

Impact of teacher value orientations on student learning in physical education

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Abstract:

Based on the value orientation theory, the purpose of this study was to determine the impact of value orientation incongruence between physical education teachers and an externally designed curriculum on student learning in a concept-based fitness-centered physical education curriculum. Physical education teachers ($n = 15$) with different value orientations taught an externally designed, standards-based fitness/healthful living curriculum to their middle school students ($n = 3,827$) in 155 sixth, seventh, and eighth grade intact classes. A pre-post assessment design was used to determine whether student fitness/healthful living knowledge gains differed in terms of teachers' value orientations. An ANOVA on class means of residual-adjusted knowledge gain scores revealed no statistically significant differences based on value orientations. The evidence suggests that teacher value orientation impact may be mediated by curriculum impact. This finding supports the observation that a well-designed physical education curriculum may minimize the impact of teachers' diverse value orientations on the curriculum implementation and student learning.

Keywords: middle school | teaching | fitness knowledge

Article:

Teacher value orientations are a powerful influence on curriculum and instruction decisions (Ennis, 1992). Since the early 1990s, research in physical education (Ennis & Chen, 1993, 1995; Ennis, Chen, & Ross, 1992) has revealed and confirmed five fundamental value orientations: disciplinary mastery (DM), learning process (LP), self-actualization (SA), self/social responsibility (SR), and ecological integration (EI). Each value orientation serves as a philosophical foundation or a belief system guiding physical educators' curricular choices, instructional decisions, and teaching behaviors in the gymnasium.

Theoretical Framework

The value orientation theory postulates (Ennis & Chen, 1993) that the DM orientation values knowledge and skill mastery. It centers on a belief that educational values lie in mastery of the content being taught. Teachers with the DM focus curricular and instructional decisions on student learning the disciplinary knowledge and developing physical competence. They believe that transmitting knowledge and skills to each generation of students through repetitive practice is the best way to achieve mastery. For these teachers proficiency in understanding the knowledge base and in performing skills is the goal of physical education.

Teachers with a LP orientation embrace the belief that the purpose of education is for learners to understand how learning occurs and to become better able to learn valuable knowledge and skills by themselves. One salient characteristic of their curricular and instructional practices is problem-solving. In teaching, they help students learn knowledge and skills to solve movement and exercise problems, apply movement knowledge and skills in new situations, and relate different knowledge and skill components to real life. The goal of physical education for LP teachers is for students to develop learning skills that allow them to relate new knowledge to existing knowledge and build new skills on a solid foundation of existing skills.

Teachers with a SA orientation hold the perspective that physical education can empower learners to succeed in accomplishing the goals they set for themselves. The SA emphasizes the importance of autonomy, independence, and personal growth. Physical activities, therefore, are a means to actualizing one's own goals. Specifically, teachers encourage students to identify personal needs and/or opportunities, define specific personal goals for success, enhance awareness of their capabilities, and work autonomously to accomplish their goals.

The SR places a priority on interpersonal interaction, cooperation, and teamwork in the learning setting and beyond. Learning tasks in a SR oriented teacher's classroom may focus on character development through nurturing students' responsibility for themselves and society. In physical education, SR teachers expect students to demonstrate respect and cooperation and to value teamwork in physical activity settings and beyond as a contributing member of a group. Active participation is an integral part of social responsibility. Teachers with this value orientation use group-centered instructional structures for students to experience cooperation, group dynamics, and teamwork and to emphasize collective effort.

Teachers with an EI endorse a balanced perspective, often emphasizing multiple educational priorities to address students' needs for knowledge mastery, self-actualization, and group/social interaction and responsibility. Physical educators with this value orientation attempt to achieve content balance with a relatively equal emphasis on the subject matter that holds personal relevance within in the larger social or natural context. They balance the content to integrate disciplinary knowledge, personal needs, and social expectations leading to a knowledgeable student who is a socially engaged and personally confident mover.

It is rare to find a teacher whose pedagogical decisions are influenced by only one value orientation. Instead, research (Ennis & Chen, 1995) suggests that experienced teachers' belief systems reflect a composite of several orientations forming a complex profile that influences selection of content, teaching styles, and assessment methods. Value orientation profiles have

been found to reflect a blend of high and low priority orientations instrumental in creating the classroom environment in physical education.

