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A Review of High-Leverage Teaching Practices: Making Connections Between Mathematics and Foreign Languages

Anne Cummings Hlas
University of Wisconsin-Eau Claire

Christopher S. Hlas
University of Wisconsin-Eau Claire

Abstract: *Recent discussions in the field of teacher education call for more practice-based professional development as a way to provide pre-service teachers with the necessary skills to significantly advance student learning. High-leverage teaching practices (HLTP) are a core set of teaching practices that, when executed proficiently by accomplished novice teachers, are said to promote higher gains in student learning over other teaching practices. In this review, we define and identify possible practices within specific teaching domains against the backdrop of the history of HLTP in the field of mathematics education, a pioneer in this area. We then extend and apply the work in mathematics to foreign language (FL) education. Examining HLTP from the perspective of mathematics education provides a useful initial framework to the FL education community to identify and establish its own set of practices and ground future research in this area.*

Key words: *anticipating student misconceptions, best practices, high-leverage teaching practices, multiple representations, problem-solving*

> Give me a place to stand and with a lever I will move the whole world.
> *(Archimedes)*

Introduction

Over the last 50 years, research in the field of teacher education has focused on characteristics of effective teachers, teacher knowledge, teachers' beliefs about learning and instruction, and teacher thinking and decision making (Cochran-Smith & Lytle, 1999; Grossman & McDonald, 2008; Vélez-Rendón, 2002). At the same

Anne Cummings Hlas (PhD, University of Iowa) is Associate Professor, Department of Foreign Languages, University of Wisconsin-Eau Claire.

Christopher S. Hlas (PhD, University of Iowa) is Associate Professor, Department of Mathematics, University of Wisconsin-Eau Claire.

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time, the practices of teaching have been researched and discussed as they have been shown to be critically important in teacher learning, development, and instructional effectiveness (Ball, Sleep, Boerst, & Bass, 2009; Bullough, 2001; Grossman et al., 2009; Mohr, 1973; Richards & Rodgers, 2001), but research on teaching practices has historically been delegated to field experiences instead of teacher education coursework (Grossman & McDonald, 2008). Recently, a focus on the importance of a practice-based curriculum in teacher education has returned as an important issue in teacher preparation (Ball & Cohen, 1999; Danielson, 2007; Grossman & McDonald, 2008). Sleep (2009) traces this current trend to "the need to focus teacher education on practice—that is, to teach pre-service teachers to *do* teaching, rather than simply talk *about* teaching" (p. 6; emphasis in original). This focus on what teachers do rather than what they know calls for teacher education to provide significantly more purposeful practice within the limited time they are given.

A practice-based focus maintains that teaching is complex work requiring analysis and deconstruction so that core practices of teaching can be made transparent to preservice students and can be taught, practiced, and carried out with skill to support student learning (Ball et al., 2009; Grossman et al., 2009; Grossman & McDonald, 2008; Lemov, 2010). The assumption is that teachers who can skillfully enact a specific set of core practices are more likely to support and advance student learning (Ball et al., 2009). Researchers have thus argued that the identification and teaching of core practices to novice teachers is an essential building block in a practice-based teacher education curriculum, regardless of the content area.

To understand this current focus on *practice*, one must first analyze and define the term practice. Lampert (2010) analyzed the term by contrasting practice with theory, claiming that this contrast is essential because it highlights important differences between what a teacher does against what a teacher thinks or knows. By teasing apart what teachers do from what they know, one can then analyze teaching as a collection of specific practices and not only as a body of knowledge. From Lampert's perspective, *practices* are defined as actions that teachers do habitually or routinely to support learning. In addition, a teaching practice worth learning to enact well is one that has proven itself successful over time and one that is adaptable to different teaching styles, students, and contexts of instruction. However, what must first be agreed upon is an understanding of exactly which practices are deemed effective and essential to learning. To this end, we identify the differences between *practice* and another common term in the profession—*best practice*.

Best practice seeks to identify effective teaching strategies. The term has its roots in business, technology development, and health care, where it is defined as "a technique or methodology that, through experience and research, has proven to reliably lead to a desired result" (Center for the Study of Ethics in the Professions, 2011, para. 4). The expression *best practice* hit its stride in the 1990s and continues to be used in various fields, including education, where the practices of expert teachers are commonly referred to as "best practices." Several articles have been written about best practices in teaching (e.g., Daniels, Zemelman, & Hyde, 2005; Pufahl, Rhodes, & Christian, 2001; Stone, 2007); however, problems with its definition remain. For example, how does one define *best*? Some researchers have defined *best* as the "most successful aspects" (Pufahl et al., 2001), while others defined it as being low-cost, reliable, and continuous (Edmonds, 2007). Clearly, the term brings with it various attributes and personal interpretations.

This lack of precision in delimiting and defining *best practice* has recently led to the re-conceptualization of accomplished teaching as one that involves the use of high-leverage teaching practices (HLTP). An HLTP seeks to delineate a core set of practices that has the greatest impact on student learning

and, therefore, may serve as a curricular framework for professional preparation in teacher education programs. Rather than attempting to prepare novice teachers with the totality of professional knowledge and skill, this approach to teacher education acknowledges that to develop skilled beginning teachers, less may indeed be more. Ball et al. (2009) provided a succinct definition of HLTP:

> [High leverage] practices are most likely to equip beginners with capabilities for the fundamental elements of professional work and that are unlikely to be learned on one's own through experience … teaching practices in which the proficient enactment by a teacher is likely to lead to a comparatively large advances in student learning. (p. 460)

Ball and colleagues went on to state that the term *high-leverage* is a useful criterion to identify the most beneficial practices for teachers—that is, practices that offer the highest student impact based on how the teacher makes use of the practice or, more specifically, how the practice is leveraged by the teacher (Ball et al., 2009, p. 474).

