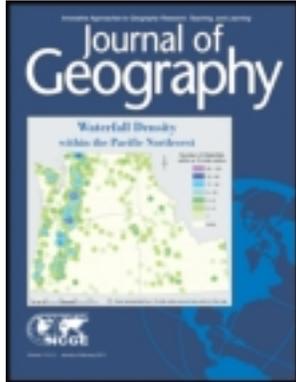


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A New Pathway: Video-Based Professional Development in Geography

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A New Pathway: Video-Based Professional Development in Geography

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ABSTRACT

The Gilbert M. Grosvenor Center for Geographic Education, in partnership with the Agency for Instructional Technology, and the National Geographic Education Foundation have embarked on the production of a twenty-two-program, Web-based professional development series for teachers of geography, social studies, and environmental science, titled *Geography: Teaching with the Stars*. Recognizing that deficient preservice preparation in geography is a serious problem in classrooms across the country, this technology-based series of programs is designed to complement and extend the impact of face-to-face in-service teacher training, the preferred method currently being used by the National Geographic Society-sponsored State Alliance program. This article includes a survey of the research literature describing and analyzing the nature of similar series in other disciplines, as well as some results of preliminary research about the effectiveness of the prototype program, "Globalization."

Key Words: *Geography: Teaching with the Stars, globalization, video-based professional development*

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INTRODUCTION

The Gilbert M. Grosvenor Center for Geographic Education, in partnership with the National Geographic Education Foundation (NGEF) and the Agency for Instructional Technology (AIT), has begun the production of a twenty-two-program, video-based professional development system for teachers of geography, social studies, Earth and environmental science, titled *Geography: Teaching with the Stars*.

These programs, available through a Web site developed and maintained by AIT, will assist teachers by providing best practice teaching strategies, supplemented by content and pedagogic enhancements, print materials such as lesson plans, a facilitator's guide, and a geo-forum where teachers can interact with other teachers, content experts, and mentor teachers. Each program focuses on a major societal issue with a clear geographic (spatial) dimension (Table 1). Topics displayed for future programs were selected because they are major issues with strong spatial dimensions. For example, program 3, funded by the U.S. Department of Agriculture, focuses on the importance of water in food production. Therefore, the list is not immutable, a necessary uncertainty of an incrementally funded twenty-two-program project. Of all of the topics, number 8, "Technology in Geographic Education," has a skill rather than content emphasis. This is because of the intense work across the country to teach teachers how to use geographic information systems (GIS) and other geospatial tools and techniques in the classroom. In this program the central issue is the pedagogy of geospatial technology, while in the other programs geospatial technology may be used to further student understanding of content.

The initial vision for this series of programs was guided by the reality that face-to-face professional development training is reaching only a fraction of the teachers that could benefit from strategies that are designed to help them teach geography more effectively. This includes teachers that teach geography as a stand-alone subject as well as teachers who teach other courses that incorporate a variety of geographic concepts and skills. A major goal is to greatly expand the teacher training function of the National Geographic Society (NGS)-supported state alliance program. The existing alliance network, established in 1986, includes the fifty states, Canada, Puerto Rico, and the District of Columbia. The network has evolved into a fine in-service professional development system, with an emphasis on face-to-face teacher education institutes and workshops held in the summer.

While the NGS alliance program has assisted thousands of teachers, many more are in need of professional development training but find the training difficult to access because of time, distance, funding, or personal/family obligations.

CONTEXT

As a result of general content requirements for social studies certification today, most teachers are unprepared to teach geography within social studies classrooms across the U.S.; a large majority of teachers have little coursework in geography during their preservice education (Boehm, Brierley, and Sharma 1994; Gregg and Leinhardt 1994; Bednarz 2002; Bednarz, Stoltman, and Lee 2004). For example, the 2008 Grosvenor Center survey of the 1,106 sixth and ninth grade geography teachers in the Dallas Fort Worth area (sixth grade required contemporary world cultures and ninth grade required world geography) found that 91 percent of the teachers had three hours or less of geography coursework in their university background. Continuing education

Table 1. Geography: Teaching with the Stars programs.

Program Description	Production Status
Globalization	Finished and available
Watershed Management	Finished and available
Agriculture and Water	Finished and available
Headwaters to Oceans	Scheduled for production in spring/summer 2012
International Terrorism	In proposal status
Energy Dependence	In proposal status
Natural Hazards	In proposal status
Using Technology in Geographic Education	In proposal status
Cultural Diversity	In proposal status
Spread of Disease	In proposal status
Climate Change	In proposal status
International Trade	In proposal status
Deforestation	In proposal status
Migration	In proposal status
Technological Hazards	In proposal status
Renewable Resources	In proposal status
War and Regional Conflict	In proposal status
Transportation	In proposal status
Employment – Business, Industry, Government	In proposal status
Location of Social Services	In proposal status
Urbanization	In proposal status
International Borders	In proposal status