Given the conceptualization, the measure of value orientations is characterized with a forced choice format. In responding to the Ennis Value Orientation Inventory (Short Form), physical education teachers face 10 five-item sets of statements. Each statement in a set reflects a value orientation (Ennis & Chen, 1993, Chen, Ennis, & Loftus, 1997). In measurement, a teacher identifies the item that best matches his/her value priority and give the highest score (5) to it. She/he will assign other scores, 4, 3, 2, and 1 to items that reflect priorities she/he value less and less. The forced choice responses provide a valid and reliable aggregated score to represent the teacher's value orientation (Ennis & Chen, 1993; Chen, Ennis, et al., 1997).

Research on Value Orientations

Many studies have documented the influence of educational value orientations on curricular / instructional decisions in urban, suburban, and rural settings (Chen & Ennis, 1996; Ennis et al., 1992; Ennis & Chen, 1995). Recent research examining value orientations (Behets & Verqauwen, 2004; Gillespie, 2011) continues to focus on their impact on teachers' curricular/instructional decisions. In these studies, a consistent finding is that value orientations form a philosophical basis and rationale for teachers' decision making. In an early study, Ennis et al. (1992) found that most physical education teachers' curricular choices and instructional decisions are consistent with their value orientations, although some of the decisions appear to be intuitive rather than reflective. In addition, Ennis et al. (1992) reported that despite differences in learning focus, DM and LP teachers may blend high priorities for these value orientations with a lesser emphasis on more student or society-focused value orientations. These teachers often are quite willing to accept curricula that support more student-centered value orientations as a means to accomplishing content mastery goals. Likewise, EI and SR teachers might profess student-centered beliefs while emphasizing the importance of performance competence as a physical education goal. In short, these groupings place the value orientations into two value families: one with a content-centered curricular focus; the other a social-centered focus. The fifth value orientation, EI, appears to stand alone emphasizing a balance among subject, student, and societal goals.

Ennis and Chen (1995) also found that value orientations are associated with the educational contexts in which teachers teach. They reported that physical education teachers in rural areas tend to embrace content-centered value orientations (DM and LP), while those in urban settings may be more likely to display a strong SA, SR, or EI value orientation. Ennis and Chen (1995) suggested that it is possible that the beliefs systems, norms, policies, and expectation structures in different educational settings shape teachers' value orientations. Teachers working in urban settings appear more likely to be influenced by the social challenges many of their students face in daily life than their counterparts in rural settings. It is natural for teachers to reinforce the value of responsibility in their instruction to help students overcome barriers to their education due to adversity within their home and school environments.

Researchers have made progress in extending and supporting value orientation research internationally. For example, studies in Australia (Gillespie, 2011), Canada (Banville,

Desrosiers, & Genet-Volet, 2002), China (Chen, Liu, & Ennis, 1997), Flanders (Behets & Vergauwen, 2004), and Taiwan (Liu & Silverman, 2006) have revealed the value orientations' influence on curricular and instructional decisions across the international physical education horizon. Additional studies have extended the value orientation research to preservice teachers (Meek & Cutner-Smith, 2004; Solmon & Ashy, 1995). These findings begin to shed light on value orientation formation during professional training, indicating that physical education teachers' educators value orientations might begin to form as early as they are in the teacher training processes. These research findings have provided a rich evidence base for continuing to study teacher value orientations and their impact on student learning.

The Current Study

Value congruence is a concept developed by Chatman (1989) in studying the fit between personal and organizational values. The theory assumes that when workers' value systems are consistent with that of their organization, their perception about the organization and productivity will improve. A parallel hypothesis argues that when physical education teachers' value orientations are aligned with the values underlying a curriculum, their curricular satisfaction and teaching effectiveness will improve. Likewise, when teachers' value orientations are inconsistent with those espoused in a curriculum, teaching effectiveness will be jeopardized and student learning will be negatively affected (Ennis, 1992).

