Math Literacy Through French Language Learning: *Connecting with the Common Core in the Lower Elementary Grades*

by Patricia Davis-Wiley and Roy V. Miller

It is most fitting that the theme of this issue of Learning Languages is dedicated to literacy through language learning and its connection with the Common Core State Standards Initiative (CCSI) for the K-12 educational arena ("Common Core States Standards"). Currently, these standards are being infused into *all* content areas in 48 U.S. states and territories[1] and include the four strands of reading, writing, listening and speaking and language that are "… represented in the National Standards for Learning Languages by the Communication standards…. the standards of the other four goal areas for learning languages – Cultures, Connections, Comparisons, and Communities – also support and are aligned with the Common Core" ("ALIGNMENT OF THE NATIONAL STANDARDS").

Due to the fact that language study is so closely connected to the Common Core Standards, which are directly linked to one of the nation's $4 billion reform movement's Race to the Top[2] goals to adopt "standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy" ("Race to the Top"), one might assume that world language (WL) study should have as viable a presence in today's K-12 curriculum as the other K-12 content area subjects. Additionally, world language study in the elementary school, delivered through FLES programs, *could* serve as a WL curricular articulation vehicle from elementary to middle and high school. This is not necessarily true, however, even though the benefits of second language study, founded on solid empirical research, are well-documented and readily accessible.[3] Among the reported proven positive results of early WL study are improved cognitive abilities and "higher achievement test scores in reading and math" (Stewart: 11), which are expected student performance outcomes for the Common Core Standards.

The future viability of FLES programs, however, is fragile at best, in today's educational arena. At a time when the number of FLES programs has significantly declined in the past 10 years (Rhodes),[4] and with more emphasis being placed on reading and math achievement for establishing schools' state and national report cards than on enrichment subjects, including world language study, art and music, FLES programs may become vulnerable to being cut from the K-5 school day. STEM (i.e., science, technology, engineering and math) subjects, however, are thriving and will continue to assume a formidable curricular presence in the near future, especially in the early grades. These programs are being generously supported by grant funding opportunities for their implementation (STEMgrants.com), including the assurance of future content-trained educators. It has been recently reported that, "…the U.S. government, including the U.S. Department of Education, plans to invest over $100 million in the preparation of… science, technology, engineering math educators" (Nekrasova-Beker, and Anthony Becker: 1).

It is indeed ironic that STEM education is being fiscally, curricularly and programmatically supported in order to ensure that the U.S. can produce citizens who will be successful in the global arena (a major tenet in the Core Standards), yet, early WL study, which would lead to proficiency in a second language, and facilitate students' ability to communicate with the non-English-speaking world, is not.

FLES programs that have essentially concentrated their student performance expectations on basic communication skills and cultural content in the target language may therefore need to include a content-enriched STEM focus in order to seek and establish a viable presence in the elementary school curriculum. Additionally, the authors of this paper suggest that proponents of FLES integration into the nation's schools need to identify disciplinary literacy as the common dominator connecting WL study and the other content subjects such as math, given the fact that, "disciplinary literacy is embedded in the [Common Core] standards … and prominently featured in the new CCSS [Common Core State Standards]" (Zygouis-Coe: 35).

DESCRIPTION OF THE CURRENT STUDY

Rationale. The notion of disciplinary literacy is "built on the premise that each subject area or discipline has a discourse community with its own language… and ways of communicating within a discipline" (O'Brien, Moje, and Stewart, as cited in Zygouis-Coe: 38). If a positive research-supported connection can be made between literacy achieved through early WL study and literacy acquired through a STEM subject (i.e., math) vis-à-vis the Common Core Standards, then, a solid evidence-based case could be made for establishing WL study as a content area class to be taught alongside of math, science, language arts, and history, in the elementary school day.

Now is the perfect time to do so, given the fact that K-12 curricula across the U.S. are being revised in order to incorporate STEM and even STEAM (the A stands for art; see "What About STEAM Education") subject emphasis at the same time that the Common Core Standards are being aligned with K-12 curricula, and state licensure standards are consequently being re-worked to incorporate these new educational trends.

These national trends inspired the authors of this paper to conduct the present research study that involved teaching math through French in grades 2-4 in a small, urban, community-based, highly-diverse elementary school in Knoxville, Tenn.