opportunities that are geography-specific are limited to teachers who seek out these activities on their own, and without the necessary coursework or professional development in geography there is now a lack of highly-qualified geography teachers in our social studies classrooms. With the push to put geography back into the core content of K–12 education (such as the Teaching Geography is Fundamental Act, which is currently under consideration by the 112th Congress and supported by the National Geographic Society Education Foundation), it is necessary to have appropriately trained teachers. Similar to teachers in other subject areas, geography teachers need to possess not only geographic content knowledge but also the pedagogy that best facilitates student learning in geography. Professional development opportunities are needed to ensure that geography teachers are equipped with the necessary knowledge and skills to be effective in the classroom. The purpose of this article is to (1) explain the need for video-based professional development in geography; (2) provide a literature review of similar work being done in other disciplines, particularly math, language arts, and environmental science; and (3) describe the component parts of this video-based system. Finally, preliminary research results on user satisfaction with the process and a comparison between this video-based and the traditional face-to-face approach with the overall research question: “Can a set of technology-based professional development

programs for teachers provide equal or similar assistance in content and pedagogy to geography teachers as the existing face-to-face approach used effectively by state geographic alliances?” will be displayed.

CONCEPT DEVELOPMENT

Initial planning proceeded with considerable input from the three partners. Personnel from the Grosvenor Center for Geographic Education sketched out an ambitious project plan based on more than twenty years of experience in preservice and in-service professional development. The Agency for Instructional Technology brought vast experience to the table, including the production of *Global Geography*, *Geography in American History*, and *The Voyager Experience in Global Geography*.¹ In addition, AIT has produced hundreds of professional development programs in dozens of different disciplines at all educational grade levels. The director and key senior staff personnel at the National Geographic Society Education Foundation contributed experience with similar professional development programs in science education, and a keen interest in expanding the power and teacher service capacity of the NGS-sponsored state alliance program.

The purpose of this project is to contribute substantially to geographic education in middle and high school. At the core of the project are video-based professional development materials intended to demonstrate to teachers how geographic perspectives, concepts, and skills together with relevant instructional and assessment strategies can be used to improve students’ ability to understand and deal with the geographical aspect of important issues that affect their daily lives. Videos can be streamed online and print materials are also available for download.

To justify the vision, the costs, and the institutional commitment to complete this five-year project, a thorough review of appropriate research was undertaken to make sure that the rationale for this approach in geographic education was firmly based in the literature on (1) teacher education in geography; (2) teacher learning and effectiveness; and (3) the nature, success, and rationale of video-based professional development.

RATIONALE FOR VIDEO-BASED PROFESSIONAL DEVELOPMENT

As technology-based systems of education have been tested and refined, it seemed intuitively correct to develop a video-based system of professional development for teachers to supplement the existing face-to-face alliance program that has now been in place for over two decades. As always, however, it is best to proceed by investigating the need for such an approach in K–12 geographic education: are there similar projects in other disciplines, and if so, what approaches were used?

Recent studies have confirmed that U.S. students trail behind their international peers in geography, science, and

math (National Center for Educational Statistics 2007). Unfortunately, more often than not geography continues to be taught as the rote memorization of encyclopedic facts and maps, which is hardly representative of the complex and rich nature of the discipline. Geography is the study of spatial relationships between phenomena on the Earth's surface; it is a critical subject for twenty-first century global awareness. With an increasing need to ensure that twenty-first century students are aware of important global issues, specifically human-environment interaction, it is critical for teachers and students to address these issues in American classrooms. If geographic literacy of American students is going to improve, it is imperative that K-12 geography teachers have access to high quality professional development and materials that enhance their content knowledge and pedagogical content knowledge of geography.

Several decades of research have verified the crucial need for teachers to have a deep knowledge of their subject areas (Ball and McDiarmid 1989; Brophy 1991; Loucks-Horsley *et al.* 2003; Yager 2005). Beyond content knowledge, teachers must have pedagogical knowledge, pedagogical content knowledge, a knowledge of learners, knowledge of curriculum, and knowledge of instructional design (Shulman 1986, 1987). Even though research has extensively explored these areas of teacher knowledge, the problem of inadequately trained teachers in geography remains.

To alleviate this problem, some professional development organizations have targeted geography teachers by promoting content knowledge, pedagogical knowledge, and pedagogical content knowledge in subject-specific professional development programs. The National Geographic Society's Geography Alliance Network, mentioned earlier, has been providing professional development to geography, science, and social studies teachers for over two decades throughout the United States. However, traditional professional development has a geographically limited reach. In large states in particular, only teachers close to urban areas or who are willing to drive long distances can participate in these types of face-to-face professional development opportunities in the form of summer institutes. Traditional professional development can also be cost prohibitive for the teacher participants and for the organizing groups (Annetta and Minogue 2004).

