

# The Impact of Professional Development to Infuse Health and Reading in Elementary Schools

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## ABSTRACT

**Background:** Elementary classroom teachers must overcome a number of instructional barriers, including time constraints and professional preparation, if they are to deliver effective health education and enhance health literacy among youth. **Purpose:** This study examined the direct impact of a long-term professional development program on integrating health education and literacy instruction on third-grade teachers' confidence and practice and its indirect effect on student learning. **Methods:** Data on confidence and implementation of instructional and assessment practices were collected from 16 teachers. Students ( $n=99$ ) from their classrooms and from four comparison classrooms ( $n=101$ ) completed pre- and post-program constructed response assessment. **Results:** Significant increases were seen in teachers' confidence in describing health education standards, determining if students achieved the standards and using rubrics to guide scoring practices. Children's books were used to integrate instruction and most teachers increased the time spent on integration activities. Students in their classrooms scored significantly higher than students in comparison classrooms on health knowledge and skills. **Discussion:** These results confirm our belief that by increasing awareness and understanding of standards-based health education and assessment, and by showing teachers how they can use children's books as the context for teaching and reinforcing health concepts and skills outlined in the standards, their confidence about teaching health can increase. **Translation to Health Education Practice:** Integrating health and language arts instruction may be the key to overcoming some of the factors teachers report as barriers to teaching health education.

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## BACKGROUND

One of the desired outcomes of health education is to increase students' health literacy so they have the capacity to navigate the numerous health challenges they will face in the 21<sup>st</sup> century. Experts across the globe have espoused the critical role schools can play in helping students achieve health literacy.<sup>1-5</sup> In 1995, the Joint Committee on National Health Education Standards (NHES) published, *Achieving Health Literacy*, a document that outlined the essential knowledge and skills children need to master to become health literate.<sup>6</sup> (The NHES

were revised in 2007 and whereas the title of the document was changed to *Achieving Excellence*,<sup>7</sup> the essence of the standards has remained the same.) Results from the 2006 School Health Policies and Programs Study (SHHPS)<sup>8</sup> showed that 36 (72.0%)

states either require or encourage schools and districts to follow health education standards or guidelines based on the NHES. At the elementary level, most states (70.6%) reported they have adopted goals, objectives or expected outcomes for school health edu-

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cation, but only 19.6% had enacted specific time requirements for health instruction.

Without such a mandate, the elementary curriculum may be narrowed to align with subjects that are included in high stakes testing. Other subjects like health, physical education, music, art and the social sciences may be limited or even eliminated.<sup>9,10</sup> The Center on Education Policy<sup>11</sup> published a report on the impact federal legislation (i.e., No Child Left Behind Act of 2001) requirements have had on instructional time in elementary schools in all 50 states, including 349 school districts. They found that the shift in instructional time away from non-tested subjects was relatively large. Districts that reported a reduction in instructional time did so by an average of 145 minutes per week. It has been estimated that teachers need approximately 1-1/2 times the instructional time they currently have to teach language arts, mathematics, science and civics.<sup>12</sup> It is not surprising that available instruction time has become a major issue facing teachers today. Lack of time is one of the primary barriers reported for not teaching health education.<sup>13,14</sup> Even though most elementary teachers believe health education is important,<sup>13,14</sup> they often feel unprepared to teach it.<sup>15-18</sup> Inadequate pre-service coursework<sup>13,18,19</sup> and in-service training opportunities in health education<sup>15,18</sup> are additional barriers that contribute to the lack of implementation of health instruction in the elementary classroom. When teachers do receive training, either in specific health content or in a comprehensive curriculum, significant changes can be seen in their health knowledge,<sup>20</sup> self-efficacy to teach health,<sup>21-23</sup> feelings of preparedness<sup>15</sup> and amount of content taught.<sup>15,24</sup>

If schools are to be successful at improving health literacy, then strategies for overcoming these instructional barriers must be identified and employed. One way of dealing with the mismatch between amount of content to be taught and available instruction time is to prioritize standards and only teach to those that are deemed most important.<sup>25</sup> This approach may be the elementary classroom teacher's current

reality given the increased demand to focus on high stakes testing areas like language arts and mathematics. An alternative to this approach is to teach across the curriculum so that students are not denied the opportunity to develop the knowledge and skills necessary to make healthy choices about behaviors that can affect their health and academic success.

In its publication, *Health Literacy: A Prescription to End Confusion*, the Institute of Medicine reports that there is sound justification for taking this approach, specifically as it relates to the integration of literacy instruction and health education.<sup>2</sup> Research shows that learning occurs best through authentic context<sup>26,27</sup> and when classroom discussions and activities are meaningful and functional.<sup>28</sup> In addition, learning is enhanced when teachers provide opportunities for children to apply their cognitive skills to a personal issue or problem.<sup>29</sup> Children are faced with making decisions about their health and well-being on a daily basis. Health concepts and situations found in many children's books contain context and messages that are authentic and meaningful.

The infusion of literacy instruction with other content areas has been effective in improving skills and knowledge in science,<sup>30</sup> social studies<sup>31</sup> and mathematics.<sup>31,32</sup> It stands to reason that the integration of literacy instruction and health education would be equally effective. Using children's books to improve health knowledge and skills is one integration strategy that has been promoted;<sup>33-38</sup> however, this instructional strategy rarely has been subjected to empirical examination. Meckler and Vogler<sup>33</sup> examined the effects of health instruction on children's reading and found that reading and language skills improved more in children who received health instruction than in children who did not receive the instruction. Improvement was particularly noted in low level readers. The effect of integrated instruction on health knowledge and skills was not examined. Thackeray et al.<sup>14</sup> found elementary teachers rarely teach health as an independent content area. Instead, they integrate it. Integration most often occurred

with reading, but teachers reported they were not exactly certain how it should be integrated. Further research is needed to determine if teachers can use content and methods they have been prepared to use (e.g., language arts) as a vehicle for providing literacy instruction and health education. If this approach is effective, achieving health literacy may become easier.