TABLE 1 MATH CONCEPTS REINFORCED IN FLES INSTRUCTION

GRADE 2	GRADE 3	GRADE 4
	MEASUREMENT AND DATA	
Odd & even numbers Place values; use >, =, and < symbols; wholes and parts; circles and rectangles	Multiplication and division within 100; partition circles and rectangles	Multiply and divide with simple word problems
	NUMBER AND OPERATIONS IN BASE TEN	
Addition & subtraction within 1000	Solve simple word problems	Read and write multi-digit whole numbers using base-ten numerals
	COUNTING AND CARDINALITY NUMBER AND OPERATIONS	
Work with time & money	Identify arithmetic patterns; identify fractions as numbers	Demonstrate fraction equivalence and ordering

DESCRIPTION OF THE MATH-ENRICHED FRENCH PROGRAM

Venue for the FLES Program. Mooreland Heights Elementary (MHES) is nestled in South Knoxville, 10 minutes away from The University of Tennessee and downtown Knoxville, located in East TN. The school has 335 students of whom 80% participate in free and reduced-lunch programs.[5] There are 3 teachers at each grade level for K-3, 2 teachers for grades 4-5, and 3 teachers (1 teacher and 2 assistants) for one CDC[6] classroom at MHES. One classroom on grades 2, 3 and 4, in addition to a CDC classroom, participated in the present study.

Curriculum. Following a 25-year tradition, graduate students pursuing a Track 1 master's degree[7] in Foreign Language Education at The University of Tennessee, Knoxville, participate in a semester-long FLES practicum during which they offer 30 minutes of world language instruction twice weekly in a local elementary school. One such master's candidate, a native speaker of French from Haiti, prepared a developmentally and academically-appropriate 13-week French curriculum, in concert with the university professor, the school's principal and grade level teachers of the FLES students. This special program of study, incorporating basic math concepts that were being concurrently taught from the EnVision Math Series[8] to the children by the mainstream classroom teachers, was aligned with the CCSS for Mathematics (see table 1). Approximately one-half of the twice-weekly, 30-minute instructional periods, delivered over 13 weeks during the spring semester of 2012, was dedicated to the reinforcement of math content; the remaining half included a traditional FLES curriculum consisting of basic French greetings, numbers, colors, time and weather expressions, geography and culture (i.e., music, art and songs).

Infusing language instruction with another subject area (such as what was done at MHRES), or content-based instruction (CBI), is not new to the language arena; it has been in practice for over 40 years, and is well-documented in the literature. Technically it is defined as "…a curricular and instructional approach in which non-linguistic content is taught through a medium of a language" (Tedick and Cammarata: 28). Due to the fact that only half of the FLES curriculum at MHES was dedicated to the reinforcement of math concepts, however, and that the instruction was only offered twice a week, it will be referred to in this article as a content-enriched or math-enriched curriculum. The curriculum followed a set of themes (Strykera and Leaver) that were "drawn from the academic content [i.e., math] of the school" (Stoller and Grabe 83).

Instructional Strategies. The math-enriched curriculum delivered to the FLES students was highly- structured, fast-paced, hands-on/interactive, multi-sensory, technology-supported and connected to real-life experiences (Asher; Dale; Dewey; Gardner; Mehisto et al.) to meet the needs of all students. It followed the tenets of the Five C's (i.e., Communication, Cultures, Connections, Comparisons and Communities) of the American Council on the Teaching of Foreign Language's National Standards ("National Standards"), and consequently presented content that was not taught in isolation but rather in context and related to real-life situations ("Common Core State Standards;" Mehisto). "To acquire new information, it must be connected to existing knowledge" (Filice 35). Consequently, numbers were taught in relation to a number line, days in the week, months in the year, making change for a dollar, and being able to determine degrees on a thermometer and tell whether that temperature was higher or lower, hot or cold. Manipulatives and realia (i.e., actual artifacts) were always liberally used with the students and the teacher encouraged oral and written productive language skills (depending on the grade level) following appropriate receptive language presentation, throughout the lesson.