Although this compelling re-conceptualization has much to offer, the relationship between an HLTP and student impact and how this impact is determined becomes a rather thorny issue. Researchers and teacher educator reformers have tended to determine impact based on empirical research; however, the type of data that count as evidence varies considerably. For example, initial work by the Carnegie Foundation for the Advancement of Teaching examined impact through the lens of documented practices of outstanding K–12 and higher education teachers nominated for teaching excellence (Franke & Chan, 2006; Hatch & Grossman, 2009; Hatch et al., 2005). The Houston Independent School District (2009) identified a cohort of teachers who had the "highest average value-added Cumulative Gain Index for two consecutive years" on the Education Value-Added Assessment System (SAS, 2010, n.p.), a statistical package that uses information on teaching practices to predict and measure student academic progress over time. Marzano, Pickering, and Pollock (2001) translated "effect sizes into [student] percentile gains" (p. 6) to identify HLTP. Finally, Ball and her team have relied on "the best available current evidence" in the existing research to define student impact (Teacher Education Initiative Curriculum Group, 2008, p. 4). From the above, it is clear that what constitutes empirical evidence is not well defined, and a common metric still needs to be determined.

This lack of agreement does not diminish, however, the important work that has already been conducted on the concept of HLTP. Along with the feature of impact, the University of Michigan Teacher Education Initiative (TEI) Curriculum Group (2008) identified seven additional features that define an HLTP (see Table 1). These features illustrate the scope and criteria for an HLTP: for example, transparency, analyzability, usefulness in various contexts of instruction, and its critical role in forming accomplished novices, a term that refers to well-prepared early career teachers.

An Example

An example of an HLTP from the TEI Curriculum Group (2008) and the University of Michigan's (2012) more recent work is leading a classroom discussion (see Table 2). As Table 2 shows, an HLTP may be parsed into micropractices, which are specific aspects of the teaching practice that need to be learned to enact the practice effectively.

Leading a discussion is parsed into 12 micropractices, and two of those micropractices are further divided into subpractices. "Leading a discussion" is an ideal example of an HLTP in that it can be analyzed, can be taught and rehearsed, and is applicable to different contexts and contents of instruction (Ball & Forzani, 2010; Lampert, 2010; TEI Curriculum Group, 2008). When applied to the context of foreign language (FL) education, leading a

TABLE 1

Eight Features of HLTP

Features related to high-quality teaching:

1. Effective/powerful in advancing pupils' learning both distally and proximally
2. Specifically effective in using and managing differences among students, and in confronting inequities
3. Useful in many contexts and across content areas

Features related to high-quality professional education:

4. Can be assessed
5. Serve usefully as building blocks for learning practice
6. Can be unpacked and taught to beginners and learned by them
7. Can be justified and made convincing to teacher candidates (and others) as meaningful and useful for becoming skilled practitioners, both now and later
8. Are unlikely to be learned well only through experience

Source: TEI Curriculum Group, 2008, p. 4

TABLE 2

HLTP of "Leading a Discussion"

1. Launching the discussion/purpose setting
2. Using students' ideas to advance the discussion
3. Eliciting and following up students' contributions
   a. Scaffolding student contributions
4. Managing multiple ideas
5. Making public records of the discussion
   a. Selecting those ideas that will become part of the record
   b. Learning to use re-voicing or re-presentation in the act of making a public record
6. Using language that is accurate yet accessible to students
7. Identifying and highlighting the core of an idea or explanation
8. Working with student errors and misconceptions
9. Clarifying terms
10. Asking students to ground discussion in shared knowledge and terms
11. Engaging different students in the class equitably
12. Deploying and connecting representations of content

Source: TEI Curriculum Group, 2008, p. 8

discussion encompasses the micropractices listed in Table 2 and most likely involves additional features, such as using the target language comprehensibly and providing assistance and opportunities for student participation in the target language during the discussion. There are additional sub-practices that might characterize leading an

effective FL discussion as well. For example, comprehensibility can be parsed into "use of paraphrase and circumlocution," "simplification of complex syntax," and "re-entering new language elements into the discussion" (Andrews and McNeill, 2005; Elder, 2001; Scullen & Jourdain, 2000).

Overview and Purpose of Literature Review

This review is based on the call by the ACTFL Research Priorities project for an examination of the work on HLTP in various academic content areas and their potential application to the field of FLs. It must be noted that work in HLTP, even within mathematics education, is still a relatively new initiative where leaders are working toward refining frameworks and identifying HLTP. While we acknowledge the lack of agreement on defining and selecting HLTP, for the purposes of this article, we also recognize the importance of examining a few possible HLTP identified from research in mathematics education because this field has a long educational history and has been a pioneer in the HLTP approach to teacher education (see Table 3). As such, we have selected possible HLTP in this review for their historical nature, their empirical evidence provided in previous studies, their continued importance in teacher training, their emphasis on the development of student understanding, and their possible application to FL education. We address concerns surrounding the identification and selection of HLTP in the conclusion.

Further, this literature review is not a comprehensive examination of all high-leverage practices, micropractices, and related subpractices within teaching, but rather a focused review of a few essential HLTP for accomplished novice teachers. To this end, we have identified four possible HLTP within the field of mathematics education that we argue have connections to the learning and teaching of FLs. With this exploratory purpose in mind, we have attempted throughout this review to connect each practice to FL education, first by briefly illustrating the relevance of the HLTP within mathematics education and then by adapting and applying the practice to the context of FL instruction.