Alternative professional development has been explored widely in science, math, and language arts as a means of providing high quality, technology-facilitated professional development while reaching a larger audience of teachers (Lampert and Ball 1990; Krajcik *et al.* 1996; Marx *et al.* 1998; Lampert and Ball 1998; Maor 1999; Andre *et al.* 2000; Smith and Diaz 2002; Hargis 2003; Annetta and Minogue 2004; Borko 2004; Brophy 2004; Dalgarno and Colgan 2007; Ryan and Scott 2008; Borko, Whitcomb, and Liston 2009; Cady and Rearden 2009; Lin 2009; Sawchuk 2009; de Mesquita, Dean, and Young 2010). Alternative forms

of professional development have become more appealing in recent years and typically use Internet technology or closed circuit television to deliver professional development using a variety of media forms, such as videos, discussion boards, or even Web seminars (Webinars) for online learning. This type of professional development is accessible for all teachers through the Web, allowing equal access to all teachers for participation in all that this professional development opportunity entails. Teachers in these settings are typically exposed to videos for lesson study, analysis, and reflection, and are able to participate in online or in-person facilitated discussions with other teachers.

Typically, video-based professional development has focused on the use of lessons for teachers to watch, discuss, and reflect upon the interaction of the teachers and students in the classroom. Lesson study, a technique used for professional development in Japan, was recognized as a successful method of professional development during the 1999 TIMMS study (Roth *et al.* 2006) and has recently been studied for its application to professional development in the United States (Lewis and Tsuchida 1997; Lewis, Perry, and Murata 2006). This professional development technique involves teachers observing colleagues during an actual lesson and reflecting on ways for improving classroom practices.

Video case studies have been successfully utilized in educational research by allowing the viewer to analyze classroom instruction, either of themselves (like in the Japanese Lesson Study Model) or other teachers (Sherin 2000; van Es and Sherin 2002; Bao, Lu, and Xia 2004; Le Fevre 2004; Sherin and Han 2004; Givvin *et al.* 2005; Lewis *et al.* 2006; National Center for Educational Statistics 2006; Boling 2007). The video also provides a means of direct observation of the intricate interactions that take place in the classroom without actually being there (Risko, Yount, and McAllister 1992; Wang and Hartley 2003; Sherin and van Es 2005; Whitcomb, Borko, and Liston 2009; Brunvand 2010). Video cases should be used to not only provide a means of content presentation, but to illustrate other dimensions of teaching such as social organization of the classroom, sequence and frequency of events, as well as other pedagogical techniques involved during the delivery of a successful lesson (Givvin *et al.* 2005). However, videos alone cannot constitute professional development without explicit and clear goals outlined by the facilitators in a structured professional development program (Fong and Woodruff 2003; Loucks-Horsley *et al.* 2003; Dymond and Bentz 2006; Wayne *et al.* 2008).

Teachers, particularly novice teachers, are able to use online videos and related print materials, to observe alternative methods of teaching. These methods are carefully prepared and of the highest quality. Early career teachers may see new ideas and different classroom techniques than those they observed in their traditional preservice education (Zeichner and Tabachnick 1981; Givvin *et al.*

2005). Using model videos to improve teacher training has experienced wide success (Rutherford 1973; Sherin and Han 2004).

COMPONENT PARTS OF TEACHING WITH THE STARS

At the core of this project is a digital video featuring one or two actual teachers in real classrooms, focusing on curriculum, instruction, and assessment in geography (See Figs. 1, 2, and 3 for selected screenshots from the first two programs). The video can be downloaded for viewing from the project Web site or from a school LAN (local area network). The videos will contain elements such as:

- **A segment that introduces viewers to the lesson and the instructional approach that is used in the lesson.** This segment describes the content, lesson, and the pedagogical techniques used.
- **A segment that specifies the instructional objectives that the teacher has identified for the lesson being demonstrated.** This segment highlights the outcomes proposed for the lesson with an explanation of why they were chosen and their connection to existing geography standards.
- **A segment that demonstrates the actual implementation of the lesson in the classroom.** This segment shows the teacher introducing, developing, and concluding the lesson. Special attention is given to the content and instructional strategies used in the lesson.



Figure 1. Star teacher, Shagufta Ellam, discusses interdependence among countries with a student in lesson 2 of the “Globalization” program. (Color figure available online.)



Figure 2. Local river authority, Cinde Thomas-Jimenez, uses her watershed model to demonstrate to students how different land use and human activities affect the local watershed in the “Watershed Management” program. (Color figure available online.)

- **A segment that shows how the intended outcomes for the lesson are assessed.** This segment includes comments from the teacher, student activities, student feedback, as well as a consideration of the assessment tools used, why they were used, and their relation to the intended lesson outcomes.



Figure 3. In this service learning exercise from the “Watershed Management” program, students work with their teacher, J. D. Stumpf, local parks department, river authority, and community members to clean up the local watershed. (Color figure available online.)