Each lesson always began with a lively whole and small-group student-participatory warm-up greeting/activity, linking the previous lesson to the next, followed by a colorful graphic overview of the new lesson

using a teacher-created Power Point presentation or website visit using an interactive white board. The children were constantly engaged in the lesson and often were invited to get out of their seats or off their group rug and come to physically interact with the teacher, artifacts and the white board. Music, chants, choral recitations and student-to-student activities (i.e., Simon dit [Simon says], short role-plays) occurred in every lesson and many came from short UTube videos which the students thoroughly enjoyed, even after class (see Teacher Interview Results later in the paper). Cultural tidbits were infused in many lessons (following ACTFL and Common Core Standards) to the delight of the students, and included virtual trips to different parts of the francophone world for a taste of art, music, geography and a peek at children on different continents who shared more commonalities than differences with the children at MHES.

Math concepts, understandably, were articulated throughout grades 2 through 4 in ways that were appropriate for the particular age, developmental level and followed the math curriculum for each grade level. Thus, second graders were able to count from 1 to 10 and then ultimately by 10s to 100. Third graders would be expected to do this, be able to count by 5's, 10's and even 20's to 1,000 and beyond. Fourth graders performed these simple math skills but were also able to solve basic word problems in French. Additionally, the math concepts of sizes, shapes and quanitities were all taught in context and presented following grade level expectations. For example, basic comparison of shapes were used for size comparisons of triangles and circles (*un petit triangle*—a small triangle; *un grand circle*—a large circle) for grade 2. Students in grade 3, however, were expected to not only identify a particular shape but also determine which shape in a series was *plus grand que* (larger than) or *plus petit que* (smaller than) another one. Additionally, basic fractions (e.g., *un demi*, a half; *un quart*, a quarter) were introduced when telling time and counting money for grade 3. Grade 4 students, however, were challenged to perform basic computational skills with fractions (*un quart* et *deux quarts font trois quarts* — ¼ + ½ = 3/4) and be able to order them by equivalence (¼, ½, ¾, 1).

METHODOLOGY

Research Questions. In an effort to access the efficacy of content-enriched early language instruction in general, and to contribute to the dearth of published research on math-enriched FLES instruction in particular, the authors of the present article sought to investigate the following questions:

1. What is the impact of content-enriched French instruction on math skills in Grades 2-4 in a specifically math-enriched FLES program?
2. What is the level of student participation and interest during French instruction compared with regular math instruction?
3. What are the regular classroom teachers' perceptions of the impact of French instruction on the children?

Participants. For the present study, 1 classroom teacher from each grade level, 2-4, and 1 from the CDC classroom, volunteered to allow math-enriched French instruction to be given to their students, 30 minutes, twice weekly, from late January through late April, 2012. Also receiving French instruction, but only participating in two of the three data collection procedures (mentioned later in this paper), were 10 students in a CDC (Comprehensive Development Classroom). It is important to note that of the 13 children in the 3rd Grade French class, 6 were special needs children (i.e., with developed Individualized Educational Plans). Additionally, of the 13 in the in the 4th Grade French class, 8 were classified as special needs children, having a low math skill level, and 5 in this class were English Language Learners or ELLs. (In an effort to facilitate inclusion accommodations for the ELLS, MHES grouped them into one classroom.)

DATA COLLECTION AND ANALYSIS

For this research study, data were collected from the following three sources:

1. individual and group interviews with the 4 classroom teachers (i.e., grades 2, 3, 4 and CDC);
2. observations of the 62 FLES childrenconducted every 2 weeks during French instruction; and
3. *Discovery Education Assessment: Probe, Math Reasoning* assessments conducted at the beginning of the semester, mid-semester and at the end of the semester.

Interviews. Two sets of interviews were conducted by the lead researcher with the classroom teachers involved in this study. The first round of individual teacher interviews occurred mid-semester and the second round (a group interview with all teachers present) at the end of the semester, following the final FLES class. The researcher followed an open-ended question format (see Appendix A for mid-term protocol and Appendix B for end-semester protocol), in an effort to document the teachers' perceptions of their students' reactions to the FLES classes. These interviews were conducted during times that the teachers deemed to be convenient for their schedules, either during a planning period or at the end of the day, and were digitally recorded for later transcription [9] and subsequent qualitative data analysis (Hatch). Specifically, the lead researcher manually examined all transcriptions in order to identify reoccurring themes and commonalities which emerged.

Observations. Throughout the 13 weeks of the FLES program, the primary researcher observed all French classes in grades 2 through 4 and the CDC classroom. She took extensive field notes (Hatch) during the class, noting: lesson pacing; use of media; students' reactions to the teacher and in-class activities; students' level of participation, interest and their comments to the teacher and to their peers; and the teacher's use of varied instructional strategies to deliver specific pieces of content, both math-related and French language/culture-specific.