Practice 1: Anticipating Student Errors and Misconceptions During Planning

In mathematics education, Ball and Forzani (2010) agreed that "one high-leverage practice is the teacher's ability to recognize key ways of thinking and misconceptions that students in a specific grade level typically have when they encounter a given idea" (p. 44). That is, when planning and executing their lessons, teachers need to be able to anticipate how students will likely react to new academic material. Learning to understand and anticipate student thinking is a powerful HLTP that is unlikely to be learned through experience only and is a skill that many pre-service teachers lack (Ball, 1990; Even & Markovitz, 1995; Even & Tirosh, 1995; Tirosh, 2000). In reference to mathematics instruction, Stein, Engle, Smith, and Hughes (2008) stated the importance of anticipating student thinking and actions:

> Anticipating students' responses involves developing considered expectations about how students might mathematically interpret a problem, the array of strategies—both correct and incorrect—they might use to tackle it, and how those strategies and interpretations might relate to the mathematical concepts, representations, procedures and practices that the teacher would like his or her students to learn. (Stein, et al., 2008, p. 323)

Carefully anticipating student responses requires a teacher to have a true understanding of students' thinking processes and has the potential to advance student learning (Borko & Livingston, 1989; Fernandez & Yoshida, 2004; Livingston & Borko, 1990). In the FL classroom, this practice may be realized by anticipating

TABLE 3

HLTP Addressed in This Article and Examples of Their Significance

	Emphasis on student understanding	Historical nature	Continued importance in teacher training
Anticipating student errors and misconceptions	• Matthews, Hlas, & Finken, 2009 • Tirosh, 2000 • Tzur, 1999 • Vac & Bright, 1999	• National Council of Teachers of Mathematics, 1989, 1991	• Ball & Forzani, 2010 • TEI Curriculum Group, 2008 • Ball et al., 2009
Making connections between multiple representations	• Ainsworth, Bibby, & Wood, 2002 • Brenner, Mayer, Moseley, Brar, & Durán, 1997 • Diezmann & English, 2001 • Goldin & Shteingold, 2001 • Lowrie, 2001	• National Council of Teachers of Mathematics, 1989, 1991 • Goldin & Shteingold, 2001	• Anthony & Walshaw, 2007 • Ball & Forzani, 2010 • TEI Curriculum Group, 2008 • National Council of Teachers of Mathematics, 2000 • University of Michigan, 2012
Leading a classroom discussion	• Doerr, 2006 • Franke et al., 2009 • Lampert, 2001 • Stein, Smith, Henningsen, & Silver, 2000 • Swan, 2005	• National Council of Teachers of Mathematics, 1989, 1991 • Shulman, 1987 • Polya, 1945	• Ball et al., 2009 • Danielson, 2007 • TEI Curriculum Group, 2008 • University of Michigan, 2012
Teaching through problem-solving	• D'Ambrosio, 2003 • Dochy, Segers, den Bossche, & Gijbels, 2003 • Gijbels, Dochy, den Bossche, & Segers, 2005 • Maxwell, Mergendoller, & Bellisimo, 2005 • Stigler & Hiebert, 1999 • Strobel & van Barneveld, 2009	• National Council of Teachers of Mathematics, 1989, 1991 • Polya, 1945 • Lester et al., 1994	• Anthony & Walshaw, 2007 • National Council of Teachers of Mathematics, 2000 • Schoen & Charles, 2003

students' difficulties in comprehending target language input, potential communication problems, and possible misunderstanding of a cultural product, practice, or perspective of a particular structure of the language that may differ considerably from their first language. The ability to anticipate student thinking involves knowing not only the contents of instruction, but also the student and any age-related developmental issues that will have an impact on the way the lesson is planned.

Micropractice: Four-Column Planning

A tool to realize the HLTP of anticipating student misunderstandings is to use a newly developed four-column lesson plan template where the lesson plan is arranged both vertically for learning activities and horizontally for anticipated student responses and potential teacher interventions (Lewis, 2002). The first column represents the planned sequence of instructional activities. Columns two, three, and four provide support for each activity by including anticipated student responses, teacher follow-up questions and activities, and the teacher's ongoing assessment of student understanding. Note also that four-column lesson planning was adapted from a Japanese form of teacher professional development called Lesson Study. In Lesson Study, a group of teachers collectively research, plan, execute, and reflect on a single "research" lesson (Lewis, 2002; Stigler & Hiebert, 1999). This process is conducted continually in a cyclic manner to improve a specific lesson through re-teaching over the course of many months. Four-column lesson planning was a tool used in Lesson Study to develop a series of learning tasks and anticipate students' reactions to these tasks. As such, the four-column lesson plan format is useful for planning and predication and later for focused reflection and lesson revision (Matthews, et al., 2009).

An example of how this planning tool may work in FL education is found in Table 4 where the lesson asks students to greet people in formal and informal situations.[1] The lesson begins by eliciting prior knowledge from the students about greetings. The teacher expects students to practice greetings while observing examples of the informal and formal *you* and corresponding structures. At this point in the lesson, the teacher anticipates that the students need to focus on variations in greetings so that they will be prepared to talk about visuals of greeting situations in the later part of the lesson and to discuss culturally appropriate ways to greet people, comparing greetings in their home culture to the target culture.

Classic models of lesson plans focus primarily on describing the activities of the teacher. Attention to how students might process the various activities is not often recorded in the plan. By adding additional columns representing the ways that students think about the lesson, teachers anticipate student mistakes and plan approaches for tackling them. It is also noteworthy that this planning format, in which the exploration of student misconceptions is expected, requires anticipating where the lesson may take alternative paths. This approach to planning contrasts sharply with typical lesson plans that describe only preconceived technical and procedural aspects of the lesson.