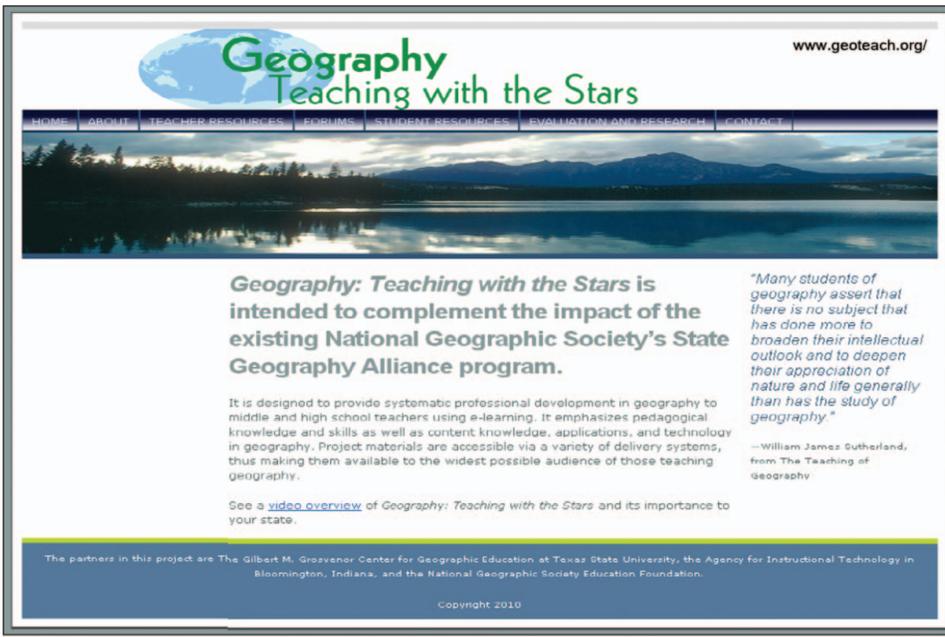


Figure 4. Homepage screenshot from the Geography: Teaching with the Stars Web site, www.geoteach.org. (Color figure available online.)

- **A segment in which the teacher reflects on the lesson.** This segment focuses on strategies used by the teacher to continuously improve the lesson through formative evaluation.

In addition to the main program, there are two video enhancements that complement the primary lesson. The pedagogic enhancement involves a mentor teacher commenting on the teacher and the teaching strategies used in the in-class lessons. This enhancement is vitally important because it revisits, in a guided manner, the pedagogic knowledge that has been developed and displayed in the program. This is a teacher-to-teacher critique and is especially valuable when these videos are used in an in-service or preservice environment.

Additionally, each program contains a content enhancement on some aspect of the main topic of the program. For example, the content enhancement in the “Globalization” program is a survey of the international characteristics of the Bridgestone Firestone Tire Company. The obvious intent of this enhancement is to increase content knowledge by viewing and learning about an industry that has adapted to and benefited from globalization.

Print materials are available to support each program and include:

- A teacher’s guide containing lesson plans and templates for student activities to help with the planning and instruction related to each program.
- A comprehensive facilitator’s guide for systematically implementing *Geography: Teaching with the Stars* in

an online or face-to-face professional development format.

A project Web site² (Fig. 4) serves the following purposes:

- Enables teachers to identify and exchange ideas, findings, and promising resources.
- Teachers, working with a facilitator, will be able to form local online learning communities to enhance and expand upon the face-to-face or online learning professional development activities in which they participate as part of this project. They will be encouraged, for example, to share instructional and assessment strategies that they have tried or created for their students, to teach some of the lessons demonstrated in the project, and to share their experiences with others in their learning

community. In addition, they could expect to design, develop, and teach their own lessons, use the lesson development model presented in the project, and collaborate with other members of their learning community in doing so.

- The site enables teachers to ask questions of project personnel and content/pedagogical area experts and contains ideas and materials for extending content, instructional, and assessment strategies highlighted in the demonstration lessons and enhancements.
- The teacher’s guide and facilitator’s guide is available for download from the project Web site.
- Student materials include links to resources that they can use in association with each of the lessons. These links appear in a special section of the project Web site.

RESEARCH QUESTION

The overarching research question that guided the development of this project was “Can a set of technology-based professional development programs for teachers provide equal or similar assistance in content and pedagogy to geography teachers as the existing face-to-face approach used widely by state geographic alliances?” Preliminary research has begun to address this question and is discussed below. This project was developed so that the materials can be presented in an online or face-to-face format. Formative research has been carried out to help shape individual programs during the production process. Preliminary research has been carried out to determine receptivity of the

Table 2. Early career teacher responses to *Geography: Teaching with the Stars* (N=10).