Discovery Education Assessment: Probe, Math Reasoning Assessments. Math benchmark assessments were conducted at the beginning of the semester, at mid-term and at the end of the semester. [10] All children (both those participating in the FLES program and those not), in grades 2-4 were given the same assessments. Class data sets were controlled for French and non-French students and by classroom grade level by the second researcher. Data were then reported in two ways: by individual student's over-all academic class rankings (low, middle, high) and by random-numeric-order [11] for each student in each classroom, grades 2-4. In both instances, percentage gain scores between the first and last benchmark assessments were hand calculated and subsequently identified for individual students within a particular class.

RESULTS AND DISCUSSION

Interviews. The interviews yielded a substantial amount of rich data; however, only five typologies, identified from the lead researcher's qualitative analysis of the interview data, guided by the study's research questions, will be reported for this study. These focus specifically on the classroom teachers' perceptions of the children during French instruction and during non-French class instruction, and are:

- children's level of interest during French instruction
- children's level of participation during French instruction
- children's behavior, participation, responsiveness, level of activity, during French class compared with during regular math class
- children's interaction with the teacher during French instruction and types of activities the children liked
- impact of French instruction on math skills

Children's Level of Interest

Midway through the 13 weeks of French instruction, one of the classroom teachers' interview responses characterized the children's interest as ranging from, "average," to "moderate to begin with and increasing every week," while another teacher reported that "the majority [of the students] are interested and find it [French] fun." Most telling, was a third teacher's comment, who stated, "They asked me regularly, 'Is it French class day?'"

Observations shared with the primary researcher during the second and last set of interviews, after the FLES program was over, testified to the overall positive reaction that all teachers reported the children expressing and include the following statements: "My kids loved it; they were fully engaged the whole time." "They had their attention on the teacher… When she would speak to them, they would respond, or try to repeat what she had said." When the researcher further probed a teacher to clarify the level of engagement her children had, the teacher further explained,

> They had their attention on the teacher… When she would speak to them, they would respond, or try to repeat what she had said. As soon as they would see her in the hallway they would immediately start saying, 'Bonjour!' to her, coming down the hallway, and in fact they would greet all of us when we came in out of the classroom that way.

Children's Level of Participation

Following the seventh week of French instruction, one classroom teacher noted that her children's level of engagement at the beginning of the program was "good"… but that this was …"average" for this particular group of students. In fact, this same teacher admitted that other students in the same class exhibited identical behavior during the rest of the school day, outside of French class, while the third teacher said, "Some of them [the FLES students] are excited about it and like it."

At the end of the French program, however, all three of the regular classroom teachers expressed positive feelings toward the program. One teacher said, "They [the children] were always trying and I think that that's important." Another classroom teacher said, "They were very excited to see her, too." And the third teacher enthusiastically shared,

> They all were pretty much on-task. You know, my usual couple [of kids], but uh, yeah, they were usually right involved and would try to do what she [the French teacher] asked them to do. And they had to listen because they didn't know what the words meant so they had to listen and watch in order to understand what she was trying to get them to do.

French Class Compared With Regular Math Class

The researchers hypothesized that the level of interest, participation, and general engagement during French instruction might be higher during French instruction than during traditional math instruction. This was the case both after 7 weeks and at the end of the semester, on a whole. The teachers shared the following comments: "I would say that their behaviors are similar, perhaps better." "Well, there's a lot more interaction in French because the instructor's repeating and then they repeat, and so there's a lot of that,… which would not be so much in a regular math instruction." One teacher excitedly exclaimed that her children's participation level at the end of the program was "strong, very strong…at 98%."

Children's Interaction With the French Teacher and Favorite Activities

Concerning the children's behaviors at mid-term, one teacher recounted,

> They are watching her very, very closely because they do not easily understand what… some things that are being said to them in French… Not because she hasn't taught them, but it's harder for them, so they want to listen more closely. They volunteer some, they take some risks, they try to answer. I just catch them listening well, and [see that they] are very happy on French class days.

Another teacher mentioned that they loved singing and that "…when she sings with them it's great, or if she calls them up in the front …they like to be part of her demonstration," while the third teacher recounted that her children reacted "Positively…. There is a refusal, and if she does spot somebody that's not participating she'll kind of go over and prompt them. They are right there. They're on task."