Previous studies have identified value orientations to be one of the most influential mediators of teachers' curricular and instructional decisions. One area that these studies have not addressed, however, is the value orientation influence on student learning, especially on learning in contexts where outside experts have designed the curriculum. These situations are becoming more frequent as school districts purchase curriculum materials and professional training as part of PEP Grant funding. Findings from previous studies also have suggested that most physical education teachers work in contexts with minimal constraints on their content selections. In other words, with little assistance from curriculum guides or textbooks, teachers typically design curriculum for their programs. Thus their value orientation profile often serves as the foundation for pedagogical decisions, including content choices and instructional styles as confirmed by Ennis and Chen (1995). Jewett, Bain, and Ennis (1995) have suggested that the value orientations also are embedded in external curricular documents for the simple reason that curricular designers, themselves, are influenced by their own value orientations. The congruence or incongruence between the curriculum designers' and teachers' value orientations potentially determines what content is selected, taught, and evaluated (Ennis, 1992). Understanding the tensions between external and internal value orientations can inform our understanding of student learning in these settings. Therefore, the purpose of this study was to determine the impact of value orientation incongruence between physical education teachers and an externally designed curriculum on student learning in a concept-based fitness-centered physical education curriculum.

The study is particularly important at the current time when standards-based and externally designed curricula are influencing curricular development and implementation. The standard-based curricular context demands accountability for students' learning measured against the predetermined expectations designated in the curriculum. In addition, in physical education, the

curricular shift from sport/skill centered to health focused curricula has ignited changes in both standards and goals within physical education curricula as indicated in the recent emphasis on physical literacy (Ennis, 2015). It remains to be determined whether value orientations play a significant role in mediating the impact of an externally designed, standards-based curriculum. Therefore, the specific research question this study attempted to answer was, “To what extent does students’ learning of fitness knowledge in an externally designed curriculum vary due to the consistency or inconsistency between teachers’ value orientations and those espoused by the curriculum.”

Methods

Research Design

The study employed a randomized, pre- and post-assessment design. Seven schools were randomly sampled from schools in a Mid-Atlantic state of the U.S. to teach a new healthful living physical education curriculum. The teachers in the study received extensive professional development (24 hours) in the form of a series of workshops to train them to implement the curriculum and its unique instructional system. Intact classes ($N = 155$) of 6th, 7th, and 8th grades taught by 15 certified physical educators in the seven schools were used as the sampling and analysis unit. With this design, the value orientation was the independent categorical variable in the analysis. Student knowledge gain was the dependent variable.

Curricular Context

The curriculum was developed to teach middle school students scientific knowledge and skills necessary for a life-long active life. It is centered on healthful living knowledge and contained two 20-lesson physical activity units: the *Cardio Fitness Club* and *Healthy Lifestyles*. The curriculum takes a balanced approach to knowledge in which the scientific basis of healthy fitness and nutrition, exercise and its benefits for health and personal responsibility to develop healthful living behaviors are integrated with physical activity tasks. The curriculum guide consists of 40 scripted lesson plans that serve as models for teachers with all levels of training and experiences. In addition the curriculum includes an extensive list of scientific vocabulary and a physical activity guide with additional equivalent activities (similar physical intensity as measured by accelerometers) that can be used to replace those in the lesson plans based on equipment and facility availability and student and teacher interests.

The curriculum is designed to reflect a LP value orientation that emphasizes cognitive inquiry approaches to problem solving. Its structural design is based on the constructivist learning theory where the scope and sequence are arranged to connect with learner prior knowledge and experiences and to facilitate connection between existing knowledge/behavior and new knowledge/behavior. In each lesson, students experience a variety of carefully designed and sequenced physical activities in which they gather personal responses to the activities (heart rate, rate of perceived exertion, steps, etc.), examine the responses in terms of the scientific principles of exercise, and attempt to solve one or more practical age-appropriate exercise problems. The learning goal is for students to develop and confirm the need for physical activity and balanced nutrition, health benefit of a physically active life, and the scientific inquiry process they can use

to enhance their own health through exercise and proper nutrition. The learning tasks are conveyed to students through both teacher instructions and a student workbook or journal in which students collect, record, and analyze personal data, complete data tables and graphs, and solve related physical activity problems. The essence of the LP value orientation is characterized by the instructional methods that the teacher follow within the lesson. Specifically, each lesson opens with an essential question that students should be able to answer at the end of the lesson. Different from the traditional warmup, lesson-focus activities, and cool-down structure, the 5-Es learning cycle strategy (Settlagh, 2000) is used to structure content and learning experiences within intact and meaningfully sequences in each lesson. The 5-Es learning cycle strategy consists of five lesson components, Engagement, Experiment/Exploration, Explanation, Elaboration, and Evaluation, to guide students to the desired lesson outcomes.