Practice 2: Making Connections Between Multiple Representations

A second possible HLTP from mathematics education is based on the use of multiple representations and making the connections between them. Many mathematics educators believe in approaching a new concept from multiple viewpoints instead of from one perspective, which can be illustrated with the fable "The Blind Men and the Elephant" (Saxe, 1873). This story involves six blind men who happen upon an elephant. Each man only touches a single part of the elephant and develops a conclusion based on this single experience. For example, one man touches the

TABLE 4

Micropractice: Four-Column Lesson Planning

Goal: Greeting people in formal and informal settings in Spanish Materials needed: Pictures, sample conversations			
Steps of the lesson: Learning activities and key questions	**Expected student responses, questions, or misconceptions**	**Teacher's support: Follow-up questions or actions**	**Goals and method(s) of evaluation**
1. Activate prior knowledge of basic greetings such as "good morning," "good afternoon," and "how are you?" in Spanish.	May initially think of most common greetings.	Connect to background knowledge by asking students for phrases they may already know from pop culture or local culture (e.g., "*Hasta la vista*").	Greet a few random students and ask them how they are doing.
2. Read through sample informal and formal conversations. Ask students to read them in pairs.	Possible confusion in understanding a formal and informal *you*.	Show concrete examples. Bring pictures of people (e.g., children, esteemed politicians) or situations (e.g., job interview or coffee shop) to show students.	Ask students if they would use formal or informal *you* based on a situation or picture. All students respond by visually signaling with their fingers (e.g., #1 means formal, and #2 means informal).
3. Indicate the different forms for informal and formal situations.	May not notice subtle changes in subject-verb agreement. Target certain words for high-frequency repetition (e.g., "*¿Cómo está Ud.?*" "*¿Cómo estás?*")	Use a highlighter to mark differences. Point or write out differences on board for visual learners.	Ask either/or questions to class based on concrete examples. For instance, "Is the expression 'What's up?' used in informal or formal situations?"
4. Discuss culturally appropriate greetings.	Students may react to non-verbals associated with greetings (e.g., proximity, eye contact, touch)	Ask students their opinion about the greetings. Compare to greetings in the home culture.	Students should recognize there are many ways to greet someone and how one greets depends on the context of the interaction.

elephant's trunk and concludes he is touching a snake, while another man touches a leg and concludes the elephant is much like a tree. This fable illustrates the problem with relying on one external representation in teaching a new concept—namely that such representations will always lack critical features of the whole concept. Further, a concept of an elephant is only formed by connecting all of the salient features of the various representations, or in this case, the experiences of the blind men.

The learning of all concepts involves the creation of some kind of representation, whether numerical, verbal, visual, or tactile. When discussing representations in education, mathematics education proposes a distinction between internal representations and external representations. Internal representations include a student's personal assignment of meaning to symbols, natural language, visual imagery, spatial representation, problem-solving strategies, and affect (Goldin & Shteingold, 2001, p. 2). In short, internal representations are the prior knowledge about a concept that students bring with them into the classroom. By contrast, external representations include various material resources provided by the teacher and the environment to visualize and mediate the development of the concept, such as concrete objects, gestures, pictures, tables, graphs, symbols, technological resources, and language. In FL education, external representations may also involve the development of concepts associated with form-meaning mappings, cultural ideas, contexts of language use, or academic content in the case of content-based instruction. The instructional goal is for teachers to use external representations of various kinds to help students develop and elaborate upon their already formed internal representations.

It has been argued that "the *interaction* between internal and external representation is fundamental to effective teaching and learning" (Goldin & Shteingold, 2001, p. 2; emphasis in original). In fact, research that supports this HLTP has been found to help students reach a deeper level of conceptual understanding, translate problems between representations, and provide multiple self-created representations (Brenner et al., 1997; Diezmann & English, 2001; Fernandez, Yoshida, & Stigler, 1992; Goldin & Shteingold, 2001; Lowrie, 2001). The HLTP of using multiple representations is based on the premise that students move from naïve internal representations to increasingly more elaborated and complex internal representations through the process of constructing, comparing, and evaluating multiple external representations.[2] Teachers then need to make explicit connections between the representations of the concept in order to be maximally effective (Brenner et al., 1997; National Research Council, 2001; Panasuk, 2010). An example from mathematics may be teaching the concept of a right triangle. A teacher may connect the idea of right triangles by providing images of right triangles from the real world (e.g., bridge supports) and connecting it to hands-on manipulatives where students select appropriate triangles from a variety of samples (e.g., right, obtuse, or acute triangles). Identifying patterns is one strategy that mathematics education uses to connect multiple representations. See Table 5 for other ways to make connections between representations with examples applied to the FL classroom.