The classroom teachers essentially shared the same type of observations at the end of the French program as those they mentioned at mid-term. One teacher, however, added that her children in particular, enjoyed, "singing,…group acting, and interactive videos."

Impact of French Instruction on Math Skills

The principal investigators in this research study had not made any predictions concerning what impact French instruction, and in particular, math concepts delivered through French, might have on the FLES children's math skills. One unique observation that a classroom teacher animatedly recounted during the mid-term interview, was the following statement, which actually connected the idea of acquiring math literacy to acquiring world language (i.e., French) literacy.

> And I'm guessing that when they [the children] learn a 'French word' [that] means to sit down … that even though no one had broken that word down … they learn those skills … [to be] able to ask accept language in math and that perhaps my guess is that some of the problem-solving that it takes to learn a language might be similar to the problem-solving they need to use to learn math. ... Math has a language, ... and as they learn that they can acquire [a] language, … they can build on that [those] skills at that they can learn a new language.

A second teacher commented,

> I think it's in that area of reinforcement, in what we have been doing, so it's another aspect of it and it's from another point of view. So, any time a child can get more exposure to the topic, the better it is for them; and, if you vary that exposure, than I think it's a good thing.

Remarks made during the final interview were overall positive, with one teacher sharing a sentiment that the other teachers agreed with, as they nodded. "I just think that generally overall, hearing it [math] another way, and experiencing it

TABLE 2 MATH GAINS FOR FLES AND NON-FLES STUDENTS CONTROLLED BY MATH SKILL LEVELS

Math Skill Levels	Number of Students	No French % Gain	Number of Students	No French % Gain	Number of Students	French % Gain
			2ND GRADE			
high	14	4%	6	2%	4	20%
medium	3	3.3%	5	8%	9	13%
low	4	20%	5	17%	1	20%
			3RD GRADE			
high	2	-15%	4	20%	4	-5%
medium	5	6%	4	-6%	4	10%
low	5	-2%	4	12.5%	6	5%
			4TH GRADE			
high			4	10%	4	12.5%
medium			12	17.5%	10	12%
low			3	24%	8	1.2%

another way…. is always positive."

Observations. The lead researcher for this study took over 75 pages of field notes during the 13-week FLES program at MHES, scripting the French teacher's questions and selected children's answers; highlighting class activities that worked, and those that would need to be re-worked; writing vivid descriptions of the children's enthusiastic participation as well as mild reticence at times to engage in unfamiliar linguistic territory; and, noting unexpected and often serendipitous interjections by the children, resulting in spontaneous joy and raucous laughter by students and all adults present, to mention just a few of the observations made during the regular visits to the FLES classrooms. The results of analysis of the FLES program's observations could be an entire manuscript by itself and consequently cannot be totally reported in this short paper.

In summary, however, this researcher wishes to report that she has first-hand observational data attesting to the courage, enthusiasm, tenacity and overall good humor and positive spirit observed by the greater majority of all FLES students during her visits to MHES's French classes. The substantial amount of both conversational skills, *classroom talk*, and math concepts (noted previously in this paper), both understood and practiced by the FLES students, was also a demonstrated outcome of the French program. She would remiss in not mentioning, however, one student-to-student exchange that occurred in the special CDC classroom (12 children, grades 1-5).

Toward the middle of the semester, after the French teacher had warmed up the CDC class with her routine, *Quel temps fait-it?* (What's the weather like?) and a loud *Les jours de la semaine* (days of the week) song, complete with animated gesticulations and whole body movements, the children were taken on a virtual tour of Paris. During the tour, the children sat seemingly awestruck at the majestic otherworld illuminated visions of famous Parisian monuments. Then, following a few seconds of quiet (something that did not often happen with these particular special youngsters), one older boy lifted his head off of the desk and enthusiastically called out, "The Eiffel Tower is my favorite building in the world." Then, a small boy perched on his desk next to the first boy literally shouted, "It's more than 13 feet!" And, not missing a beat, a shy, tiny young girl screamed, "That's Paris. I love Paris." What is particularly poignant in this scenario is the fact that these are very special children, and yet, of all the FLES children participating in the semester-long program, it was these children who proved to this observer, to be the ones who on some level, truly benefitted the most from this new language/cultural excursion into the study of a world language. This experience was reminiscent of another semester in a similar CDC classroom, where these children were introduced to Spanish in 2010 (Davis-Wiley and Miller).