	Low (1)	(2)	Medium (3)	(4)	High (5)	x
1. How useful did you find the program on globalization?				5	5	4.5
2. How useful did you find the pedagogic enhancement?		1	2	4	3	3.9
3. How useful did you find the content enhancement?			3	1	6	4.3
4. Please rate the potential of this program (Globalization) and others like it to make you a more effective teacher.				2	8	4.8
5. Please rate your level of confidence in using this program (Globalization) and others like it to lead an in-service workshop in your home school district.			2	2	6	4.4
6. Please rate this low cost, Web-based professional development approach as a means of improving teacher effectiveness across the state.				1	9	4.9
7. Please rate this professional development approach as a means of improving teacher effectiveness in remote areas of the state.			1		9	4.8
8. How helpful would this professional development approach have been in your preservice education program?		1	1	1	7	4.4

programs by teachers and to compare the online experience to a face-to-face approach. In this comparison teachers have been exposed, as much as possible, to all lesson plans, activities, background materials, the facilitator's guide, and both the content and pedagogic enhancements.

PRELIMINARY RESEARCH

Four groups were surveyed, each with a slightly different set of questions. The first group consisted of ten NGS-sponsored state alliance coordinators. This sample was selected because the creative thinking behind the project targeted alliance coordinators as principal users of this video-based professional development project as a means of complementing the existing face-to-face method of teacher training. After a formal presentation of the "Globalization" program, with pedagogic and content enhancements, alliance coordinators were asked to respond to a survey. To the question, "Do you see value in the *Geography: Teaching with the Stars* project?" all ten respondents answered "yes." The same uniform "yes" was answered to the question "Do you see this set of programs as a way of strengthening your alliance professional development training?" One coordinator offered this caveat, "We think professional development must start as face-to-face, but after personal introduction, these materials could be used to increase the amount and range of professional development." The project is flexible enough so that it could begin with a face-to-face workshop and then move into online activities. Nine of the ten coordinators expressed a willingness to "pursue an implementation strategy" in their state. One coordinator said that such a decision would have to be discussed with other alliance members. All but one coordinator answered "no" when asked if this professional development package posed a possible threat to existing professional development activities. The lone dissenter was concerned that the programs "possibly could limit face-to-face instruction," however, this issue would be taken care of with the aforementioned face-

to-face workshop directions available in the facilitator's guide.

The second group surveyed consisted of ten early career (less than five years of teaching experience) teachers who were participating in an alliance professional development summer institute. All of these teachers were teaching either sixth grade contemporary world cultures or ninth grade world geography. The questions and results of the first group were quite positive (Table 2).

A few respondent comments were interesting and useful and are included below:

I liked the way the veteran teacher pointed out specifically which pedagogics were being used. It validated my own thinking and gave me some "ahh haa!" moments.

I enjoyed the student lessons. I liked the way the students used graphic organizers and worked together to understand the material.

I think every teacher could benefit from this approach and it definitely keeps in line with using technology as a learning tool for not only students but teachers, as well.

Seeing a lesson in action that aligns with pedagogical standards is helpful in understanding how to prepare as a teacher—plus, it is less overwhelming to start where someone else has found success rather than to start from scratch.

It gives engaging lesson plans with resources. How could it NOT improve teacher instruction? Saves teachers time and gives them knowledge on the subject as well as how to effectively teach it.

While the overall ratings of the *Stars* program were high, these early career teachers were less confident about

Table 3. Experienced teachers, 2009, Teaching with the Stars: Utilization potential (N = 25).

	Yes	No	Maybe
1. Do you see value in this project?	25	0	0
2. Would you be able to integrate one or several of the programs into your home school district's professional development plan?	20	0	5
3. Would you be willing to lead a professional development activity, based on Teaching with the Stars, outside of your home school district (Educational Service Center, state, or national conference, etc.)?	19	2	4
4. Do you think that your school district would be willing to support this series financially? All 22 programs, with written content and pedagogic enhancements, would be available for ten years.	7	3	15

using the programs as a teacher-leader in an in-service environment (see question 5, Table 2). It is important to note here that the facilitator's guide for leading professional development workshops was not yet fully produced at the time of this group's viewing of the prototype program. They were also unsure of the value of the pedagogic and content enhancements. In the end, the answers to question 4 seemed to sum up the responses of the early career group. Of the ten answers, eight rated the question of whether this type of professional development program has the "potential. . .to make you a more effective teacher" as "high."

A third group, consisting of experienced teachers, most with high school world geography assignments, participating in an alliance professional development summer institute, was surveyed in 2009 with a somewhat different set of questions (Table 3). These results provide insight into the potential for this series to be integrated into the professional development programs of school districts.

Almost all of the experienced teachers surveyed were supportive of this concept and are willing to integrate the programs into their home district professional development plan. It is encouraging to note that nineteen of the twenty-five teachers would be willing to use *Teaching with the Stars* in a professional development situation outside of their home school district or at a state or national professional conference. This is significant because most state geographic alliances would expect this level of professionalism from teachers once they graduate from a two-week face-to-face teacher training session held during the summer.