An example of how to connect multiple representations in FL education may involve the techniques of visualization and verbalization, tools from concept-based instruction (Lantolf & Johnson, 2007). An example from the work of Negueruela (2003) demonstrates how students first visualize or develop a concrete model or flow chart of a grammatical topic such as when to use the preterite and imperfect for purposes of past narration in Spanish. For a complete flow chart example of aspect, see Negueruela and Lantolf (2005, p. 9). Next, students verbalize the model and the connection of the model to their own written and oral work. Providing more representations of this sophisticated grammatical

TABLE 5

Making Connections Between Multiple Representations

Technique	Description	Example in FL
Concept attainment	Students are provided with or develop positive and negative examples of a concept. Based on examples and non-examples of the concept, students derive a concept definition (Bruner, Goodnow, & Austin, 2009).	Based on several contextualized examples, the class makes a list of examples and counter-examples to explain, for example, the various ways to ask for information (e.g., *¿Qué?* and *¿Cuál?* Or *Pourquoi?*, *Quand?*, or *A quelle heure?*). Then, students state their observations in a brief rule about how to request information.
Identify patterns	Students compare and contrast attributes of representations in different ways.	After hearing an authentic folktale in the target language and discussing the meaning of the story, students identify the pattern for stating comparisons between objects or people.
Manipulatives	Students work with hands-on objects to learn properties of target concepts.	Students work with two sets of pictures: people and actions. Students create their own picture to create original and truthful utterances that describe various activities that they or others do in their daily lives.
Verbalization	Students verbalize their understanding of a concept in relation to a model, manipulatives, or their own work.	Students explain the use of metaphors in a paragraph they read or wrote based on their understanding of the concept. Students create a visual representation (e.g., drawing, short video, photograph) of their metaphors and then present to the class in the target language how their image represents and relates to the meaning of the metaphor of text.
Visualization	Students create a concrete model.	Students create a concept map of, for example, a language function, such as requesting information, the important events of a story, a time line of an historical event, or a comparison of holidays in the United States and in other cultures.

concept and assisting students to make connections through visualization and verbalization can lead to a more coherent and systematic understanding of the concept and stronger connections (Elman et. al, 1996; Negueruela, 2003; Negueruela, Lantolf, Jordan, & Gelabert, 2004). Helping students to build representations of how actions can be represented in the past and connections between those representations can help transform students' subconscious and naïve understandings of past narration (e.g., "just use the past tense verb") to an informed understanding of the multiple

ways that past actions are understood, viewed, and expressed through various language choices by speakers.

Practice 3: Leading a Classroom Discussion

Leading a classroom discussion, presented earlier, is a commonly cited example of a possible HLTP because it can increase students' understanding and interpretations of texts (Doerr, 2006; Franke et al., 2009; Lampert, 2001; Stein et al., 2000; Swan, 2005). Discussions are used in various contexts, are valued across disciplines, take awareness of discourse on the part of the teacher, and require careful planning to enact discussions that go beyond plot recall to interpretation, conceptual understanding, and the creation of intertextual connections (Stein, et al., 2008). Due to the complexity of this HLTP, the following section focuses on only one of the micropractices for leading a discussion: eliciting student contributions during discussions. By attending to student contributions during discussions, teachers can monitor student comprehension of texts, increase student participation in the discussion, and decide upon follow-up discourse moves as the discussion unfolds.

Micropractice: Eliciting and Reacting to Student Contributions During Discussion

One of the most frequent discourse moves that teachers use to elicit student responses and manage participation during discussion is to ask questions (Edwards & Mercer, 1987). Carefully constructed questions can increase student engagement with the task, identify what students know, support increasingly more explicit student explanations of the material, and promote critical thinking about texts (Franke et al., 2009; Lampert, 2001; Stein, et al., 2000; Swan, 2005). Teacher questions also guide students' thinking, focus attention on specific aspects of the text, and contribute to a positive classroom environment (Boaler & Brodie, 2004). In FL education, questions must also take into account the student's current language development and a consideration of the features of language and the content of the discussion. Asking just any question, however, is not enough. Asking viable and thoughtful questions is an excellent example of an HLTP in that question types can be detailed, analyzed, and practiced. Moreover, how a skilled discussion leader poses and uses questions to advance the discussion is unlikely to be learned through observation alone.

Within mathematics education, research on teachers' questioning suggests the questions that elicit student reasoning are among the most effective because they have the ability to tap into critical thinking, which in turn advances student learning. For example, Boaler and Brodie (2004) and Brodie (2011) examined teacher questions and coded them for their uses and categories. From these categories, probing questions that pressed students to clarify, elaborate, and explain their thinking clearly were found to increase student engagement in problem solving and to promote students' mathematical reasoning. The researchers also found that teachers who asked a greater variety of questions led students to higher-level thinking and engagement with the content.

Focusing on questions that promote, sustain, and extend thinking during discussion, Franke et al. (2009) described four types of teachers' questions used to follow up on students' explanations of their thinking: (1) general questions, (2) specific questions, (3) sequences of specific questions, and (4) leading questions. Follow-up questions, focused on something specific a student said, were found to help students better connect their ideas to the content and make their thinking more explicit. These questions also demonstrated that the teacher understood students' thinking and understanding of the content. From the above, it is clear that teachers' focused questions and follow-ups

have the ability to encourage and direct student thinking.

Based on the work of questioning in mathematics education, we propose that learning how to elicit and follow up on students' contributions during discussion is a suitable candidate for an HLTP in FL education. In FL education, teacher education candidates need to learn how to ask specific types of questions for engaging students in level-appropriate discussions that prompt students to share opinions about topics of interest or to demonstrate their interpretations of printed, audio, or video texts. For example, after carefully planned text-based lessons, students come prepared to the discussion with the necessary content knowledge and language resources to participate in text-based discussions that go beyond factual recall and plot summaries. Here, a teacher's skillful use of questions elicits students' thinking and enables them to elaborate upon opinions and reactions to the text and, as a result, emerge from the discussion with insight.

One type of question that has been discussed in the literature is the assisting question, which helps produce thinking that the student cannot or will not produce alone (Tharp & Gallimore, 1988). Assisting questions, as opposed to assessing questions (i.e., those that assess student knowledge for accuracy), prompt students' cognitive operations by helping them to organize content, make connections, and clarify their thinking. They may probe students for alternative explanations, brainstorm possible interpretations of textual events, or help students make links between texts of various kinds and their own life experiences. For example, students may be asked why they agree or disagree with the actions of a character in a story, or if the film that they have just watched reminds them of other stories they have read or experiences in their own lives.