In addition, the in-class student workbooks and the pretest and posttest assessment systems form an accountability system for both the teacher and students. In each lesson, students complete a series of tasks each of which requires them to gather personal responses to exercise (data) and apply this information to answer workbook questions. Teachers assist students to understand exercise principles and benefits through explanation and elaboration, enabling them to answer questions correctly using physiological data they gather during physical activity tasks. Finally, the summative assessment consists of a standardized knowledge test, creating an academically oriented environment similar to those in other content areas in which students are expected to demonstrate learning outcomes.

Samples and Setting

In this research the teacher sample included 15 physical educators teaching 155 classes in seven middle schools. The teachers taught a range of 6–13 classes. There were eight males and seven females; 14 were Caucasian Americans while one was of Hispanic descent. On average teachers had about 10 years of teaching experiences (range = 1 year to >15 years). All teachers attended four 6-hour professional development sessions throughout the semester. These sessions followed a consistent format in which (a) the researchers updated the teachers about progress of the study, (b) the teachers discussed problems and solutions they had experienced since the previous session, (c) the researchers explained new lessons to be taught with an emphasis on the 5-Es structures, (d) the researchers demonstrated the new lessons in the gymnasium with the teachers acting as students, and (e) the teachers were divided into small groups, then planned and taught an example lesson to one another. Each session ended with (f) the teacher and the researchers together addressed issues with logistics and content (equipment orders, facility arrangement, conflict with school activities and consistency with health education curriculum).

The student sample included 3,827 students from the 155 intact classes. All middle school grades were represented with 30% of the students in the sixth, 35% in the seventh, and 35% in the 8th grade. Both genders were equally represented with 49% males and 51% females. Table 1 describes student ethnicities. Physical education was taught on an A-B day schedule exclusively. The average lesson length was 48 min, ranging from 40 to 55 min. All schools had a main gymnasium, an auxiliary gymnasium, and ample outdoor space for physical education. All teachers and parents of the students consented to the study before data collection.

Table 1. Student Participants’ Ethnicities

	Arabic	Asian	Black	Hispanic	Mixed	White	Total
Frequency	16	73	499	845	271	2,079	3,783
Percent	.04	1.90	13.20	22.30	7.20	55.00	100.00

Fidelity of Implementation

Lessons taught were observed by trained observers using structured observation forms to ensure fidelity of implementation. A total of 60 lessons were observed for the 6th grade curriculum, 51 for the 7th grade curriculum, and 46 for the 8th grade. A standardized observation field note recording form was used for trained observers to record factual information as lesson events were occurring. A field note example for a lesson consistently taught is as follows:

Engagement:

XXX How closely did the teacher follow the lesson plan during this E?

o At 1:12 students started to arrive in the Gym, grabbed there journals [workbooks] and sat down around the teacher. She told them to open their journals to lesson 14 and started to talk to them about what flexibility means on page 31. [She continued to review] other new vocabularies such as: Dynamic Stretching and the Stationary stretch.

o At 1:15 she started to explain the experiment from the journals on lesson 14. [She focused] on table #2 so students would know what they will have to do during the experiments. She talked to individual teams after she divides them.

[Field notes: XXXX School 7th grade Cardio Lesson 14]

A field note example for a lesson taught with “slippage” from the lesson plan is as follows:

Exploration/Experiment

XXX How closely did the teacher follow the lesson plan during this E?

o Not too closely, teacher used 5 stations (instead of 6): basketball shot, jump rope, medicine ball toss, basketball passing, and kettlebell rows

o Students used task cards at stations and were recording in journals [workbooks] their calories burned based off the chart and RPE [Rate of Perceived Effort]

[Field notes: XXXX School 8th grade Healthy Lifestyles Lesson 10]

Observers also referred to an eight-point checklist and indicated the extent to which the teacher taught key lesson segments (5-Es) consistent with the lesson plan. A preliminary analysis of the observation field notes indicated that most lessons were taught faithfully and that slippage from the curriculum was minimal.

