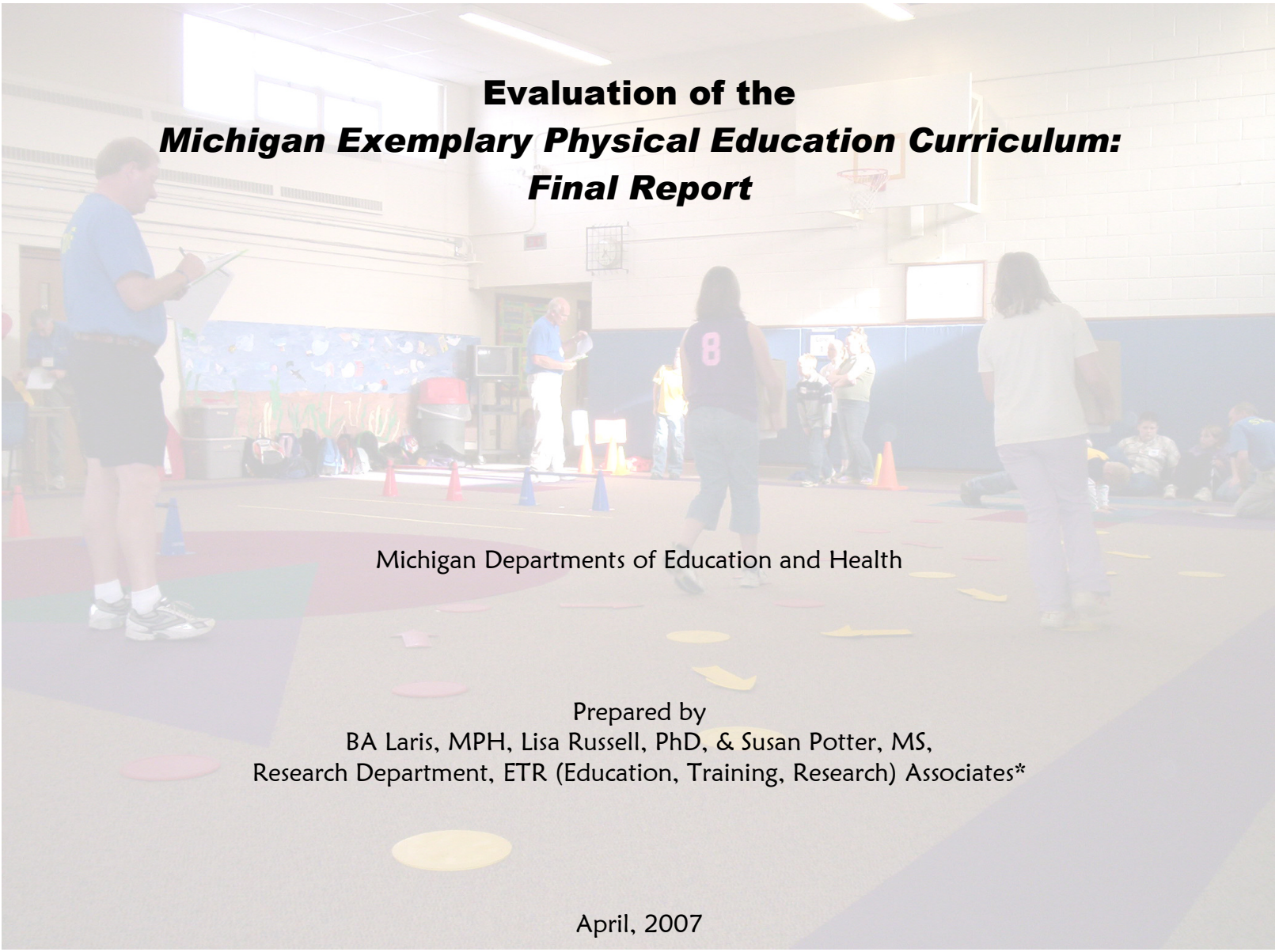

Evaluation of the *Michigan Exemplary Physical Education Curriculum: Final Report*

Michigan Departments of Education and Health

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Executive Summary

Overview

As compared to their peers, the youth of Michigan exhibit elevated rates of several health risk factors (physical inactivity, obesity, elevated cholesterol and high blood pressure). They also do not appear to be acquiring the level of motor skills necessary to enable physically active lifestyles. Research has shown that physical inactivity is the most common risk factor for chronic disease. To address this, the Michigan Departments of Education and Health have supported the development of the Exemplary Physical Education Curriculum (EPEC). EPEC is a program designed to enhance fitness levels; motor skills; and knowledge, personal, and social skills to equip students to be active for life. Over time, increased competence in these skills is postulated to lead to improved confidence and fitness levels.