The answers to question 4 of the survey were revealing. At a time when states are delaying textbook purchases and school districts are slashing budgets, seven teachers felt that their school districts would be impressed enough with this series to support it financially. The fifteen teachers that answered "maybe" cited uncertain budgets, and generally, "if there is money for professional development, it would normally be spent on science or math."

The comments from this group of teachers on *Teaching with the Stars* are representative of the group as a whole:

Sounds like a wonderful project and I can't wait to start using it.

I think it is great and would help a lot of teachers on our staff and in our district.

I think GTS could be a way to bring professional development to teachers who need it, at the right time, and it can be used any time of the day/year. It is much more versatile than traditional in-service programs.

I like the concept. Certainly many current teachers have little background in geography and how to teach it.

Very excited. When possible, it would be nice for the program descriptions to list specific examples/areas for those with district requirements to teach regionally. This will help us fit the topics into our school year plan.

Very exciting concept. I think lots of smaller, rural districts would find this beneficial/an effective way to train teachers (especially if sending them to a state or national conference is not possible).

COMPARISON OF VIDEO-BASED PROFESSIONAL DEVELOPMENT TO TRADITIONAL FACE-TO-FACE

In order to compare the teaching of the video-based prototype program of the *Geography: Teaching with the Stars* professional development approach to a traditional face-to-face technique, an experiment was designed to allow senior teachers to experience both approaches to teaching and learning using the prototype program on globalization. This comparative approach involved a target group that consisted of a cohort of high school geography teachers. These teachers were involved in a summer leadership institute during the summer of 2010. On day one, eighteen world geography teachers were randomly divided into two groups (Group A and Group B) consisting of nine teachers each. Group A experienced face-to-face professional development by listening and interacting with the same teacher (live) who was featured in the "Globalization" program. The teacher acted as the facilitator/instructor in this

Table 4. Leadership Institute teachers, 2010, *Geography: Teaching with the Stars* survey results (N=18).

Components	Face To Face Much Better	Face To Face Somewhat Better	Equal	Stars Somewhat Better	Stars Approach Much Better
Classroom Demonstration – Shagufta Ellam’s classroom demonstration of best practice strategies and lesson plans.	2	4	2	4	6
Pedagogic Enhancement – Mentor teacher’s comments on the best practice strategies used by Shagufta Ellam.	1	5	5	5	2
Content Enhancement – Bridgestone/Firestone Case Study	0	0	3	4	9
Print Support Materials – Lesson plans used by Shagufta Ellam on globalization.	5	0	10	0	3
Facilitator s Guide – Instructions on how to implement a professional development workshop.	2	4	9	1	2
Web-Based Interactive Forum – Forum for teachers to share ideas, questions, and promising resources.	3	3	4	0	7

face-to-face professional development format and was instructed to keep her presentation as close to the video and video-based support materials as possible. For two hours, the facilitator demonstrated how teachers could and should present the concept of globalization to their students.

At the same time, Group B experienced the video professional development version of the “Globalization” program, including the use of all support materials, the facilitator’s guide, and the video-based forum for teachers to ask questions, share ideas, and promising resources. The next day Groups A and B reversed their experience. Group A experienced the video-based version while Group B learned about teaching globalization from the *Teaching with the Stars* teacher/instructor.

After the second day of instruction, a survey was administered to all eighteen teachers. The survey was designed to solicit survey participants’ opinions about the effectiveness of *Geography: Teaching with the Stars* as an instrument of professional development, and particularly how it compares to face-to-face training. Table 4 displays the answers of all eighteen teachers, when comparing (face-to-face versus video-based) the component parts of the *Teaching with the Stars* professional development approach.

After analyzing the answers of Groups A and B together (Table 4), one would get the impression that the video-based professional development experience is at least equal, and perhaps a bit better than the face-to-face approach. Two-thirds of the teachers rated the video demonstration equal or better than the face-to-face, with one-third (six) rating the video “much better.” Two-thirds of the eighteen rated the video pedagogic enhancement as equal or better. The video content enhancement was rated by all teachers as equal or better but it must be pointed out that in the face-to-face presentation the Bridgestone/Firestone case study was presented orally, not visually as in *Teaching with the Stars*.

The face-to-face approach, however, compared more favorably with the video-based approach when it came to

support materials and interaction with an actual teacher. Fifteen of the eighteen found the face-to-face approach equal or better in providing and discussing print support materials. The same numbers support the face-to-face use of a facilitator’s guide, the how to approach to teaching about globalization. There was no clear preference between face-to-face and the video approach when the question targeted the video-based interactive forum. Six preferred the facilitator in a face-to-face professional development teaching workshop environment and seven preferred the video-based transmission of professional development.