Another tool for eliciting student participation is the use of teacher reactions to student contributions. In everyday interpersonal communication, people often provide personal reactions to what is said and thereby prompt more thinking and discussion (Hall, 1995, 2004). An indirect request, such as "I'm not sure I see your point clearly," or "That's a very interesting idea. Tell me more," often serves to elicit student extended responses in ways that go beyond asking for a single student response to a teacher query. For example, paraphrasing previous student statements allows students to comment upon what has been said, confirm or disconfirm the accuracy of the teacher's and other students' understanding of the points developed in discussion, and simultaneously provide a launching point for elaborating upon the points raised in discussion and moving the discussion forward.

The core practice of eliciting student responses during discussion through assisting questions and targeted teacher reactions invites students to express themselves during discussion, provides scaffolding to reach higher levels of understandings and conceptual development, and assists students in explaining and making their thinking public. From this discussion, it is clear that the art of eliciting student contributions is a complex and multifaceted endeavor and represents only one of the micropractices, albeit an important practice, involved in leading a classroom discussion. In time and with teaching experience, teachers may extend their repertoire for eliciting participation. However, for those at the initial stages of learning to be FL teachers, the micropractice of eliciting student responses during discussion is developmentally appropriate and amenable to deconstruction, explanation, modeling, and focused rehearsal, all requirements for the identification of high-leverage practices for the beginning teacher.

Practice 4: Teaching Through Problem Solving

Teaching through problem solving is a possible HLTP that involves providing students with a problem, rather than a lecture on

solutions, as the basis for exploring and learning new content. Teachers who use problem solving typically support students working cooperatively and encourage the sharing of problem-solving strategies and skills among students (Boaler, 2008). In FL education, the use of problem solving is found routinely in the use of word puzzles (e.g., crossword puzzles, word games of various kinds), real-world problems (e.g., a lost passport while abroad), communication concerns (e.g., negotiation of meaning), writing issues (e.g., "Who is my audience?" "What is the genre?"), or interpretation of texts (e.g., exploring the motivations of characters in a story), among others.

Boaler's (2008) research provides a description of one class where problem solving occurred. She observed that in this class, "students were actively involved in their learning and were able to offer their own thoughts in solving problems. This class [also] worked so well because students were given problems that interested and challenged them" (p. 3). She went on to state that students were able to solve these challenging problems because of targeted scaffolding from the teacher. Interestingly, her rich description of this class embodies the characteristics of problem solving as an HLTP, which are identified as:

- student/student and student/teacher interactions,
- establishing the right amount of background knowledge,
- teachers facilitating, coaching, guiding,
- selecting an appropriate problem, and
- dialogue and consensus among students about solutions. (Lester et al., 1994; Van Zoest, Jones, & Thornton, 1994)

Ample evidence exists that shows that where problem-based learning (PBL) is used, students demonstrate significant improvement in tests of academic achievement, self-directed learning skills, and retention (D'Ambrosio, 2003; Dochy et al., 2003; Gijbels, et al., 2005; Maxwell et al., 2005; Ravitz, 2009; Strobel & van Barneveld, 2009). The student gains associated with successful problem-based learning are the result of a delicate interaction between the content, teacher, and students. From this PBL interaction, one micropractice, targeted scaffolding, stands out as a key to building a framework of support for students during PBL and is the focus of the next section.

Micropractice: Targeted Scaffolding Through Routine Questioning

Polya's *How to Solve It* (1945) is a well-respected book on how to solve problems within mathematics. In this book, Polya provided a generic four-step process for solving mathematical problems: (1) understanding the problem, (2) devising a plan, (3) carrying out the plan, and (4) looking back and revising the plan. He presented targeted scaffolding as the support that teachers provide students as they engage in the problem-solving process. Questions related to each level are a central component of this scaffolding. For example, "Have you seen this problem before?" and "Do you know a related problem?" are examples of questions designed to help students orient themselves to the initial stages of problem solving. Polya argued that routinely asking students similar types of questions allows the students to eventually internalize these questions, making them available to students for their own independent problem solving at a later time. This process of internalizing questions to regulate thinking is based on the work of Vygotsky, in which cognitive development is viewed as increasingly greater degrees of self-regulation—that is, the ability to complete certain tasks with minimal support (Lantolf & Thorne, 2008).

In FL education, one example of the use of the HLTP of problem solving and the related micropractice of targeted scaffolding through routine questions is the use of a story-based approach to teaching the relationship of meaning and form. Other important aspects of using story-based approaches during language instruction

TABLE 6

Targeted Scaffolding With PACE Model

PACE step	Routine questions
Presentation of meaningful language	What do you think is going to happen? Can you retell the story? (e.g., acting, pictures) Could you restate it differently?
Attention	Can you indicate a pattern? Can you highlight the pattern? Do you see a difference in the pattern based on context or situation? Which parts were hard to understand?
Co-construction	What words look familiar to you? What could those words mean? Do you see any similarities or differences? Can you prove the pattern will happen again?
Extension activities	Can you re-write the ending? Can you predict what happens next? Can you compare it to another story?

include cultural information, interpretive communication, and creative thinking. For example, the PACE model (Adair-Hauck & Donato, 2010) of meaningful and contextualized teaching of grammar involves four steps for dealing with stories: **P**resentation of meaningful language in the context of a story, **A**ttention to specific aspects of the text, **C**o-construction of explanation of form-meaning mappings, and **E**xtension activities that ask students to use new information in a different but related context. The heart of this approach is that the teacher and the students are working together to understand the meaning of a story using questioning as an essential component of this task. Adair-Hauck and Donato (2002) described one aspect of the PACE model: "From the very beginning of the lesson the teacher and students are engaged in authentic use of language through joint problem-solving activities and interactions to render the story comprehensible" (p. 271).