## PURPOSE

The purpose of this study was to examine the direct impact a nine-month professional development program on integrating standards-based health education and language arts in the elementary classroom had on teachers and the indirect effect it had on learners. Changes in elementary teachers' confidence to teach health education when infused with literacy instruction and their practice of integrating reading and health instruction and assessment were assessed. Differences in their students' health knowledge and skill also were investigated.

## METHODS

### *Participants*

All third-grade teachers (n=29) in two Wyoming school districts (one rural, one urban) were invited to participate in the nine-month professional development program, *Read Wyoming: For the Health of It*. The rural school district consisted of five elementary schools. Of the 743 rural K-12 students, 51 were third-grade students. Enrollment in the urban district was 13,301 K-12 students; 987 of whom were third-grade students in the district's 24 elementary schools (that housed third grade). Additional elementary teachers (e.g., classroom, physical education, reading) and school personnel (e.g., counselors, school nurses, curriculum coordinators) who expressed interest in the workshops were allowed to participate. Overall, 26 elementary educators participated. Because we were interested in the effects of the program on third-grade teachers who had direct responsibility for teaching reading and health, only data from those participants (n=16; 5 males, 11 females; 6 rural, 11 urban) are reported here.



Students in participants' classrooms (n=99) completed a pre-test and post-test written assessment on their health knowledge and skills. Students (n=101) from four additional elementary classrooms in the urban school district served as the comparison group by completing the same pre-test and post-test. No comparison group was used in the rural district because all third-grade teachers participated in the program.

### Professional Development Program Design

The U.S. Department of Education's publication, *Building Bridges: Missions and Principles of Professional Development*,<sup>39</sup> and principles of best practice in literacy instruction<sup>40</sup> were used to design and guide implementation of the professional development program. The program design can be seen in Figure 1. Participants attended two face-to-face workshops, a two-day workshop in late summer/early fall and a one-day workshop in the middle of the academic year.

Prior to and following the first and mid-year workshops, participants completed questionnaires so that interventions could be designed to meet their changing needs. This effort enabled the workshop facilitators to work collaboratively with the participants to plan the training. As an ongoing professional development experi-

ence, participants also completed monthly tasks that required them to apply what they learned in the workshops. The effectiveness of the program was evaluated on the basis of change in teacher confidence to teach standards-based health education, teacher use of children's books to infuse the instruction and student learning.

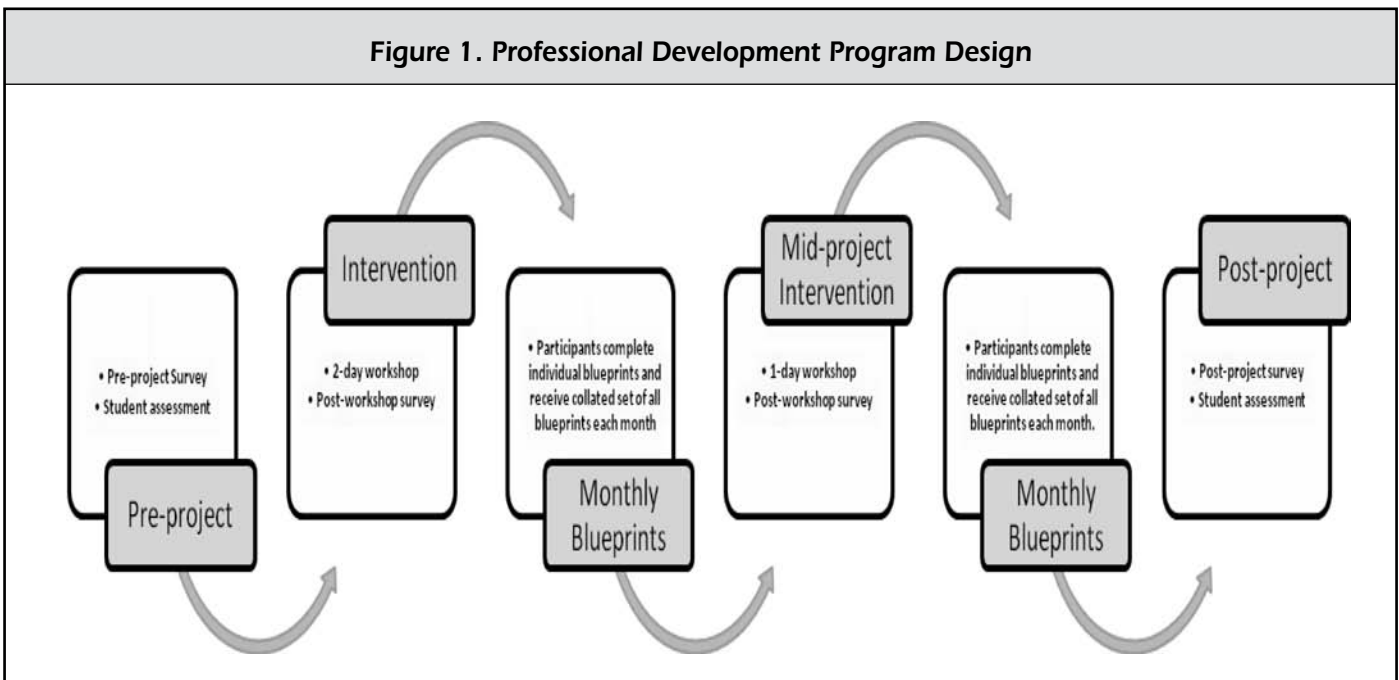
### Workshop Design

The face-to-face workshops were held at central administration sites for both school districts. Participants received a resource packet that contained workshop handouts, PowerPoint® presentations, and supplemental readings, and a three-ring binder to organize monthly work that each participant would submit. In addition, they received several resources from the Council of Chief State School Officers (CCSSO) State Collaborative on Assessment of Student Standards (SCASS) Health Education Assessment Project (HEAP), including a set of assessment items, rubric scoring cards and posters that provide student-friendly tips for meeting national and state health education standards. Participants also received a copy of each of the children's books that were modeled in the initial workshop. At the end of the program participants were provided a \$150 stipend to purchase books they would

use to integrate health and literacy instruction. School districts were reimbursed for costs associated with workshop-related substitute teacher pay. Workshop facilitators included a health educator who serves as the lead member of the state health education assessment training cadre and a reading recovery teacher working toward her doctorate in literacy education.

