

**West Virginia EDPace - TAPP**

**Executive Summary**

The Educational Development for Planning and Conducting Evaluations (ED PACE) Project was a partnership between the West Virginia Department of Education and ROCKMAN ET AL, undertaken to design, conduct, and disseminate research that could be used within and beyond the state as a model for studying technology interventions in education. Funding for the three-year project came from the U.S. Department of Education, which awarded grants to nine states in support of research on the impact of technology-enhanced programs on student achievement. The State Educational Technology Directors Association (SETDA) provided networking services to ED PACE and other state projects, to highlight research methods and strategies and disseminate findings.

The focus of the ED PACE research, conducted by ROCKMAN ET AL from October 2003 through October 2006, was the implementation and impact of West Virginia’s Virtual School Spanish program. This nationally recognized program was created in response to a mandate from the West Virginia Board of Education (Policy 2510) requiring all counties to offer two years of foreign language to middle-school students. West Virginia faces a serious shortage of licensed Spanish teachers, and online courses offered an attractive alternative, one that would give seventh and eighth graders the opportunity to earn a year’s credit in Spanish by completing 1A and 1B courses, and help middle schools, especially those in remote rural areas, meet the state mandate.

To develop the online Spanish courses, the West Virginia Virtual School, created in 2000 by state legislation to deliver high-quality instruction to all students regardless of their location, partnered with the Florida Virtual School. Like West Virginia’s other middle-school language programs, the Virtual School Spanish program divides the Spanish 1 curriculum into two years (1A and 1B). In a further effort to meet the learning needs of seventh and eighth graders, the program uses a blended or hybrid delivery model that combines face-to-face and virtual instruction and both paper and web-based activities. Instruction is provided by a three-member team—a lead teacher (a certified Spanish teacher), responsible for the design and delivery of the daily lesson plan and a weekly meeting with each class via phone; an adjunct teacher (also a certified Spanish teacher), who provides content-related feedback, via email and voicemail, and grades students’ tests and products; and a classroom facilitator (a certified teacher, but not a Spanish teacher), who guides students on site to ensure that they stay on task and complete assignments on time. The technology-rich course also includes electronic communication, not only between the instructional team and students but also between student “virtual amigos,” and web-based voice or WIMBA tools that aid instruction, assessment, and interaction.

The overall goals of the ED PACE research on the Virtual School Spanish program were:

* to provide empirical data on student achievement in the Virtual School Spanish program using a quasi-experimental design and both formative and summative measures, and
* to develop a framework for scientifically-based research that builds state capacity to assess the impact of technology programs.

**Methodology**

The impact or summative research was designed to measure students’ Spanish proficiency and their overall performance on the state’s standardized achievement tests. The implementation or formative study provided contextual information for that research and a comprehensive picture of implementation statewide. During Year 1, ROCKMAN ET AL developed survey instruments to collect implementation data about, made exploratory visits to 1A and 1B classrooms in 26 of the 27 virtual sites around the state and a sample of comparison face-to-face sites, and developed a Spanish outcome measure to assess the Spanish language proficiency of students in both virtual and face-to-face sites. Our analyses of the data showed few differences between virtual and face-to-face sites in Spanish language proficiency, but a range in performance among the virtual sites. This range in performance, along with variations that emerged from our observations, led us to design a Year 2 study that would allow us to examine implementation in the virtual sites more closely, take a second look at students’ performance on the Spanish proficiency outcome measure, and begin to explore associations between implementation and performance In Year 3, we focused the study on 1B classrooms in all virtual sites, again administering the Spanish outcome measure and further exploring associations between implementation and performance and the factors that contribute to effective facilitation of the program.

**Results**

Three years of research for the ED PACE project indicates that the Virtual School Spanish program works. Students learn, they are engaged—especially in activities that involve technology and culture— and they develop not only language skills but also positive attitudes, and work habits, all of which serve them well in Spanish II in high school. The program has been well received by students and their parents, and by school administrators, who believe the program helps them successfully meet the state mandate to offer foreign language instruction. As it has matured over the last four years, the program has drawn on the foreign language expertise of lead and adjunct teachers, and established a cadre of facilitators who have incorporated their own teaching expertise into classroom practice.

Our data also suggest that the effective use of some key elements of the blended model is associated with more successful implementation and powerful student outcomes. When implemented as such, this blended model provides not only effective instruction to students, but also a model for effective virtual instruction, one we believe could and should be replicated to ensure that students can continue learning Spanish in high school and to deliver courses in other foreign languages.

**Methodology**

The research design for the third and final year of the ED PACE project emerged from 1) a review the Year 2 findings, especially those that emerged from linkage analyses and allowed us to pinpoint some key factors related to facilitation of learning and student outcomes; 2) a statewide meeting with lead teachers, adjuncts, facilitators, convened to share two years of data and explore ways to combine what the research had shown and what practitioners had learned to enhance the Virtual School Spanish Program; and 3) a debriefing with WVDE partners.