The analysis of the teaching of the concept of globalization using the *Stars* approach versus the traditional face-to-face approach has shown that teachers’ opinions of the two approaches seem to favor *Stars* but for the most part the two approaches were viewed as equal. Nevertheless, a chi-square goodness-of-fit test was performed in order to see whether a statistically significant relationship existed between the participants’ opinions on which approach they felt was more effective or whether the two approaches were equal when comparing (1) the teaching of the classroom demonstration and (2) the pedagogic enhancement. Only two component parts were chosen because they were the only ones to satisfy the requirements for a legitimate chi-square goodness-of-fit test. The totals for “much better” and “somewhat better” were also combined for the analysis. A chi-square goodness-of-fit test compares the observed frequencies in certain categories to the expected frequencies acquired in those categories by chance (Field 2009). The results show, however, that no statistically significant difference exists between the type of delivery method for the classroom demonstration, $\chi^2(2) = 5.34, df = 2, p > 0.05$ (Table 5), or the pedagogic enhancement, $\chi^2(2) = 0.33, df = 2, p > 0.05$ (Table 6). This seems to show that no statistically significant difference exists between teaching the concept of globalization using *Stars* versus teaching the same concept in a face-to-face workshop. A larger sample of teachers, however, should be utilized in the future.

Table 5. Results of chi-square test for classroom demonstration.

Classroom Demonstration (CD)							
CD	Frequency	Percent	Test Percent	Cumulative Frequency	Cumulative Percent	Chi-Square Test for Specified Proportions	
1-Face-to-Face Better	6	33.33	33.30	6	33.33	Chi-Square	5.3387
2-Equal	2	11.11	33.30	8	44.44	DF	2
3-Stars Better	10	55.56	33.30	18	100.00	Pr > ChiSq	0.0693

Sample Size=18

The purpose of this experiment was to gather preliminary data on a satisfaction comparison between a “real teacher” approach and a video-based professional development strategy for teaching using the prototype program, “Globalization,” of the series *Geography: Teaching with the Stars*. Much more data needs to be gathered and analyzed, but for now, *Stars* competes fairly well with face-to-face professional development. It must be remembered that *Stars* is not being produced to replace face-to-face professional development but rather to enhance and increase opportunities to offer and receive quality professional development in geography.

FURTHER RESEARCH

The information gathered on the prototype program, “Globalization,” in this series of surveys of alliance coordinators, early career teachers, experienced teachers surveyed in 2009, and teachers participating in a summer leadership institute in 2010, suggests that the answer to the overarching research question that guided the production of *Geography: Teaching with the Stars* is “yes;” a set of technology-based professional development programs for teachers can provide equal or similar assistance in content and pedagogy to geography teachers as the existing face-to-face approach used effectively by state geographic alliances. Virtually all respondents had positive things to say about the series and many grasped the potential for expanding

traditional face-to-face teacher education. There are still, however, questions to be answered. The authors of this article have already embarked on a more robust research agenda, and the invitation is open to other researchers to investigate a number of issues, including but not limited to, the following:

- Does a statistically significant difference exist between the teaching mastery of lessons offered over the Web versus the same lessons taught in a face-to-face workshop?
- Are the programs and related print materials capable of increasing teacher self-efficacy?
- Do the programs provide an avenue for increased content knowledge (CK) by the teacher user?
- Do the programs and print materials offer the opportunity for increased pedagogic content knowledge (PCK)?
- Do the programs offer teachers a means of increasing their pedagogic knowledge (PK)?
- How do possible gains in CK, PCK, and PK compare with a similar face-to-face experience in a summer institute environment?
- How do these programs and print materials compare with a traditional social studies methods preservice program?

Table 6. Results of chi-square test for pedagogic enhancement.

Pedagogic Enhancement (PE)							
PE	Frequency	Percent	Test Percent	Cumulative Frequency	Cumulative Percent	Chi-Square Test for Specified Proportions	
1-Face-to-Face Better	6	33.33	33.30	6	33.33	Chi-Square	0.3337
2-Equal	5	27.78	33.30	11	61.11	DF	2
3-Stars Better	7	38.89	33.30	18	100.00	Pr > ChiSq	0.8463

Sample Size=18

- How effective are these programs in delivering in-service teacher training in areas distant from the educational core of alliance states?
- How does this video-based system of in-service training compare to in-service training offered by teachers who have been trained in a face-to-face situation?
- Do these programs and their related print materials have the potential to increase student learning in geography and related subjects by enhancing teacher skills and content understanding?