Variables and Measures

Value Orientations. The teachers’ value orientations were measured using the Ennis Value Orientation Inventory—Short Form (VOI-SF, Chen, Ennis, et al., 1997). The VOI-SF consists of

50 items, 10 representing each value orientation. The items are randomly arranged into 10 five-item sets so that each value orientation is represented by one item in each set. A forced-rank scoring system is used for the respondent to assign a score from 1 to 5 to each item in a set. A 5 represents the highest value priority and 1 represents the lowest. The scores are aggregated within each value orientations. Thus, a total possible score of 50 will represent the highest score for a value orientation, while a total possible score of 10 will represent the lowest value orientation score. Table 2 lists a sample of VOI items and their value orientations.

Table 2. Sample VOI-SF Items

VOs	Item
EI	I teach students to try new activities to find ones that they enjoy.
LP	I teach students how to break down movement, skill, and fitness tasks to emphasize the most critical components for learning.
SR	I teach students to work together to solve class problems.
DM	I plan so that students are practicing skills, games, or fitness tasks.
SA	I teach students to take responsibility for their own actions.

* VOs: Value orientations

Student Learning. Students' learning was determined using standardized pre- and post-written assessments of fitness knowledge. Both pretest and post tests were validated through a content-validation procedure where content relevance was determined to be acceptable by a panel of experts in kinesiology, and through a field-test where indices of difficulty and discrimination were computed and determined to be acceptable (Index of Difficulty ranged from 45–60%; Index of Discrimination was above 45% for all test items). The tests were differentiated by grades so that students in each grade took a test relevant for the content for the grade. Table 3 shows sample knowledge test items. The tests consist of items for each grade to best measure student learning in each of the two curricular units as well as to preserve the discriminatory power between grades. Table 4 reports the item numbers in both pre- and posttest for each grade.

Table 3. Sample Questions in Standardized Knowledge Tests by Grades

Grade	Knowledge Domain	Question
6	Overload principle	Sweating, fast breathing, and fast pulse in exercise are indication of (a) overload. (b) sickness. (c) having a heart attack. (d) reduced workload.
7	Target HR zone	To receive optimal benefits, I must exercise at a heart rate intensity of (a) 100% of the maximum heart rate. (b) 50–85% of the maximum heart rate. (c) 220 beat per minute. (d) the resting heart rate.
8	Energy system & Physical Activity	If I want the aerobic glycolysis (AG) system to work effectively during a 20-min speedball game, I must (a) run as fast as I can. (b) sit down and rest fully. (c) be a goalie. (d) use a pacing strategy in the game.

Table 4. Number of Test Questions by Grade

	Pretest (Both Units)	Posttest (Cardio Fitness Club Unit)	Posttest (Healthy Lifestyles Unit)
6th Grade	28	37	39
7th Grade	30	40	37
8th Grade	30	42	38

Student knowledge gain was represented using the residual-adjusted gain scores. The weakness of using the simple difference or change score (posttest score—pretest score) has been

documented to be low-reliable (Baumgartner, Jackson, Mahar, & Rowe, 2016) and unsuitable for research purposes (Thomas, Nelson, & Silverman, 2011) due to many factors such as the floor-or-ceiling effect and pre-post testing correlation. In this study, a residual-adjustment method recommended by Tracy and Rankin Jr. (1967) was used to calculate the knowledge gain scores.

Data Collection

The researchers administered the VOI-SF to the teachers in a professional development workshop. The teachers took about 20 min to independently complete the VOI-SF in a quiet meeting room. They were instructed to reflect on their teaching practices when ranking the items. The researchers addressed all questions from the teachers and followed the VOI-SF data collection protocols.

The pre- and post-instruction knowledge tests were administered to all students as part of the curriculum via Qualtrics, an on-line survey tool. The students were instructed to complete the test as they did for any other tests in the school: they were expected to be quiet, work by themselves, and address all questions to the teacher and/or the research assistant. The pretest was taken before the instruction of the curriculum started and the posttest was taken immediately following the last lesson.