The focus of the Year 3 design was facilitation, or the factors that, in concert, support Spanish learning in the Virtual School Spanish program. Continuing research conducted in Year 2, we also included plans for further examination of the links between facilitation or classroom implementation and student performance. In the Year 3 design, we proposed to:

Describe how facilitation of Spanish learning occurs in the blended Virtual Spanish instructional model, focusing on factors such as the use of technology, and the variation in use and type; high-quality instruction, including activities that encouraged students to make connections to the real world, group or dialogue activities, combination of all language-building activities—listening, speaking, hearing, and reading; adult language use; feedback and communication; and cultural connections, community-building activities, and other elements of beyond those solely related to teaching language skills.

Describe supports to the facilitation of Spanish learning in the Virtual Spanish instructional model, including collaboration and communication among team members, shared roles and responsibilities, instructional flexibility, and professional development.

Examine linkages among supports to facilitation and the implementation of factors that directly facilitate Spanish learning.

Examine linkages between the implementation of factors that directly facilitate Spanish learning and student intermediate and learning outcomes.

Examine the linkages among student intermediate outcomes and student learning outcomes.

Examine the degree to which students are prepared to meet the expectations of Spanish II.

To address these objectives, we further refined instruments, streamlining the observation protocol; revising the facilitator and student online surveys; creating new protocols for adjunct, lead teacher, and facilitator interviews, student focus groups, and high school Spanish II teachers; and revising the Spanish Assessment based on review of expert panel and item statistics.

Because only eighth-grade 1B students take the Spanish Assessment, we observed only 1B classes in Year 3 (N=17). To get a view of individual classes more detailed and nuanced than that afforded by a single visit, we observed each 1B class for two consecutive days, and in a few cases made a return visit, for a total of 56 observations across the 17 1B sites. During visits, we conducted post-observation interviews with facilitators (N=23) using a structured protocol, and informal focus groups (N=25) with five to six students in most 1B classrooms. Where possible, we talked informally with school principals. In Year 3 we also conducted in-person interviews with 12 Virtual Spanish adjunct teachers.

To extend our picture of the impact of the program on students’ language skills, preparation, and attitudes toward foreign language, we interviewed Spanish II teachers in a sample of high schools (N=10) that offer the next level of Spanish instruction to Virtual School students, and four program leaders and administrators. During interviews with facilitators, adjunct and lead teachers, and program leaders, the focus of the questions was on the facilitation process and implementation factors such as classroom activities, collaboration, communication, student feedback, and program support.

In five sites identified in the first round of visits as examples of effective facilitation, we made an additional one-day visit. Those sites were chosen based on a set of criteria that included a particular style of facilitation, history and stability of the program, geographical representation, and past student Spanish assessment results. To have as full a data set as possible, we included sites that were also SOPA sites.

**Data Analyses**

Analyses of the impact and implementation data fall into four categories: 1) descriptive analyses of all items on the student, parent, facilitator, and adjunct surveys and of observation indicators and other open-ended, qualitative data to identify preliminary findings and themes; 2) psychometric analyses of the different measures associated with the various constructs listed in Table 1 above to determine their reliability and validity as measures of these constructs; 3) examination of the variation in student academic and non-academic outcomes, and implementation outcomes and processes, to identify factors that may differentiate sites, or students within sites, from each other; and 4) use of statistical models to assess the strength of relationships among implementation processes and outcomes, intermediate academic and non-academic outcomes, and learning outcomes.

**Quantitative Analyses**

We conducted several analyses to summarize survey and classroom observation data, examine differences and trends in Spanish assessment performance, and explore relationships between implementation characteristics and student performance and with classroom facilitation. These analyses helped us answer key research questions about the nature of the program, student outcomes (e.g., Spanish proficiency, valuing of foreign language, engagement, and intent to continue to study foreign language), and about relationships between constructs and student and instructional outcomes.

We used descriptive statistics (means, standard deviations, and frequencies) to summarize key survey questions. We created scales from survey items and from observation measures by calculating an average across all items or measures for each scale. In addition, we examined the reliability and item statistics for each of the scales . To assess differences in Spanish achievement between virtual Spanish and face-to-face students, we conducted analyses of covariance, adjusting Spanish achievement scores for prior year Language Arts achievement scores and adjusting for the effects of classrooms . We also calculated appropriate effect sizes (mean differences and eta-squared or proportion of variance statistics) to determine the practical significance of any findings. To examine trends across the three years of the study for the virtual Spanish students, we conducted repeated measures analysis of covariance, adjusting Spanish achievement scores for prior-year Language Arts achievement scores, and adjusting for the effects of classrooms and calculating the appropriate effect sizes.