The initial two-day workshop was designed to meet three objectives. First, participants would become aware of the relationship between integrating and aligning health and language arts standards, assessments, and instructional strategies. Second, they would recognize reading materials containing health themes that can be integrated into the literacy program. Finally, they would become familiar with scoring and using health assessments for content knowledge and health skills. The workshop began with an introduction to the Wyoming state health education standards and a review of the language arts standards. Participants were then introduced to the HEAP scoring system, which includes two four-point rubrics - one for health concepts and one for health skills. They practiced scoring student work and discussed reasons for awarding specific score points. After the first scoring

Figure 1. Professional Development Program Design





round, workshop facilitators modeled how a non-fiction book could be used to teach health within the context of the literacy lesson. As the facilitators discussed different literacy strategies for using the book, they completed a blueprint for integrating health and language arts instruction. The blueprint included health concepts and skills found in the book and corresponding page numbers, health and language arts standards and benchmark indicators, HEAP assessment item reference, brief introduction of book, follow-up questions to determine if students understand the health concepts and/or can show the health skills, and ideas for how the book discussion could be extended into additional health and language arts activities.

Participants then replicated the lesson blueprint using a fiction book. They perused the book for health messages that might be meaningful and personal to their students and the HEAP database for assessments that aligned to related health concepts and skills. Throughout the remainder of the workshop participants examined different types of books that encompassed a variety of genres and completed blueprints that outlined how they would implement them in integrated lessons. They discussed how non-fiction books could be used to increase student comprehension before reading fiction books that contained the same health themes and how fiction books could be used to springboard into discussions about health concepts and skills. Three additional practice scoring rounds on student assessments were alternated between blueprint activities and discussions. Assessments were aligned so health concepts and skills demonstrated in student work they scored were the same as those found in the books discussed after the practice scoring round was concluded. At the end of the workshop, participants were provided with the lesson template and asked to complete monthly blueprints of books they used in their classes. At the end of each month the researchers collected the blueprints, made copies of all of them, and returned a completed set to each participant. By the end of the program each participant had a portfolio of blueprints for more than

100 children's books.

At approximately mid-academic year, a one-day face-to-face workshop was held. The workshop included a time for sharing integration ideas and experiences. Participants completed another practice scoring round on HEAP assessments to reinforce their understanding of the health concepts and skills outlined in the state standards and to determine consistency in evaluating student work. Additional books were blueprinted, and participants discussed how they might use the books in their classes. At the end of the workshop they perused book lists and catalogs to develop a list for purchase with the stipend. Project staff placed the orders so participants received their books within six weeks of the mid-year workshop.

### *Instruments*

Participants were surveyed five times during the course of the nine-month project, prior to and immediately following the initial and mid-year workshops, and again at the end of the school year. A 36-item pre-program questionnaire was developed to obtain background information regarding participants' confidence about state health education and language arts standards and assessment, use of literacy instructional strategies, status of health education in their classroom, use of integrated instruction and training needs. This information was used to assist the project staff in developing an agenda for the initial two-day workshop. A five-point Likert-type scale was used with questions pertaining to confidence about standards and assessment (responses ranged from *not very confident* to *extremely confident*) and to familiarity with different literacy instruction strategies (responses ranged from *unfamiliar* to *very familiar*). Open-ended questions were used to explore characteristics of literacy and health instruction such as amount of instructional time devoted to both subjects, strengths and weaknesses of current curriculum/programs, integration practices, and desired outcomes of the professional development project.

Participants were surveyed again at the end of the first workshop. Confidence in standards and assessment was assessed using the

same set of questions used in the pre-project questionnaire. A five-point Likert-type scale was used to indicate how likely participants were to use formal health education assessment in their classrooms. Responses ranged from *not at all likely* to *extremely likely*. Five open-ended questions were used to obtain feedback from participants about the strengths and weaknesses of the training and what additional support they would like to have in the upcoming months.

Prior to the mid-year workshop, participants were surveyed to ascertain if changes had occurred in the participants confidence levels and if they had implemented instructional and assessment strategies modeled in the pre-program workshop. Confidence was assessed from the same set of questions used in the pre-program questionnaire, and open-ended questions were used to determine if and how participants had incorporated the use of children's books to teach health education and if they had formally assessed their students' health knowledge and skills. Participants were also asked about current professional development needs and types of support they would like to receive for the remainder of the school year. Participant confidence and future professional development needs was again measured at the end of the workshop.

A final questionnaire was administered at the conclusion of the academic year. Questions from the pre-project survey concerning confidence in standards and assessment and instructional strategies were replicated. Participants reported changes in their instructional and assessment practices that were a result of the professional development they received in the project. Open-ended questions were used to determine how participation impacted teaching and assessment practices. Finally, a list of children's books used in the two workshops was provided and participants indicated if they had used them during the academic year. A team of health education and reading researchers and practitioners reviewed all iterations of the questionnaire to ensure content validity.