Similar to Polya (1945), the steps of the PACE model are a generic four-step problem-solving approach. In the case of PACE, the problem may be defined as working toward comprehension and interpretation of a story that has been carefully selected by the teacher. Once this problem has been addressed, the students and the teacher work together to co-construct the relationship of particular aspects of the language of the text to its meaning, an additional form of problem solving. To this end, the teacher facilitates the discussion with routine questions based on the specific step in the PACE process. Students internalize these external questions that eventually become habits of mind enabling them to become independent readers and storytellers (see Table 6 for a sample). The problem-solving process leads students to think about patterns they encounter in texts, to explain their thinking, to predict, to selectively attend to parts of texts, and to test their hypotheses during meaning making. In addition, it should be noted that research already supports PACE as a more effective model than traditional bottom-up grammar teaching, for these same reasons (Adair-Hauck, 1993; Adair-Hauck & Donato, 2002; Donato & Adair-Hauck, 1992). It is based on this above

discussion that we argue that scaffolding problem solving through routine questioning in the context of a PACE lesson may be a suitable HLTP to include in a pre-service teacher certification program.

Debates and Emerging Issues

Four possible high-leverage practices from mathematics education were selected and explored for their applicability to FL education. Deciding which practices to choose, however, did not prove to be an easy task. Notwithstanding the list of features of HLTP (see Table 1), it was difficult to decide which practices could be considered high-leverage for novice teachers. There are myriad teaching practices from which to choose, but which ones have documented evidence to meet the criteria of an HLTP? For example, the TEI Curriculum Group (2008) identified 62 HLTP but failed to include evidence that demonstrates their impact on student learning. It is important to point out that unsolved issues and questions exist in the field of HLTP in teacher education. For example, how do we decide which practices are high-leverage, how are HLTP classified into practices and micropractices, and how will we know if a practice has an impact on student understanding? Because HLTP are distinguished from best practices for their effect on student learning, we need to ensure that we move forward with a clear definition of these practices rather than reiterating the term *best practices* with simply a new adjective.

The identification of instructional domains, core practices, micropractices, and subpractices is complex and may lead to confusions and differences within and across content areas. For example, to identify HLTP, Grossman and McDonald (2008) recommended that the field of education first carefully "parse" the teaching field into key components of teaching based on content, students, and grade levels in order to begin the process of identifying essential teaching practices. The TEI Curriculum Group (2008) divided the work of teaching into eight domains[3] to be further broken down into HLTP; however, not everyone associated with this work has agreed upon this hierarchy. For example, the TEI Curriculum Group defined "leading a discussion" as a high-leverage practice, whereas Boerst and Sleep (2007) referred to it as a domain. Researchers appear to have difficulty with this question and in deciding the grain size of particular practices for inclusion in a pre-service teacher education program (Ball & Forzani, 2010; Lampert, 2010). Further, Ball and Forzani (2010) argued that many attempts to define teaching practices have been too abstract, identifying teaching principles or goals instead of specific practices. Developing a common language to discuss and define the size and scope of a practice is an essential issue to the future success of practice-based research and teacher education.

Another area of concern is the beginning teacher. One cannot assume that novices will be able to reconstruct a specific HLTP at the appropriate time within a larger sequence of teaching. We must remember that teaching is more than just an assemblage of isolated practices, one dangerous misunderstanding of an approach to teacher education based on the teaching of a limited set of core practices. Hiebert et al. (2005) summarized this idea:

> It is more productive, in our view, to treat teaching as a system of interacting features. The core of teaching—the interactions of teachers and students around content—takes its shape from the knowledge teachers and students bring to the lesson, the tasks presented, the discourse structures and participation expectations, the assessments, the physical materials available, and so on. It is the interaction among these elements, the system, rather than the individual elements acting alone, that defines the learning conditions for students. (p. 113 emphasis in original)

Within this *system*, it is not sufficient only to implement an HLTP; what matters more

is how the feature is enacted by teachers and integrated into the whole of instruction (Hiebert et al., 2005). If a beginning teacher learns to anticipate student errors but is unable to use this information to advance student learning, connect to students on a personal level, or understand the errors in relation to the current content, then this practice can neither be skillfully executed nor high leverage. Parsing teacher activities into "bite-sized" pieces has the potential to lead novice teachers to believe that teaching involves only the enactment of isolated practices in succession with no regard for how practices are integrated into overarching instructional goals.

Developing a teacher education curriculum based on an extensive accumulation of practices rather than a select few practices may not give students time to practice and learn them well. For this reason HLTP work well because beginning teachers need time to analyze and rehearse HLTP with students in designed settings (e.g., "critique" lessons, laboratory classes) before taking the practice into actual classrooms for solo enactment (Ball & Forzani, 2009; Medina, 2008). Thus, teacher education programs need to provide the necessary time to develop competence in a few fundamental practices that are developmentally appropriate for beginning teachers. To achieve this goal, in turn, requires careful selection of the practices that language educators hope to develop in novice teachers.