To assess the links between implementation indicators and student outcomes, we conducted a set of correlational analyses where we predicted the level of Spanish achievement on each of the three multiple choice and four writing performance measures by levels of the different characteristics in the sets of variables . We used hierarchical linear modeling regression techniques to analyze the data because students are nested within sites. Because of this nesting effect, students in a single site are more likely to be similar to each other than to students in other sites since they share a common context. The hierarchical approach allowed us to account for the similarities in students’ performance that are due simply to their being in the same context, and to correct the significance test results to obtain better estimates.

**Qualitative Analyses**

To address a number of research questions related to implementation, we gathered and analyzed qualitative data during the project’s three years, through open-ended survey questions and interviews with key participants and stakeholders. For open-ended survey responses, we generated a series of codes based on recurrent themes that emerged from multiple reviews of responses, then coded all responses. The interview and focus group data were digitally recorded and uploaded to a computer. Using a qualitative data analysis software program, we then coded and analyzed the data. For the first level of data analysis, we coded the data according to the constructs addressed in the questions and aggregated by type of respondent. In the second level, we aggregated the data by construct. In analyzing the survey and interview data, we looked for consistencies and common patterns across responses.

**Results**

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Our data also suggest that the effective use of some key elements of the blended model is associated with more successful implementation and powerful student outcomes. When implemented as such, this blended model provides not only effective instruction to students, but also a model for effective virtual instruction, one we believe could and should be replicated to ensure that students can continue learning Spanish in high school and to deliver courses in other foreign languages.

Do students learn?

1. Findings from our research indicate that students in the Virtual School Spanish program learn Spanish. Data collected over three years show that students in virtual classes performed as well as those in face-to-face classes on the Spanish Assessment, and maintained a relatively high level of achievement over the three years of assessment. Their scores on the Student Oral Proficiency Assessment (SOPA) showed similar trends and consistent improvement in performance over three years.

2. Virtual School Spanish students do well in high school Spanish II classes, often out-performing some peers. High school Spanish II teachers say that students from the Virtual School Spanish classes are well prepared, and often better prepared than students who take Spanish I in high school. Students from the virtual program excel in language proficiency, especially in pronunciation and vocabulary, and demonstrate better work habits, participate more in class, and take more responsibility for their learning.

3. The Virtual Spanish program helps students develop positive attitudes towards learning a foreign language and strong work habits. Student survey and interview data indicate most students not only feel that they learn a lot in Virtual Spanish, but also like learning a foreign language, think it is important, and want to continue Spanish in high school. Students also think that learning Spanish will prepare them for high school and college, for a workplace where others speak Spanish, and for a more diverse world.

4. The Virtual School Spanish program gives students valuable technology skills. High school teachers report that virtual Spanish students are comfortable finding online language resources and using technology to complete assignments. Teachers believe that the technology skills gained through the virtual Spanish will equip students to take challenging classes, including AP classes, only available online.

Does the model work?

5. Levels of satisfaction in the Virtual School Spanish program are high—among students, members of the instructional team, parents, and site administrators. ¬Feedback from the students and instructional team members who actively participate in the program, and from the school administrators and parents who support it, was positive and consistent across the three years of our study. Students report that taking Spanish through a program is challenging, but that it makes learning fun. Most would take another virtual course such as this one, and recommend one to their friends. (Scattered feedback from students taking differently designed high school virtual programs suggests that the blended nature of the Virtual School Spanish model contributes to students’ satisfaction.)

6. The three-member instructional team and the communication between them and with students support learning and provide multiple opportunities for students to interact and gain feedback. There is general agreement that the team model works well, in large part because of a shared understanding of roles and responsibilities and ongoing communication between team members themselves and with students. Continuous feedback builds a sense of community and ensures that students get the kind of support instructional team members believe students, especially middle-school students, need—and the level of support and interaction not available in online programs that do not use a blended model.

7. Virtual School Spanish students are engaged in their classes, especially in technology activities and hands-on cultural activities. Observation and survey data, and feedback from facilitators indicate that students are generally engaged in the virtual classes. The activities that students find most engaging often involve technology or learning about Hispanic culture—activities that reflect the intentional instructional range built into the model. Cultural activities appear to be appealing to students because they are hands-on, and allow students to be creative, and because they help students learn songs, dances, and recipes they can share with friends and families. Students also seem to respond positively to hands-on activities because they alter the pace of instruction and provide variety.

What attributes of the implementation model are associated with student learning outcomes?

8. Interaction with students, instructional scaffolding, and active involvement on the part of the facilitator are associated with positive learning outcomes. In classes when there is more interaction with the instructional team (facilitators or lead teachers) and team members make connections to and provide scaffolding from other subjects, students tend to learn more Spanish and be more engaged. The same is true in classes where the facilitator is actively involved in the learning process and guides students smoothly through the daily lessons by maintaining flow, giving directions, reviewing activities, and asking questions.