Data Reduction and Analysis

Descriptive statistics were computed to describe teacher value orientations. A standard-deviation based cutoff system for high and low value orientations was used to determine the teachers' value orientation priorities. The cutoff standard was based on an algorithm established from 495 teachers' value orientations (Ennis & Chen, 1995). Researchers have repeatedly reported (Ennis & Chen, 1995) correlations among the value orientations. Specifically, LP is positively correlated with DM ($r = .37, p < .001$), EI has a low but positive correlation with SA ($r = .24, p < .001$), and SA, EI, and SR have moderate, negative correlations with DM and LP ($r = .38-.57, p < .001$). A further reduction was conducted to regroup the teachers with high priority DM and LP value orientations in a Content-Centered category in which their value orientations were consistent with the externally designed curriculum they were teaching. Conversely, teachers with high priority scores in SA and SR were grouped in a Student-Centered category and teachers with a high priority in EI were grouped in a Balanced category. These latter two categories were considered to be inconsistent with the curriculum (Ennis et al., 1992).

Students' correct responses to a knowledge test item was assigned 1 point while an incorrect responses was assigned a 0. A percentage correct score was calculated for each student on the pretest and posttest. The gain scores were calculated using the raw score procedure recommended by Tracy and Rankin (1967) in the following specific steps. First, a regression was conducted at the individual student level with the pretest percentage scores as the independent variable and posttest percentage scores as the dependent variable. Second, individual student gain scores were calculated by subtracting the sum of the product of regression slope and the mean pretest score and the constant from the posttest scores. Third, individual students' gain scores were aggregated at the class level. Lastly, the class means were grouped by teachers' three value orientations for further analysis.

The unit of statistical analysis was the class means of the knowledge gain scores that were used as the dependent variable. The three value orientation categories were used as the independent variables in analyzing students' knowledge gain. Class means for the teachers in each of the three value orientations were grouped together to reflect student learning achievement under the particular value orientation influence. A one-way ANOVA was employed to determine value orientation impact on student knowledge gain.

Results

Teacher Value Orientations

Table 5 reports descriptive statistics of the value orientations ($n = 15$). Among the 15 teachers, four held a high priority DM orientation (above the cutoff 38.59), one LP (above the cutoff 35.51); four were with a high priority on SA (above the cutoff 36.13), one on SR (above the cutoff 39.87), and five showed a high priority on EI (above the cutoff 32.32). These high priority value orientations placed five teachers and their students in each of the three value categories: Content-Centered, Student-Centered, and Balanced.

Table 5. Descriptive Statistics for Value Orientations

	N	Minimum	Maximum	Mean	SD
DM	15	22.00	48.00	33.13	6.81
LP	15	19.00	37.00	27.93	5.27
SA	15	21.00	40.00	31.73	4.92
EI	15	18.00	37.00	28.80	5.48
SR	15	19.00	46.00	28.40	6.86

Table 6. Descriptive Statistics of Knowledge Gain Scores (Class Means) by Teacher Value Orientations (VOs)

	N (155)	Pretest ^a M/SD	Posttest ^a M/SD	Gain ^b M/SD	Min/Max	Effect Size ^c (Cohen's <i>d</i>)	95% CI
Content VO (DM & LP)	62	.34/.16	.54/.18	.18/.08	.01/.37	1.17	.16–.20
Student VO (SA & SR)	42	.34/.16	.54/.18	.16/.06	.07/.30	1.17	.14–.18
Balanced VO (EI & Neutral)	51	.34/.16	.56/.18	.19/.09	-.01/.35	1.29	.17–.22
Total	155	.34/.16	.54/.18	.18/.02 ^d	-.01/.37	1.17	.17–.19

^a Percent correct score; ^b Residual gain score; ^c Effect sizes are for the differences between the pretest scores and posttest scores; ^d The mean and standard deviation for the total gain are based on the three gain scores by VOs above (thus $n = 3$) rather than on the residual adjusted gain scores due to the fact that the grand mean for residual adjusted scores will be zero.

Value Orientation Impact

To determine the impact of value orientations on the students' learning, class means of the knowledge gain scores were analyzed with their teachers' value orientations as the independent variable. Table 6 reports class means of student knowledge gain scores by their teachers' value priorities. There were 62 intact classes taught by teachers in the Content-Centered perspective, 42 by those in the Student-Centered perspective, and 51 by teachers in the Balanced value perspective. Overall, the students gained 18% knowledge as a group. Cohen's *d* for all value

orientation groups indicated sizable knowledge growth between the pretest and posttest regardless of the teachers' value orientations.