Student learning was evaluated using a



HEAP constructed response assessment. The assessment item was selected from the HEAP database, which contains approximately 1900 elementary, middle school, and high school items (see <http://scassheap.org> for sample items.) To ensure content validity and scoring reliability, the HEAP subjected all items in the data base to multiple reviews by experts and field testing in more than 1500 classrooms.<sup>41</sup> The constructed response assessment was administered to students from participants' classrooms and to students in the comparison group prior to the first professional development workshop and at the end of the school year. The assessment was designed to measure the students' knowledge about safety and the skill of accessing valid information and products and services to enhance health. In this assessment, students were asked to specify where they could go to get help when someone in their family had a problem with alcohol. The elementary level items in the HEAP database were initially created and intended for use by older children (e.g., 5<sup>th</sup> and 6<sup>th</sup> grade students). We modified the original HEAP item slightly to illustrate that the situation described in the prompt made the youngster scared and uncomfortable. We believed that younger children who had not observed or experienced a similar situation might not recognize the inherent fear and/or discomfort, and this lack of awareness could ultimately affect their response. Pre- and post-test administration occurred within a two-week window of the beginning and end of the academic year. Teachers were not aware of the pre-test and post-test assessment content until they received the assessments for administration. The University of Wyoming Institutional Review Board reviewed and approved the research protocol prior to its implementation.

### Data Analysis

The questionnaire was comprised of items yielding both quantitative and qualitative data. Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) Windows version 15.0 (SPSS Inc., Chicago, IL). A critical alpha level of  $P < 0.05$  was adopted for all significance

tests. Descriptive statistics (i.e., percentages, means) were applied to questionnaire responses pertaining to teacher confidence concerning standards and assessment practices, health curriculum and curriculum integration. Paired sample t-tests were used to determine significant differences between their pre- and post-test measures. The Pearson product-moment coefficient of correlation was used to examine the relationship between teacher confidence in describing health education standards and assessment practices.

Expert reviewers used the HEAP rubrics as the basis for scoring student assessments on conceptual knowledge and health skill. Agreement must have been achieved by two of the three reviewers for the scores to be included in the data analyses. A Group X Trial ANOVA with repeated measures on the last factor was used to examine differences in students' health knowledge and skill scores. Effect sizes (ES) were calculated for pairwise comparisons by using Hedges' *g* statistic.<sup>42</sup> The calculation of Hedges' *g* involves subtracting the means of two groups and dividing the mean difference by the pooled standard deviation across the intervention and comparison groups.

Questionnaire responses were analyzed qualitatively to enhance understanding of quantitative data. Peer review established trustworthiness for the construction of common themes reflected in teachers' responses to open-ended questions and reduced bias in the interpretation process.<sup>43</sup> A researcher experienced in qualitative methodology and a graduate research assistant independently analyzed the written records and grouped responses into categories. Both investigators then met to discuss the classification systems. Consensus (100% agreement) between both investigators had to be reached on all categories. When disagreements between investigators surfaced, the investigators restudied the original response, discussed points of contention, and established concurrence.

### RESULTS

The results are based on responses from 16 elementary classrooms in one urban

and one rural school district in Wyoming. Program effectiveness was determined from participant responses and from changes in health knowledge and skill scores of 99 students from the 16 classrooms that were taught by program participants and 101 students from four comparison classrooms. Quantitative and qualitative results pertaining to teacher confidence and practice, and student learning, are presented and teachers' quotes are used to elucidate these findings.

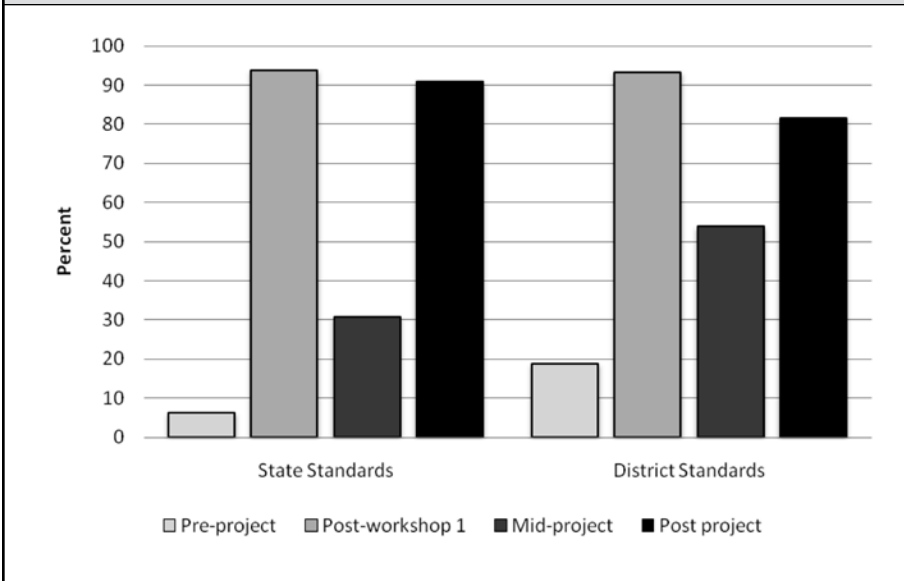
### Teacher Confidence

Prior to the start of the program only a few of the teachers reported being confident to extremely confident in describing the state (6.3%) and district (18.8%) health education standards (Figure 2). Similarly, less than 20% of the teachers indicated they were confident to extremely confident in determining if students achieved health education standards and in using rubric/scoring systems to assess core concepts and health skills (Figure 3). By the end of the project, nearly all of the teachers reported being confident to extremely confident in describing the state (90%) and district (81.5%) standards. All of the teachers indicated they were confident to extremely confident in using rubric-based scoring systems and in determining if students achieved the standards. It is interesting to note that confidence levels in each of these conditions dropped off considerably by the mid-point of the program, but rebounded by its end such that significant increases were seen in teacher confidence in describing the state ( $t = -6.708$ ,  $P < 0.0001$ ) and district health education standards ( $t = -5.516$ ,  $P < 0.0001$ ), and determining if students achieved those standards ( $t = -7.479$ ,  $P < 0.0001$ ). Their confidence in using rubrics to guide scoring practices on conceptual knowledge ( $t = -4.215$ ,  $P < 0.0001$ ), and health skills ( $t = -6.248$ ,  $P < 0.0001$ ), also significantly increased.