Math Benchmark Assessments. Data from the Math assessments, conducted at the beginning, middle and end of the 13-week FLES program with all children in grades 2-4, were quantitatively analyzed and controlled by the following variables: grade levels; FLES and Non-FLES classes; percentage gains by whole class; and, percentage gains by math skill levels (i.e., high, medium, low), as determined by a pre-assessment from the EnVision Math Series. Table 2 (see above) presents a comprehensive summary of the results comparing math skill gains, controlled by math skill levels, for both those children who received French instruction and those children who did not.

Percentage gains for *all* FLES children (with high, medium and low math skill levels) in the second grade were 17.6% overall, compared with the 2 non-FLES classrooms that had gains of approximately 9%. On the third grade level, those FLES children with a medium skill level in math, showed a 10% gain, compared with a -6% gain reported in one non-FLES classroom and a 6% gain in the other non-FLES classroom. Lastly, FLES children in the fourth grade, with a high math skill level out-performed the children in the one non-FLES classroom with a 12.5% gain compared with a 10% gain.

The results of the math score gains of the FLES children were guardedly positive, especially considering several underlying the demographic challenges of students in the FLES classrooms in Grades 3 and 4 previously mentioned under the Participants section of this paper.

CONCLUSIONS

Early world language study, and in particular, second language study, enriched by another discipline area (i.e., math), has positive and most importantly, measureable, evidence-based (to echo CCSS language) outcomes that attest to its benefits for all students, and not for just those classified as high-achievers. In terms of the documented efficacy of the math-enriched FLES program described in this paper, which offered 30 minutes of French instruction, delivered twice a week, over 13 weeks, one could say that its documented results are cautiously optimistic. As such, they offer a gentle argument for offering FLES in the early grades for all academic skill levels of children. Most importantly, the results of this study help support the notion that FLES programs should be considered a core subject along with the traditional math, science, social science, language arts elementary school curricular litany so that they can serve as the Common Core Standards glue in connecting literacy across all content areas.

IMPLICATIONS AND RECOMMENDATIONS

Should early world language study be an integral component of the elementary school curriculum? The answer is a resounding "yes." The published literature attesting to the benefits of FLES and their linkage to the goals of the Common Core Standards corroborate this. Modest empirical research studies, such as the one presented in this paper, also contribute support to an argument for an integrated FLES program in the early grades. It must be noted, however, that the reported results of the data collected and analyzed in the present study, are at best cautiously optimistic, yet, still offer some evidence for the positive impact of a math-enriched French program. Performance (in French) of grade-level appropriate math literacy skills were most definitely observed and documented through field notes. Additionally, standardized assessments of benchmark math skills did show some gains, albeit modest, for some of the FLES students. Even though the study did have inherent limitations and its results cannot be generalized to a larger population, the findings can contribute to the paucity of published literature on the topic. Therefore, the authors suggest that additional research needs to be conducted in an effort to further investigate the efficacy of a content-enriched FLES program.

NOTES

1. See http://www.corestandards.org/in-the-states>for a comprehensive map where the CCSS have been adopted.
2. Race to the Top: Promoting Innovation, Reform, and Excellence in America's Public Schools, is an initiative, backed by a $4.35 billion investment, and first announced on July 24, 2009 by President Obama, "to commit to reform "… America's public schools to provide every child access to a complete and competitive education." (<http://www.whitehouse.gov/the-press-office/fact-sheet-race-top)
3. There is a plethora of published research studies on the efficacy of studying a second language, especially in the early years of school, easily retrievable from the Network for Early Language Learning (nnell.org), Center for Applied Linguistics (cal.org) and American Council for the Teaching of Foreign Languages (actfl.orgl) websites, as well as from web search engines and more traditional research databases.
4. The 2008 national survey of U.S. World Language programs reported a significant decline in FLES programs from 31% to 25% between 1997 and 2008. (See Executive Summary, para. 3, from the Rhodes and Puphal *Foreign Language Teaching in U.S. Schools: Results of a National Survey*.)
5. Data supplied by the building principal of MHES on October 13, 2012.
6. Knox County School District defines those students who are enrolled in a CDC as having "…been identified as needing a small, structured environment where core academic areas are addressed at the student's instructional level while still tying the instruction to curriculum standards" (CDC, 2012, para. 2).
7. The Track 1 master's degree consists of 18 graduate hours in Education and 15-18 hours in the target language. The Track 2 master's degree is a fifth-year, initial teacher licensure program with a year-long internship.
8. Both state and local school district curricula were used to develop the scope and sequence of the math-enriched French curriculum. The EnVision Math Series (Scott Foresman Publishers) was the math textbook series from which lessons were examined and reinforced by the FLES teacher.
9. Whereby the primary researcher conducted and recorded the interviews with the classroom teachers, Dorothy Blanks, Ph.D. candidate, Education, at The University of Tennessee, transcribed the data for later qualitative analysis.
10. The dates for these assessments were: January 18, 2012; March 14, 2012; April 10, 2012.
11. Students' identities remained confidential for data analysis by assigning each student a random number to ensure confidentiality.