The Levene's test for homogeneity of variances indicated the equal variance assumption was not violated (Levene's statistic = 2.46, $p = .09$). The residual-adjusted gain scores ranged from 16% (Student-Centered value orientation) to 19% (Balanced value orientation) further substantiating the knowledge gains observed in the differences between the pretest and posttest scores. The subsequent one-way ANOVA revealed no statistically significant differences in the knowledge gain scores among the three value categories ($SS_{b/w\ groups} = .02$ with $df = 2$, $MS = .01$, $F = 1.94$, $p = .15$). The results suggest that the teachers' different value orientations had little impact on student learning from the curriculum.

Curriculum Efficacy

The curriculum efficacy can be observed in the data in the entries in Table 6. The mean residual gain score from the three VOs groups was 18%. The mean effect size was 1.71. The large effect sizes solidly established the efficacy of the curriculum in helping middle school students learn fitness-related knowledge.

Discussion

The purpose of this study was to determine the impact of value orientation incongruence between physical education teachers and an externally designed curriculum on student learning in a concept-based fitness-centered physical education curriculum. The findings indicate that teachers' high priority value orientations did not influence students' knowledge gain when learning the externally designed physical education curriculum. The finding helps address a critical concern when implementing this externally-designed, standards-based curriculum. That is, will teachers' individual educational beliefs and values lead them to change the curriculum resulting in infidelity or content slippage? Our data seem to suggest that when the curriculum is well designed with explicit content structure *and* a compatible instructional system, the impact of diverse and contradictory teacher value orientations on student learning may be minimal.

From a curricular perspective, the finding shows that the curriculum appeared to be the primary factor that influenced student learning. The content in the curriculum and its organization for effective delivery (the 5-Es learning cycle structure) allowed teachers to implement the curriculum with fidelity with or without a high priority consistent value orientation. As Sun, Chen, Zhu, and Ennis (2012) observed, a coherent curriculum can be so powerful that its impact will reach the intended learners and lead them to effective knowledge construction regardless of individual teacher beliefs.

It is apparent that there were incongruences between the teachers' value orientations and the espoused curriculum value orientations. The data clearly show that only one teacher held a high priority LP orientation, matching the value orientation of the curriculum. The value incongruence, however, did not seem to prevent the teachers with other high priority value orientations from implementing the curriculum with fidelity, holding themselves and their students accountable for learning. It seems reasonable to speculate that when physical education

teachers have access to a well-structured and sequenced disciplinary-oriented curriculum, they will value and teach fundamental disciplinary knowledge to their middle school students.

Ennis et al. (1992) noticed that high priority EI and SR teachers experienced difficulties organizing and teaching content consistent with their EI and SR value orientations, possibly due to a lack of direct teacher training to implement these value orientations. It seems in the Ennis et al. (1992) study, a fitness knowledge centered LP curriculum with a logical internal structure coupled with a strong accountability system for both students and the teacher provided a curricular “attractor” (Ennis et al., 1992, p. 44). The attractor may become the central value to which teachers attached their personal values in teaching physical education. The above reasoning suggests a possibility that a well-designed concept-based fitness education curriculum may embed multiple valued perspectives, activating teachers’ value orientations regardless of the inconsistency of the curriculum with their value orientation priorities.

It is evident that the curriculum can mediate potential incongruence between the value orientations. Specifically, the curriculum was able to attract or encourage all the teachers to conform to teaching the LP-oriented curriculum faithfully as manifested in student learning achievement, thus confirming the mediating power of the curriculum to transcend teachers’ value orientation profiles. Although the curriculum is designed to convey the LP value orientation with an emphasis on constructivist learning through problem solving, it also includes many learning opportunities valued in other value perspectives. For example, learning how to exercise using scientific principles (progressive overload, specificity, FITT) to develop one’s personal fitness and health can be a very personal and highly valued experience for students. Thus, the science-based curriculum provides a context for students to explore physical activities that are personally meaningful. Clearly, teachers preferring a SA and/or EI orientation (Jewett et al., 1995) appreciated opportunities for their students to engage in these personally meaningful tasks. Likewise, cooperative, socially constructivist learning strategies adopted throughout the instructional system, such as “think-pair-share,” are consistent with the SR value orientation. On this aspect, the teachers seemed to be able to find meaning and support for their beliefs within the curriculum.

