the other did not have a pacing guide at all (but was required to assess certain knowledge and skills and turn in these results at certain times). Despite differences in the use of a pacing guide, both educators discussed the importance of time management in mathematics instruction and mentioned the help of more experienced educators to help them manage their days wisely. In addition to differences in pacing guides, the two interviewed teachers also structure and plan their lessons differently. One educator plans for a week of instruction two weeks before implementation, but she only has to complete this about once a month because the teachers in her grade level take turns writing everyone's lesson plans. The other educator did not write lesson plans; she read the lessons and took some notes, but did not otherwise plan her mathematics instruction. From these results, clear similarities and some unique differences in the lesson planning of these first-year teachers emerge, even though they are both elementary educators in the same area.

Limitations

Due to the difficulty of obtaining willing first-year teachers to interview in the Cedar Valley, this study only expands upon the experiences of two teachers. While the researcher was able to probe more deeply into the lesson planning process of each of these teachers as a result of

the limited number of interviews, other conclusions may have been drawn if discussions were held with a greater number of first-year teachers.

To narrow the scope of the target population, this study was limited to educators teaching in Iowa's Cedar Valley. Obtaining a more comprehensive understanding of the trends in the utilization of the written curriculum in first-year teachers' lesson planning would require additional interviews to occur and more time to complete the project.

The researcher did not analyze the first-year teacher's textbooks, pacing guides, or lesson plans, nor was the implementation of those plans observed by the researcher in the classroom. This study is limited to the perceptions of their textbooks, pacing guides, and lesson plans that the teachers shared. There may be a discrepancy between the teachers' perceptions of their materials and the actual content of these materials.

Future Research

Based on the results of the study, many suggestions can be made for future research to benefit preservice teachers and the future of teacher preparation programs. First, further studies should be conducted to overcome the limitations of this particular investigation. Similar research should be undertaken to determine if the same conclusions can be drawn from studies that include a higher number of first-year teachers and a broader target population. Additionally, it may be beneficial for future researchers to investigate the perceptions the teachers held about their written curriculum materials compared to the actual content of those materials. These future research efforts may yield different results than the two case studies presented in this investigation.

More research should be completed to determine why first-year elementary teachers do not fully utilize the features of their curriculum text to plan for student-centered instruction.

Though the first-year elementary teachers perceived multiple curricular features as present in their mathematics textbooks, these resources were not always referenced when planning for instruction. Why the textbook materials are not fully utilized remains unanswered. Did the teachers feel that these resources were not helpful or not applicable to their particular students? Did they have so many resources outside of the curriculum text that these features were unnecessary? Did the educators feel unprepared to use the curriculum features due to a lack of training (or some other reason)? Would these particular teachers have been better equipped to use the textbook resources if they had more time prior to their first day of teaching to learn about the curriculum materials? Further research may bring light to the reasons why the written curriculum is not completely utilized.

Additionally, further research should investigate the difference in the perception of using textbooks for lesson planning as a preservice versus first-year teacher. Though this research determined that first-year teachers rely heavily or entirely on the written mathematics curriculum materials for most or all of their lesson plans, Stein, Remillard, and Smith (2007) wrote that preservice teachers associate textbooks with unsatisfactory pedagogical practices and are reluctant to use textbooks in their lesson planning. It is striking that such an apparent difference exists between preservice teachers and teachers in their first year in the field. Has a shift occurred in teachers' perceptions of incorporating textbooks in the lesson planning process since Stein, Remillard, and Smith's publication from 2007? Are preservice teachers still apprehensive about textbooks? Are the opinions of preservice teachers and first-year teachers truly different? Were the interviewed teachers reluctant to use their textbooks, but did so anyway? Were they overwhelmed by all of the content they needed to teach and used the lessons in the text simply to

stay caught up with the demands of their new position? The answers to these questions cannot be determined from this study, so further research is needed to answer these questions.

Final Comments

The proposals from this study for changes to teacher education programs and further research will assist many invested parties in education. First, preservice teachers should be taught what to expect in their first year in the field; the conclusions from this research help future teachers understand the role the written curriculum may take in their lesson planning for mathematics. Institutions of teacher preparation may use the results from this study to alter their programs to better meet the needs of first-year elementary teachers. The results of this study may also cause first-year teachers to reflect upon their practices for using their written curriculum materials when planning for mathematics instruction and alter them to better fit the unique demands of their students. Lastly, curriculum writers and school administrators can understand the experiences of first-year teachers and properly alter current practices to meet their specific needs based on the results of this study. Better understanding the role of the written curriculum, pacing guide, and timing in influencing the way a first-year elementary teacher creates mathematics lesson plans is important to support the highest level of student-centered mathematic instruction, imparting the best possible educational practices and opportunities for students in the future.

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