A significant correlation was found between teacher confidence in describing health education standards and determining if students met them ( $r = 0.56$ ,  $P < 0.01$ ). As one teacher stated, "I know how to assess health standards now, so I do it. Before I took the Read Wyoming workshop I was very unsure about health standards and



Figure 2. Percentage of Participants Who Reported Being Confident, Very Confident or Extremely Confident Describing State and District Health Education Standards



the teachers used HEAP performance-based assessments during the school year. Short answer and extended response items were incorporated to assess writing, classroom activities and health concepts. Performance tasks were used to assess classroom activities. This teacher reported that learning how to assess was the most valuable aspect of the project, “Learning to score assessments was very valuable. I feel very comfortable in this area now.”

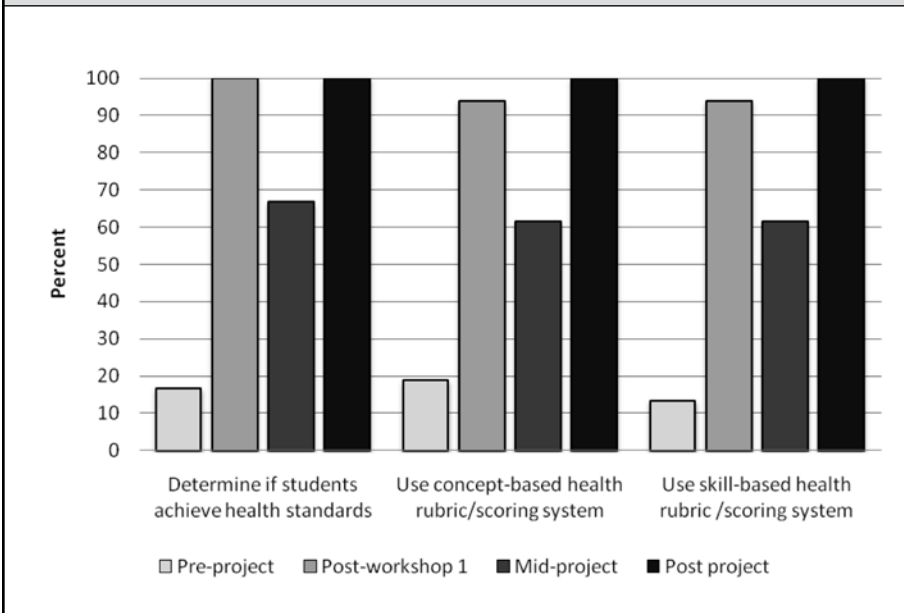
Teacher Practice and Use of Books

Prior to beginning the professional development program, teachers were asked what they would like to accomplish as a product of participating in the project. One teacher wrote, “I would like ideas on how to integrate health curriculum with language arts so I don’t have to take time to teach health in isolation.” Another wrote, “[I would like] a way to integrate health so it doesn’t take up too much time. It seems like there isn’t enough time in the day to adequately hit all subjects.” Teachers were asked to identify the most valuable activity and/or information they received during the two-day workshop and from the entire professional development experience. Several themes were common in their written responses (Figure 4). Increased capacity to integrate health and languages arts was consistently reported. One teacher wrote, “I realized how easy it is to bring health standards into language arts teaching.” Another teacher stated, “I’m more aware of what I need to bring out in health in my literature series. I’m also much more aware of what health topics I need to cover.”

The majority of teachers (79%) indicated the time they spent integrating health and language arts instruction increased. The remaining teachers reported integration time remained the same. The practice of integrating health and language arts helped teachers to negotiate the time barrier, as this teacher indicated, “Teaching health through literature...is more time efficient and [requires] less planning.”

Teachers frequently integrated reading and writing activities such as read and discuss, literature circles, read aloud, shared

Figure 3. Percentage of Participants Who Reported Being Confident, Very Confident, or Extremely in Assessment Related Tasks