Further, Ericsson (2002) argued that it is not the amount of time spent practicing but how practice occurs. For students to fully engage in HLTP and practice them effectively, teacher preparation programs must enable analysis of how a particular practice is integrated into the totality of instruction (Grossman & McDonald, 2008; Lampert & Graziani, 2009). Given the current political spotlight on education and teacher effectiveness and the fact that some states are reducing the required number of education courses (Virginia Department of Education, 2007), the focus on a few high-leverage practices would be beneficial in methods courses coping with reduced time. These courses may only be effective, however, if language educators attend to the above-mentioned concerns.

Further Research

With a common language for those working in the HLTP framework, researchers and teacher education reformers will be able to begin making connections across subject areas. First, it is up to the field of FL education to examine the HLTP and micropractices that are specific and unique to our goals. For example, launching a classroom discussion may take place differently in a mathematics class compared to an FL class. In FL classes, it may involve the use of sequences of well-ordered questions (Curtain & Dahlberg, 2010) to provide language support and more initiation-response-follow-up communication patterns and less initiation-response-evaluation patterns (Hall & Verplaetse, 2000; Hall & Walsh, 2002; Mehan, 1979). HLTP within FL education need to take into consideration languages (e.g., writing systems, tonal languages, cognate languages), level (e.g., elementary, secondary, or university), and students (e.g., beginners versus heritage speakers). The features of the context of the learning environment may help inform the identification of core practices for novice teachers of FLs, but they will not be enough. The HLTP identified will also need to be verified for their impact on student learning. Advancing student learning will be a major indicator as to the effectiveness and selection of HLTP within FLs.

Glisan (2010) offered a few initial suggestions for HLTP within the field of FL education: for example, "guiding students in interpreting an authentic text" and "using the target language to the maximum extent in classes at all levels of instruction" (p. 360). The work of Donato (personal communication, March 13, 2011) at the University of Pittsburgh also illustrates how FL teacher education programs can successfully be grounded in HLTP such

as using the language in comprehensible ways, use of questioning, and implementing co-constructed grammar explanations. More research is therefore needed on how to identify, implement, and teach HLTP to novice teachers.

It would also be beneficial to look to other domains, such as social studies, science, and English language arts, to better understand how these subject areas implement HLTP in teacher education. Core practices and related micropractices such as historical comparative analysis, process writing, or the scientific method could inform the FL field, if given the opportunity to explore the common ground. Common ground across subject matter teaching can only strengthen our purposes and resolve in developing high-quality accomplished novices.

Finally, once HLTP are identified and developed for teacher education programs, how to implement a teacher education program focused on HLTP is another area of future research. Grossman and McDonald (2008) suggested that "research in teacher education needs to return to sustained inquiry about the clinical aspects of practice and how best to develop skilled practice" (p. 189). Gathering systematic evidence as to the effectiveness of teaching high-leverage practices to novices is an essential component of evaluating FL teacher preparation within the HLTP paradigm. Future research may include studies that trace the evidence of teaching effectiveness based on the use of HLTP throughout a teacher's career. Questions such as the following could be posed: How do HLTP affect outcomes in specific dimensions of language learning? How do early career teachers use HLTP once they leave a teacher education program? What are teachers' initial and longitudinal opinions and reactions regarding HLTP? It would serve the profession well to research this complex area of teacher development, particularly as teacher educators continue to have to justify their work at the local, state, and national levels.

Conclusion

The largest challenge, in our view, that the HLTP effort faces is distinguishing itself from the generic and not very well-defined *best practices* rhetoric. From our work during this literature review, it is clear that the distinction needs to be further explored and explained. In addition, the limited empirical evidence directly connecting teaching practices to student achievement indicates a need for creative research on this issue. While this area of research faces many challenges, there are many positive reasons to consider building a framework of teacher education grounded in core practices: a focus on a limited and learnable set of practices, using a set of core practices that can be applied to a variety of instructional contexts, addressing the time limitations imposed on teacher education programs, and finding common instructional ground among content areas, among others.

The above examples of possible HLTP open a discussion that we hope will not end here. We are heartened to see a focus on teaching practices because this gives an opportunity for cross-content discussions as we have tried to achieve in this literature review. Moreover, this discussion brings with it a renewed focus on student-centered practices that influence the development of proficiency in FLs. HLTP show great potential to "provide a common foundation for teacher education, a common professional language, and a framework for appraising and improving teaching" (Ball & Forzani, 2010, p. 45). HLTP encourage disciplines within the field of education to work together to think more about the work of teaching and teacher education. Dedication to this collaboration is well worth the time and effort. It is up to a cross-disciplinary effort to help shape teacher education around important HLTP that are fundamental to the work of accomplished novices and that are part of larger systems of instruction and learning.

Finally, reflecting upon our HLTP work, we end with a question: Is a person who can effectively execute HLTP a good teacher? The realistic answer here is, "Maybe, but

not necessarily." Although it makes sense to look at practices and at empirical evidence, it also makes sense to realize that teaching is an evolving, cultural process that is informed by practices and research but is not defined by them. Knowing how to use a lever "to move the world" is only one element of the multifaceted work of teaching.

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Notes

1. In beginning Spanish classes, students often enter the class already knowing a few basic Spanish greetings such as Adiós, Hola, or Buenos días.
2. The move from naive representations to academic representations of concepts relates to Vygotsky's discussion of the development of scientific concepts from spontaneous concepts. For more information, see Vygotsky (1986).
3. The eight domains identified by the TEI Curriculum Group include: (1) enacting instruction; (2) building community, managing the classroom, and establishing a culture of learning; (3) assessing students; (4) planning and preparing instruction; (5) communicating and working with parents and caregivers; (6) communicating and working with colleagues; (7) developing one's practice; and (8) showing professionalism.

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