Evidence from the data and the above reasoning lead us to reflect on the mechanisms that underlie this externally designed, science-enriched curriculum. Because teacher value orientations are individualized belief systems, they are stable traits of a teacher and a curriculum (Eisner & Vallance, 1974; Ennis & Hooper, 1988). Within a discipline, however, the value system can be assumed to attach to the core content of the discipline. Teachers may be inherently supportive of teaching disciplinary content because each value orientation grows out of the disciplinary knowledge and skills. In this instance, differences in the value orientations might conform to a belief about how the learned disciplinary knowledge will function to enrich a student’s life. A DM teacher might believe it enriches a student’s life through proficiency in executing a motor skill or understanding a knowledge component when students perform tasks in a physical activity setting. Conversely, a SA teacher might argue that it enriches students’ lives by helping them apply knowledge and skills to accomplish personal goals in physical activity. In short, the evidence from this study raises a possibility that a well-designed physical education curriculum can bring teachers with diverse value orientations together to focus on teaching standards-based, disciplinary content. The evidence also suggests that this curriculum can

mediate the influence of diverse value orientations, enhancing students' disciplinary knowledge in physical education.

Taken together, the finding is consistent with those from value congruence studies. As Youngs, Pogodzinski, Grogan, and Perrone (2015) summarized, for example, person-organization value congruence is most likely to be associated with positive attitudinal outcomes. When an organization shares employees' value system, the employees frequently demonstrate satisfaction toward their job, commitment toward the organization's goals, and good citizenship in the organization. Our results seem to echo these findings in that although the teachers demonstrated value incongruence with the LP value orientation espoused in the curriculum, this incongruence did not affect their instructional behavior as a professional educator. Instead, they taught the curriculum with fidelity, permitting their students to learn the disciplinary content. Research based on the value congruence theory is needed to further clarify the mechanisms underlying the teaching of a value-incongruent curriculum in physical education. These studies are particularly needed at this moment of curricular transition from a sport skill centered physical education to a concept-development and behavior-change approach to physical literacy (Society of Health and Physical Educators, 2014).

The findings deepen our understanding of value orientations' impact on curriculum fidelity at a time when physical educators are confirming the value of lifelong healthful and active living. A strength of this study lies in examining the five "traditional" value orientations with student learning as a common denominator. The findings reported here help us clarify the role of value perspectives in enhancing student learning.

Divergently, the findings also challenge researchers to consider value orientations from multiple learning perspectives. According to Ennis (1992), teachers with different value orientations hold different curriculum goals that guide their curricular and instructional decisions and practices. In this research, content-centered goals appeared to be summative outcomes of a disciplinary-oriented physical education curriculum, while student-centered goals such as self-actualization or social responsibility could be considered formative outcomes to promote positive behavior during the learning processes (Ennis & Chen, 1993). Without including formative outcome variables, we cannot determine the extent to which student-centered values can *optimize* learning experiences to yield positive change (summative goals). One limitation of this study is the lack of evidence for the formative learning outcomes that could document learner efforts, motivation, cooperation, respect for peers, teachers and content, and emotional feelings toward the learning process. Teachers whose value priorities were on EI, SA, and SR might have encouraged these outcomes in their instruction.

In conclusion, this study generated convincing evidence to suggest that value orientation impact on student learning may be mediated by an externally designed, standards-based physical education curriculum. These findings advance our understanding of the role teacher value orientations play in student learning of fitness knowledge. However, the findings, especially the masking effect of the curriculum for congruent and incongruent value orientations, challenge us to conduct additional research to enhance our understandings of the value orientation influence on formative and summative learning outcomes.

Although the findings about the power of the curriculum are compelling, it is necessary to caution the readers that the findings are from a randomized, controlled intervention study. As study participants, the teachers were bound by the terms imposed as well as enjoyed tremendous support by the research team. The findings do not imply that when these research conditions are removed, the curriculum will continue to mask the value orientation impact.

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