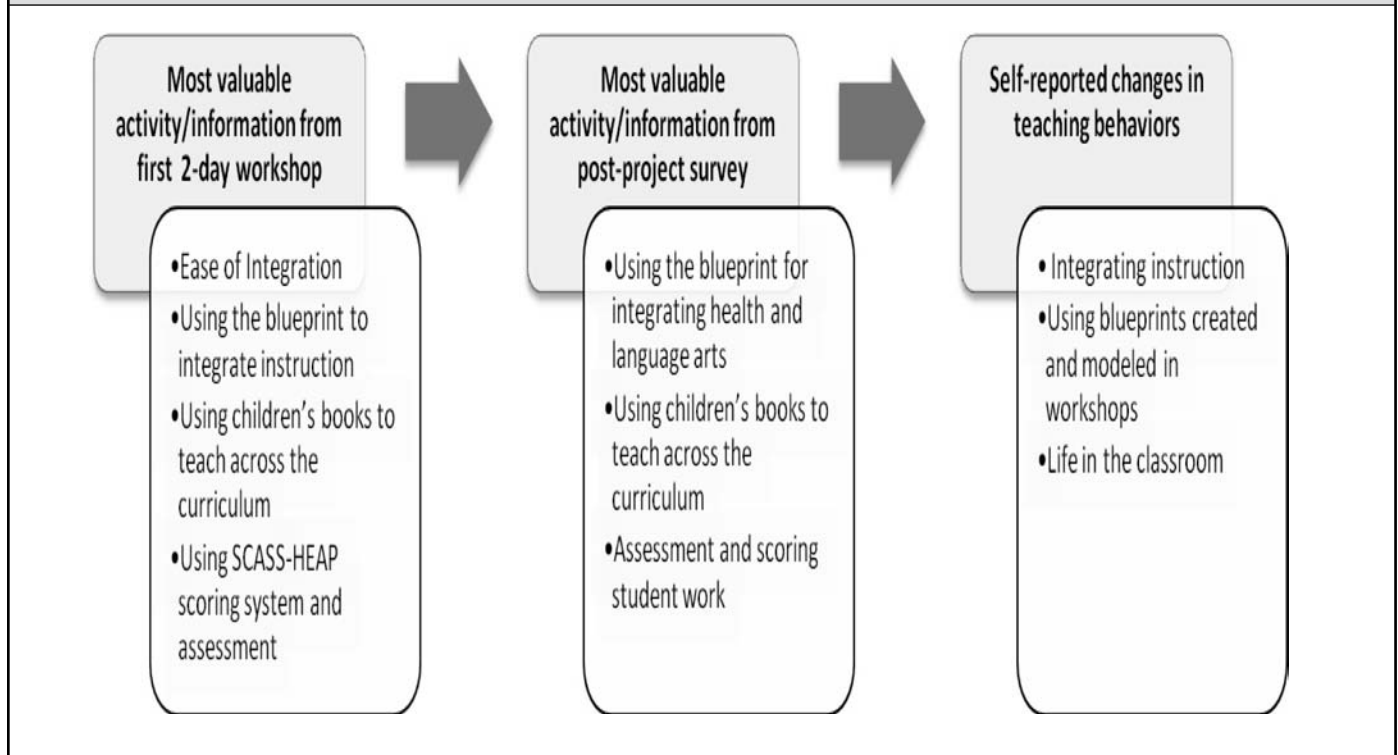


how to assess them.” Confidence in describing the standards and teachers’ subsequent use of HEAP assessment items to test student knowledge and skills was also related ( $r=0.54, P<0.01$ ). By the end of the year, more than three-fourths of the participants (77%) reported using HEAP items to assess

student learning. One teacher reported, “The SCASS assessments were really nice to have. I enjoyed using them and [my] scoring [ability] for Health and Language Arts is improving.” Additionally, teachers reported using multiple types of SCASS assessment items in a variety of ways. All of



**Figure 4. Themes Pertaining to the Most Valuable Activities/Information and Behavior Outcomes of Professional Development Program**



reading, Six-Traits writing and student journal responses. Science and art activities were also integrated as reported by this teacher, "I have used several of the books we received in class. I read the books aloud and we completed written study guides together. The students grew germ cultures in Petri dishes and made posters about washing hands." Participation in the project primarily provided teachers with increased awareness of how to integrate health and language arts and how to find health concepts and skills in literature books. The teachers believed that integration saved time, and the project provided them the awareness and ability to integrate.

Creating a blueprint for identifying health themes in children's books and for using the book to simultaneously teach health and language arts (reading & writing) was frequently reported by the participants as the most valuable experience in the workshop. This teacher reflected, "The booklists and blueprints were the most valuable aspect of the Read Wy[oming] Project. They

made it easier to integrate materials with the reading language arts standards and benchmarks." Another teacher stated, "The most valuable piece is the blueprint. It gives me information and quick access to books that will be useful in my classes." At the end of the program, all of the teachers reported using at least one of the books that was blueprinted in the workshops and most of them (92.3%) used more than one book (Table 1). The primary reasons teachers chose a book was because it supported a health concept or skill they were teaching and the book was at the appropriate reading and developmental level for their students. Lack of time and inappropriate reading or developmental level were the primary reasons for not using one or more of the books. Teachers also reported creating and implementing blueprints for books they currently use in their classrooms. One teacher stated, "I am trying to incorporate the Growing Healthy curriculum into the classroom again to back up the benchmarks; I am cataloguing & blueprinting the G.H. books."

### *Improving Student Learning*

Students in participants' classrooms scored significantly higher than students from comparison classrooms on the post-program assessment for both health concepts ( $F=4.28, P<0.04, ES=0.30$ ) and health skill ( $F=15.44, P<0.001, ES=.57$ ). Effect size measures show that while the intervention (i.e., participation in the professional development program) had a small, but significant effect on core concept knowledge, the intervention was more influential on students' health skill.

### **DISCUSSION**

Elementary classroom teachers must overcome a number of instructional barriers if they are to deliver effective health education and enhance the health literacy of youth. Lack of preparedness, confidence and instructional time are just a few of these challenges. *Read Wyoming for the Health of It* was a professional development program designed to help elementary classroom teachers improve their confidence to teach

**Table 1. Citations (ISBN, Lexile Reading Level [if Available]) That Were Modeled and Used in Workshops by Percent of Teachers who Implemented Them in Their Language Arts Lessons**