APPENDIX A

First Round Interview Protocol

I. Rapport Building
   A. Pseudonym Chosen By Participants
      1. I will explain what a pseudonym is and why it will be used.
      2. What would you like your pseudonym to be?
   B. Background Information
      1. How long have you taught? Where?
      2. On what grade levels have you taught?
   C. Guide Questions
      1. How would you describe the children's level of interest during French instruction?
      2. How is the level of participation of the children during French instruction?
      3. Compare the children's behavior, participation, responsiveness, and level of activity during French instruction with that during math instruction.
      4. What type of activities do the children seem to enjoy during French instruction?
      5. How do the children interact with the teacher during French instruction?
      6. As you know, part of the French class is focused on reinforcing math topics already introduced in English during regular math instruction. What impact do you think this has on the children's math skills?
      7. Any other comments?

APPENDIX B

Second Round Interview Protocol

Guide Questions

1. How would you describe the children's level of interest during French instruction?
2. How is the level of participation of the children during French instruction?
3. Compare the children's behavior, participation, responsiveness, and level of activity during French instruction with that during math instruction.
4. What type of activities do the children seem to enjoy during French instruction?
5. How do the children interact with the teacher during French instruction?
6. As you know, part of the French class is focused on reinforcing math topics already introduced in English during regular math instruction. What impact do you think this has on the children's math skills?
7. Any other comments?

WORKS CITED

Alignment of the National Standards for Learning Languages with Tthe Common Core State Standards. ACTFL. Web. 7 Oct. 2012. *http://www.actfl.org/news/reports/alignment-the-national-standards-learning-languages-the-common-core-state-standards*

Asher, James. *Learning Another Language Through Actions*. Los Gatos, CA: Sky Oaks Productions, 2012. Print.

CDC. Comprehensive Development Classroom. Knox County Schools. Web 8 Oct. 2012. *http://se.cdc.knoxschools.org/modules/groups/integrated_home.phtml?gid=514575&sessionid=478a885587ebe5300118e841c809233b*

Common Core State Standards Initiative: Preparing America's Students for College and Career. National Governors Association. Web. 7 Oct. 2012. *http://www.corestandards.org/*

Dale, Edgar. *Audio-Visual Methods in Teaching*. 2 ed. New York: The Dryden Press, 1954. Print.

Davis-Wiley, Patricia and Miller, Roy V. "The Positive Impact of World Language Study On Special Needs K-5 Children: A Mixed Methodology Research Study." *Learning Languages* 16:1. (2010): 26-31. Print.

Dewey, John. *Democracy and Education: An Introduction to the Philosophy of Education*. New York: The Macmillan Company, 1916. Print.

ED.gov. *Race to the Top Fund*. U.S. Dept. of Education. Web. 7 Oct. 2012. *http://www2.ed.gov/programs/racetothetop/index.html*>

Filice, Serafina. "Integrated Learning for an Integrated World: Facing the Challenges of Language Education." Proceedings of the X World-Wide Forum on Education and Culture. Rome, Italy, November 30-December 3, 2011. Print.

Gardner, Howard. ***Frames of Mind: The theory of Multiple Intelligences***. New York: Basic Books, 2011. Print.

Hatch, Amos. *Doing Qualitative Research in Educational Settings*. Albany, N.Y.: State University of New York Press, 2002. Print.

Mehisto, P., Marsh, D. and Frigols M.J: 2008 ***Uncovering CLIL. Content and Language Integrated Learning in Bilingual and Multilingual Education***. Macmillan, Oxford, 2008. Print.