Regarding answering the above questions, some techniques and methods have been identified in the literature that have potential for replication and adaptation. For example, focus groups and interviews were used to get teachers' opinions on the effectiveness of video-based professional development as well as how these two approaches compare (Montes and Gonzales 2000; Baran and Cagiltay 2006). In a study comparing online/video-based and face-to-face professional development, Russell *et al.* (2009) used many different data collection instruments to measure and compare the change in teachers' pedagogical beliefs, content knowledge, and instructional practices while participating in an online workshop and face-to-face workshop. The authors employed the use of pre/post-surveys on teachers' pedagogical beliefs, background, and the content being taught. Twice the teachers were asked to fill out teacher logs that "were designed to capture information about teachers' day-to-day pedagogical practices" (Russell *et al.* 2009, 77). Students were also surveyed regarding the learning practices their teacher involved them in. Studies have used pre/post-tests to measure gains in teacher pedagogical knowledge, content knowledge, and pedagogical content knowledge (Fong and Woodruff 2003; Sherman, Byers, and Rapp 2008; Santagata 2009). Other studies have embarked on discovering what techniques directly lead to improvements in student learning (Desimone *et al.* 2002; Fishman *et al.* 2003). Fishman *et al.* (2003) outlined a research design for measuring the effectiveness of student learning after sixth-, seventh-, and eighth-grade science teachers participated in the online/video-based professional development program, Center for Learning Technologies in Urban Schools (LeTUS). Data related to student performance were obtained through pre- and post-tests that accompanied the LeTUS lesson plans and contained multiple-choice and free response questions. The authors found that their approach to "teachers learning how to foster map reading skills related to watersheds... enabled [them] to make reasoned and substantial improvements in teacher learning and subsequent student performance" (Fishman *et al.* 2003, 655). Derry (2007) also outlines guidelines for video research.

CONCLUSION

The authors of this article attempted to do three things: (1) develop the concept of delivering professional develop-

ment for teachers through a twenty-two-program, video-based and print materials format; (2) review appropriate research to confirm that this approach to professional development was firmly grounded in the literature; and (3) provide some tentative data on the receptivity to this concept by presenting the prototype video and print materials to a small sample of alliance coordinators, early career teachers, experienced teachers surveyed in 2009, and teachers participating in a summer leadership institute in 2010, and then administering surveys to determine initial satisfaction.

Geography: Teaching with the Stars is the first attempt in the discipline to offer professional development through a technology-based set of programs. These programs include a classroom demonstration of a geography concept by a master teacher, buttressed by pedagogic and content enhancements, as well as a set of supporting print materials including lesson plans, activity templates, and a facilitator's guide written in a how to do it manner. A forum for interactive communication on matters of content or pedagogy is also available.

While face-to-face workshops should in no way be replaced by online professional development, it is clear that all of the surveyed groups are ready to accept the video-based professional development series, *Geography: Teaching with the Stars*, as an alternative transmission strategy and, as a supplement to face-to-face professional development in summer workshops and institutes. Thousands of teachers who are unable to attend workshops during the summer because of distance, time, or financial reasons can also benefit from the alternative experience of video-based programs.

This article is based on an in-depth concept development including a substantial literature review of teacher education in geography, teacher learning and effectiveness, and a rationale for video-based professional development. Research has indicated success with this concept in subject areas such as math and environmental science, to mention just two. Video-based professional development in geography appears to be a satisfactory addition or alternative to traditional face-to-face training. Much more research needs to be carried out and more programs in this series need to be produced. Nonetheless, our initial findings suggest that teachers are willing to receive professional development online. If this is true, there are opportunities for geographic educators to reach a much larger cadre of geography, social studies, and environmental science educators with online training in content, skills, and pedagogy.³

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NOTES

1. *Global Geography* was a 1989 middle school series of ten programs organized by major world regions with an appropriate theme and skill for each program. These programs were based on the 1984 *Guidelines for Geographic Education* and included a detailed teacher's guide that correlated program content with appropriate units in the most commonly used geography textbooks. The same model was used in the 1991 production of *Geography in American History*, a ten-program series for teachers and students at the high school level. Major historical events or situations, with strong geographic dimensions form the guiding structure of these programs. An example would be the program *An Industrial Revolution in Pittsburgh, 1865–1900*, where film, maps, interviews, and archival materials were used to tell the story of the growth of the steel industry. In 2002 AIT produced ten 25-minute programs titled *The Voyager Experience in Global Geography* that highlight a high school-aged cast as they travel and explore diverse lands in foreign countries and experience how people of other cultures deal with global issues in their daily lives. Issues include: changing borders, emerging economies, the global environment, political landscapes, population explosion, global trade, the power of nature, natural resources, the movement of people, and cultural conflict. *Global Geography* is no longer active, but *Geography in American History* and *The Voyager Experience in Global Geography* are available at www.ait.net through the online catalog.
2. The project Web site is available at www.geoteach.org. This Web site is updated continuously when new videos and resources become available.
3. At the time of this writing, program producers have completed the series' first program, "Globalization." This program was used to demonstrate the concept to alliance coordinators, early career teachers, experienced teachers surveyed in 2009, and teachers participating in a summer leadership institute in 2010. Subsequent programs are currently under production and all have benefited from the experience with the prototype program, "Globalization." The second and third programs, "Watershed Management" and "Agricultural and Water," respectively, are complete and available for use. The fourth program, "Headwaters to Oceans," is proceeding in a joint venture with the Harte Institute at Texas A&M University-Corpus Christi.

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