Title of Book	% of Teachers Who Implemented Book
Matott J. <i>Drinking Fountain Joe</i> . Littleton, Co: Clove Publications, Inc., 2000. (ISBN-13: 9781889191126, L not available)	42.9
Moore I. <i>Six Dinner Sid</i> . New York: Aladdin Paperbacks, 1991. (ISBN-13: 9780671796136; 690L)	35.7
McDonnell C. <i>Toad Food and Measle Soup</i> . New York: Puffin Books, 1984. (ISBN-13: 9780670035090, L not available)	00.0
Smith RK. <i>Chocolate Fever</i> . New York: Bantam Doubleday Dell, 1978. (ISBN-13: 9780142405956; 680L)	21.5
Cole J. <i>The Magic School Bus Explores the Senses</i> . New York: Scholastic, Inc., 1999. (ISBN-13: 9780613593311, 490L)	50.0
Davidson M. <i>Helen Keller</i> . New York: Scholastic, Inc., 1969. (ISBN#0-590-42404-1, 520L)	42.9
Chier R. <i>Danger: Alcohol</i> . New York: Power Press Kids, 1996. (ISBN#0-8239-2339-8, 730L)	78.6
Vigna J. <i>I Wish Daddy Didn't Drink So Much</i> . Morton Grove, IL: Albert Whitman & Company, 1988. (ISBN-13: 9780807535264, L not available)	71.4

health education and to develop implementation strategies that build on their instructional strengths. Previous research has shown that only a small percentage of classroom teachers feel prepared to teach health education,<sup>15-18</sup> but professional development can improve teachers' self-efficacy and confidence to teach health education.<sup>15,21-23</sup> Results from this study are consistent with these findings and confirm our belief that by increasing awareness and understanding of standards-based health education and assessment, and by showing teachers how they can use children's books as the context for teaching and reinforcing health concepts and skills outlined in the standards, their confidence and likelihood of teaching health can increase.

By the end of the program, confidence in describing health education standards and in determining if students had met those standards significantly increased. This change was seen immediately after teachers completed the first two-day workshop.

Prior to participation, fewer than 10% of the teachers reported being confident to extremely confident in describing state standards; however, after the initial workshop almost all of the teachers reported this level of confidence. A similar pattern was seen in their confidence to determine if students were achieving standards and using the HEAP rubric-based scoring system to draw inferences about student learning. In both cases there was a considerable drop in confidence levels after teachers returned to their classroom and began implementing health instruction and assessment. The mid-project survey results did not indicate a reason for this change, but we suspect it was an artifact of returning to the reality of the school. Immediately after the first workshop teachers were enthusiastic about returning to their classroom and implementing what they learned. Their post-workshop report on confidence to carry out these difficult tasks could have been an acute effect of the training; that is, they may have found that

implementation was not as easy as they had anticipated. By the end of the school year their confidence levels had rebounded to post-workshop levels—a significant increase from pre-program levels. These findings suggest that confidence can be improved when teachers participate in professional development, but ongoing support is needed to insure that confidence continues to remain high. Research has shown that short, one-shot professional development workshops are not as effective in producing changes in teacher practice as those experiences that occur over a longer period of time.<sup>44,45</sup> Longitudinal research is needed that examines professional development outcomes and the variability in those outcomes that are a product of time.

In addition to increased confidence, participation in professional development can have an impact on the time teachers spend in health education instruction. In this study, more than three-fourths of the teachers increased the time they spent





teaching health education and none of the remaining teachers reduced the amount of time they spent teaching it. These findings are consistent with those reported by Telljohann, et al.<sup>21</sup> In their study, the number of hours devoted to health education instruction by elementary teachers who completed a 30-hour summer workshop was not only greater than a comparison group of teachers, but significantly increased.

By the end of this program, most of the teachers increased the amount of time they spent integrating health and language arts instruction. We believed that teaching and assessing across the curriculum would increase if we built on teachers' instructional strengths; that is, their confidence and competence in teaching language arts. Teachers in this study frequently confirmed that they used language arts strategies like literature circles, reading aloud and shared reading to teach health content and skills. In previous research, teachers reported that they rarely taught health education independent of other content, and if it was taught it was usually in conjunction with reading.<sup>14</sup> We wanted to see if by exposing teachers to children's books that contain meaningful health messages and helping them to recognize the content and health skills that were embedded in the books, they would be more likely to use the books to teach health education. Eight books were modeled in the workshops. By the end of the program, all of the teachers had used at least one of the books and half of them used at least four of the eight books. Lack of time was the most consistent reason given for not implementing the books. This was not surprising, considering that time constraints are frequently reported in the literature as a primary barrier to teaching health<sup>13,14,18,19</sup> Teachers in this study commented on using books and integrated learning as a way to overcome the time barrier. Comments like, "My students were doing more reading and writing while learning various health issues, through literature," "[I learned] how to teach more than one standard at a time," and "I realized how it [health content and skills] would fit into books I am already using"

suggest that these teachers now make better use of limited instructional time.

The two books that were used by the greatest number of teachers were *Danger: Alcohol* and *I Wish Daddy Didn't Drink So Much*. These books were modeled in the first workshop to show how non-fiction books can be used to teach content knowledge and to springboard into fiction books that can be used to develop the context for applying health knowledge and practicing health skills. Comments like, "[I] used books to give facts and concepts [and] then had students write using and applying the knowledge to their lifestyles," suggest that teachers adopted practices that were modeled in the workshops. It is possible more teachers used these alcohol related books because of the history and prevalence of alcohol use in Wyoming<sup>46</sup> and the association between binge drinking and violence.<sup>47,48</sup> This reason did not emerge in the post-program survey. However, as these books were being modeled in the workshop participants discussed the sensitive nature of, and challenges in teaching about, alcohol abuse when students in their classrooms came from families where substance abuse and/or domestic violence was an issue. One participant even indicated that he planned to implement the book, *I Wish Daddy Didn't Drink So Much*, in the days leading up to the winter break – a time he had observed to be fraught with alcohol use and violent behaviors.