National Standards for Foreign Language Education. ACTFL. Web. 11 Oct. 2012-10-12 *www.actfl.org/advocacy/discoverlanguages/advocacy/discoverlanguages/advocacy/discoverlanguages/resources-1?pageid=3392*

Tatiana Nekrasova-Beker, and Anthony Becker. "Integrating STEM Topics in the Foreign Language Classroom: Promising Practices for Foreign language Instruction." Web. 11 Oct. 2012. *http://www.ncela.gwu.edu/files/uploads/promising_FL/ForeignLg_STEM.pdf*>

Rhodes, Nancy, and Ingrid Pufahl. *Foreign Language Teaching in U.S. Schools: Results of a National Survey*. Center for Applied Linguistics. Web. 8 Oct. 2012. *www.cal.org/flsurvey/*

STEM Grants.com. Web. 7 Oct. 2012. *http://stemgrants.com/*

STEM School: STEM Articles & Opinions: What About STEAM Education? Web. 7 Oct. 2012. *http://www.stemschool.com/articles/what-about-steam-education/*>

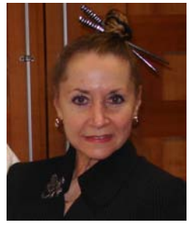
Fredericka Stoler, and William Grabe, W. (2007). "A 'Six-T's' Approach to Content-Based Instruction." *The Content-Based Classroom*. Eds. Marguerite A. Snow and Donna A. Brinton. New York, NY: Longman. 2007. 5-21. Print.

Stephen B. Stryker, Stephen B., and Betty Lou Leaver. *Content-Based Instruction in Foreign Language Education: Models and Methods*. Washington D.C.: Georgetown University Press, 1997. Print.

Stewart, Janice H. "Foreign Language Study in Elementary Schools: Benefits and Implications for Achievement in Reading and Math." *Early Childhood Education Journal* 33.1. (2005): 11-16. DOI: 10.1007/s10643-005-0015-5

Diane J. Tedick, and Laurent Cammarata. "Content and Language Integration in K-12 Contexts: Student Outcomes, Teacher Practices, and Stakeholder Perspectives." *Foreign Language Annals* 45: (2012): 28-53. Print.

Zygouris-Coe. "Disciplinary Literacy and the Common Core State Standards." *Topics in Language Disorders* 32.1. (2012): 35-50. doi: 10.1097/TLD.0b013e31824561a2



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LITERACY THROUGH LANGUAGES CONNECTING WITH THE COMMON CORE

by Paul Sandrock

Every language teacher should be excited with the opportunity presented by the Common Core State Standards. The Common Core Standards have defined literacy and outlined the mission for English Language Arts in a way that provides a natural fit with our National Standards for Language Learning. Taking advantage of this connection, language teachers can showcase the importance of learning languages by demonstrating how literacy is learned, practiced and strengthened through standards-based and performance-based language learning.

The national consensus that has coalesced around our National Standards for Language Learning is remarkable. Most states have adopted or adapted the standards represented by the five goal areas, our five C's of Communication, Culture, Connections, Comparisons and Communities. Not only have the language standards endured for over 15 years, they have proven to be flexible and adaptable to fit all types of program models, instructional sequences of varying lengths and all languages; whether alphabetic (French, German, Latin, Russian, Spanish), logographic (Chinese, Japanese) or visual (American Sign Language). The Standards have guided the critical review and improvement of language programs from prekindergarten through postsecondary levels, teacher preparation programs and teacher licensure requirements. Language assessments have also been impacted by the standards as institutions look for or design valid evaluations of language performance.

ACTFL worked with local and state supervisors of languages to create a crosswalk to show the connections between the four strands of the Common Core State Standards for English Language Arts (ELA) and the Standards for Language Learning. This document is available to download at www.actfl.org/commoncore. The easy part was to link the Common Core strands of reading, writing, speaking and listening to the three modes of communication (interpersonal, interpretive and presentational). The fourth Common Core strand, language, correlates with the description of language proficiency levels (Novice, Intermediate,Aadvanced) as Common Core describes growth in the strand of language as increasing accuracy in applying language conventions, deepening understanding of how language functions, and expanding precision of understanding and using vocabulary. The more difficult challenge is to demonstrate what could occur through language learning that would truly develop or strengthen the literacy skills described in the Common Core Standards.