9. Using Spanish, and providing high-quality and frequent feedback about learning, are associated with oral proficiency, engagement, and the value students attach to learning Spanish. In classes where students hear more Spanish, from either the facilitator or the lead teacher, they perform better on SOPA, are more engaged, value foreign language more, and want to continue Spanish in high school. High-quality and frequent communication with the instructional team is also associated with these outcomes.

10. Access to functional technology is associated with student learning outcomes and with effective support and communication. In classes where technology works well and students have access to the necessary tools (e.g., headsets and microphones) students learn more Spanish and are more engaged. In these classes, facilitators provide more instructional support and feedback to students, and communication and interaction between facilitator and students is more frequent and of higher quality.

11. All exposure to Spanish—writing on the computer, listening to Spanish via technology (CDs, Wimba tools), listening to facilitators, lead teachers and peers—enhances language learning. In classes where students write more on the computer—filling in blanks, writing words or phrases, or composing open-ended responses—they have higher Spanish achievement and oral proficiency. (Writing on paper is associated with lower Spanish Achievement and oral proficiency.) Hearing Spanish is also associated with higher writing and oral proficiency.

12. Site support can contribute to a robust, effective Virtual School Spanish program. When there is a high level of school support—support from administrators, support from other teachers, an appropriate time in the school schedule, an appropriate class space—students tend to be more engaged and learn more Spanish, value learning a foreign language, and want to continue Spanish II in high school.

**Recommendations**

Based on a detailed analysis of the extensive data collected over the past three years, including observations, questionnaires, assessments, and interviews, we see opportunities to both enhance and replicate the program. As noted above, many of the ideas outlined below come from program participants themselves and from Spanish II teachers.

Enhancing the existing program

1. Facilitators could benefit from best practices. Facilitators in the virtual classrooms, especially new facilitators, could benefit from training and support that includes examples of best practices and effective classroom scaffolding.

2. Facilitators should be encouraged to learn along with students and use Spanish as much as they are able to. [This is a dramatic change in their role and one that each facilitator can choose to take on.] Encourage experienced facilitators who have learned some Spanish to use it frequently. Reassure facilitators less confident with Spanish that, even though they may not know Spanish, informal use seems to encourage students’ use and grasp of Spanish and affect performance. Discuss ways—e.g., providing posters or instruction for basic commands—for facilitators to “use” more Spanish.

3. Take advantage of the technology. The program should take full advantage of the existing technology to provide more opportunities for students to hear Spanish, and explore other new technologies that expose them to as much Spanish as possible. This is especially useful, given students’ preference for technology-based activities. Feedback indicates that the WIMBA tools offer powerful, effective ways for students to learn Spanish, but may be underused. Explore ways to maximize use of existing WIMBA tools, or add other appropriate tools to the Virtual School Spanish WIMBA suite. Explore use of WIMBA electronic chat rooms so students can communicate in Spanish with advanced Spanish learners or native speakers. Facilitators also mentioned the use of technology, such as speakerphones, to communicate with the advanced students or native speakers.

4. Take advantage of students’ interest in cultural activities to offer more. “Crafts,” “cultural activities,” “fiestas,” and “field trips” [during which they could use Spanish] were among the most frequently mentioned things students would like to see added to the program. They suggested doing: a Spanish mural, a piñata, research on Hispanic traditions, and fiestas with “all the schools from other counties.” Some adjuncts also said they would like to see more cultural activities added to the program, and high school teachers suggested adding readings on culture. One high school Spanish teacher encouraged broader cultural exposure, building an interest similar to that in Mexican culture in the culture of Spain and other Latin American countries.

5. Explore advantages (and disadvantages) of encouraging more practice at home. Although students say “getting their work done in class” and “not having homework” is one of the pluses of the class, some adjuncts suggest that home practice is very valuable, and that they can tell which students practice at home. Facilitators said that students with home computers can also communicate with the lead and adjunct teachers more often. Some students say that they like to get ahead by working independently. Some facilitators say that, to keep everyone at about the same place, it is also important to strike a balance between working independently and getting ahead and staying with the class.

6. Explore increasing the number of activities that require students to compose in Spanish and engage in more natural dialogue. Spanish II teachers suggested that students need more practice constructing sentences, which would also help them understand the structure of the language. They, like adjuncts, also suggested more natural conversation and more listening. In addition to increased WIMBA use, consider other ways to enhance the listening component, and encourage more natural dialogue and extended conversations among students themselves—even if students may have to include some “Spanglish” to converse. At the December 2005 meeting, some participants recommended inviting local native speakers or Spanish majors from neighboring colleges (where feasible). These may also be good sources for Spanish newspapers, magazines, or other documents students could try to read or translate (understanding that they would not be able to do so fluently or immediately).