The professional development program also influenced teacher practice in assessment. Initially, teachers did not express a high level of confidence in assessing the content knowledge and skills outlined in the state and district health education standards. But after completing the program their confidence significantly increased and more than three-fourths of them reported using HEAP assessment items to evaluate student learning throughout the academic year. A significant correlation was found between using these items to assess student achievement and teachers' confidence in describing the standards. Scoring student work was an essential component of the professional development program. Teachers dissected the

prompts to differentiate between the parts that would elicit functional and conceptual knowledge about health topics and the parts that would elicit the health skill. They discussed criteria or skill cues that needed to be present and what the different score points from the HEAP scoring system meant. As they practiced scoring student work, they would look for evidence that the written response met the specific skill and core concept criteria. According to Easton,<sup>49</sup> professional development should involve active learning practices that resemble the work that teachers do. The experience teachers received in scoring student work, an authentic teacher practice, may have led to their increased confidence in using assessments and rubrics to score student work.

The teachers seemed to favor performance assessments (e.g., short answers, extended responses, performance tasks that are completed over multiple days) over selected response items (e.g., multiple-choice). This may be due to the written nature of student responses on performance assessments. These written responses could be used to simultaneously assess health knowledge and health skills, along with traits of writing, and teachers reported using them for multiple purposes. Teachers valued the HEAP assessments because they allowed for rubric based scoring and dual assessment, particularly as it related to the six traits of writing. They also saw the HEAP assessments as a tool for making cross-curriculum assessment easier. One teacher related this ease of use to the axiom, "two birds with one stone..."

Improved teacher confidence and competence in assessing health education standards is an important outcome of this study. Popham<sup>50</sup> argues there is a gap in the assessment literacy of our nation's teaching force and this gap needs to be filled by colleges and universities through pre-service education and via professional development experiences teachers receive. Results from this study show that through on-going experiences that provide practice in scoring student work and learning more about performance-based assessment, barriers like confidence and competence can be overcome.



One of the most promising findings of this study was the impact professional development can have on student learning. By the end of the study, students in classrooms taught by teachers who attended the professional development program scored significantly higher on the HEAP assessment than students from comparison classrooms. Effect size measures ranged from 0.30 for conceptual knowledge about injury prevention and safety to 0.57 for the health skill of accessing valid sources of health information and services. According to the U.S. Department of Education's What Works Clearinghouse,<sup>51</sup> these effect sizes meet the criteria for being "substantively important." Our findings are consistent with other studies where professional development for teachers had a moderate effect on student achievement in math, science, and language arts. Yoon et al.<sup>45</sup> provide a comprehensive review of research on the effects of professional development on student achievement.

### **Strengths and Limitations**

One of the strengths of this study is that the intervention was sustained, intensive and content-focused – three of the criteria for high quality professional development stipulated in the No Child Left Behind Act of 2001. In addition, teachers engaged in active learning that was connected to pedagogical skills and assessment practices that were relevant and meaningful, and that led to direct changes in their confidence and practice. They scored student work, developed lesson blueprints, discussed literacy and integration strategies, and modeled how they would use children's books in their classrooms. By using children's books to infuse health instruction into the language arts program, teachers were effective in helping their students develop a sample of the skills and knowledge they need to become more health literate.

A quasi-experimental approach was used to determine the effect of the intervention on student achievement. By having a comparison group of students we were able to detect differences in their health knowledge and skill that was an indirect effect of the intervention. However, a randomized

control trial (RCT) design would provide stronger evidence of the effect. While the quasi-experimental design provides acceptable control in a setting where it is difficult to randomly assign students to classroom teachers who will or will not participate in the intervention,<sup>51</sup> studies using RCTs would have stronger internal validity for inferring the causal relationship.

There were several additional limitations to this study. Teachers were volunteers so they may have been predisposed to the use of integration practices, which could lead to selection bias. Results could also be biased because changes in teachers' confidence and practice were based on self-report and not direct observation. Risks to internal and external validity could be reduced if a RCT or quasi-experimental approach was used to study the effects of professional development on elementary classroom teachers' confidence to teach standards-based health education and their use of integration strategies for instruction and assessment. Direct observation of teacher practice could strengthen the findings.

Performance-based assessment was used to ascertain student achievement. This assessment required students to construct a written response that illustrated criteria specific to the health skill and core concept addressed in the prompt. Findings were limited by the students' ability to communicate in written form. Alternative forms of assessment, including oral communication, could be used to provide evidence of student achievement. Only one health concept, injury prevention and safety, and one health skill, accessing valid sources of information, products and services, were assessed in this study. To draw inferences about the effectiveness of cross-curriculum instruction on student health literacy, a broader array of concepts and skills should be examined. Constructed responses can reflect a deeper level of understanding than do selected responses, but scoring these responses is very time and labor intensive. Future research may need to assess student achievement through a balanced system of constructed and selected response items. Despite these

limitations, important implications for professional development in health education can be drawn from this study.

### **TRANSLATION INTO HEALTH EDUCATION PRACTICE**

The purpose of this study was to examine the impact a long-term professional development program could have on elementary classroom teachers practice and on student learning. The findings have several implications for health education practice.

Due to increased demands for school accountability and high stakes testing, finding time for professional development outside of the core curriculum may be difficult, if not impossible. As such, it is vital that we find ways to embed health education in professional development for core curriculum subjects like reading and writing.

Integration may be a key to overcoming some of the factors teachers report as barriers to teaching health education. Professional development in health education for elementary classroom teachers should build on their pedagogical strengths and provide instruction and assessment strategies that will compliment their delivery of the core curriculum.

During professional development teachers should engage in active learning practices that resemble the work they do in their classrooms. In this program, teachers read books they could use in their classroom, they reflected on health themes they could address and the different roles children could play when they read the books in their literature circles, and they practiced scoring student work.

Professional development should not be limited to one-shot, short-term workshops or conferences. Instead, it should be long-term and continuous so that teachers' confidence and competence to teach and assess health education content and skill is sustained.

Elementary classroom teachers can use children's books to infuse health instruction into the language arts program. A variety of non-fiction and fiction books can be used independently or as springboards to compre-



hension and application of health knowledge and skills. By doing so, teachers can impact the health literacy of their students.

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