The Michigan Physical Education Evaluation (MPEE) was a study designed to examine the extent to which children who are exposed to Michigan's Exemplary Physical Education Curriculum in elementary school are more physically educated for life's demands compared with children who are exposed to other PE curricula. In this study, indicators of physical education level included assessments of personal/social skills related to physical activity, motor skills function and form, physical activity, and fitness.

Methods

The Michigan Departments of Education and Health requested technical assistance in evaluating the effectiveness of EPEC relative to a variety of curricula provided to students in standard physical education (PE) curricula. ETR Associates and the Centers for Disease Control and Prevention, Division of Adolescent and School Health or CDC-DASH provided technical assistance to complete this evaluation. Schools were selected to participate in the evaluation and matched (8 teaching EPEC and 8 teaching standard care physical education) based on the inclusion of grades 4, 5, and 6 in the school and ten additional demographic characteristics. All 16 schools agreed to be part of the evaluation. By request, the physical education teacher in each school actively partnered

in the MPEE and assisted in coordinating, scheduling, and completing evaluation activities at the school site.

The goal of the MPEE outcome evaluation was to measure the effectiveness of EPEC at improving student psychosocial precursors and motor skills, physical activity, and fitness outcomes. The goal of the process evaluation was to assess the level and quality of EPEC implementation and participant (teacher and student) reaction.

Evaluation Design

The evaluation design of EPEC was a quasi-experimental design with two conditions, including both outcome and process components. One condition consisted of eight schools who were high implementers of EPEC; the second condition was the comparison condition, which consisted of eight schools that did not use EPEC. In each school, a cohort of 4th graders and a cohort of 5th graders were followed for two academic years. A pretest-posttest-delayed posttest design was used to examine student outcomes over time.

Results

Psychosocial Outcomes

Compared with same-grade students receiving alternate PE curricula:

- 4th grade cohort students exposed to EPEC reported greater levels of *motor skill specific self-efficacy.*
- 4th grade cohort students exposed to EPEC reported lower levels of *enjoyment of physical education class*. This effect was significant only at the last assessment point (end of their 5th grade year).
- 5th grade cohort students exposed to EPEC reported greater levels of *physical activity knowledge*. This positive effect was significant at the first follow-up assessment, but was not sustained over the following year (during 6th grade).

Motor Skills Outcomes

Compared with same-grade students receiving alternate PE curricula:

- Students exposed to EPEC demonstrated higher skill levels over the two year study period for all three motor skills assessed - *Forehand Strike*, *Lift and Carry Posture* and *Leap*.

Physical Activity Outcomes

Compared with same-grade students receiving alternate PE curricula:

- 4th grade cohort students exposed to EPEC reported a significantly greater number of *total minutes of physical activity*.
- 4th grade cohort students exposed to EPEC reported using a significantly greater amount of *energy during physical activity* (as measured by the Metabolic Equivalent Task Score - MET).

Fitness Outcomes

- There were no significant effects for abdominal strength, arm strength, or lower body flexibility measures (curl-ups, push-ups, and sit and reach respectively).
- Overall, there was no significant intervention effect for aerobic capacity (VO2max) as measured with the PACER. At one measurement time, the 4th grade cohort exposed to EPEC showed a significantly greater capacity, but this was not sustained over the two years and was not observed in the 5th grade cohort.

Limitations

As with all applied research projects, there are likely to be limitations to the resulting data. Because we used a quasi-experimental design, we were able only to control for measured differences between study conditions; other uncontrolled differences related to outcomes may have existed. Some study measurement tools presented challenges (e.g. self-report data that could not be verified empirically, given finite resources, and testing new motor skill assessment tools for this population without the benefit of published gold standard measures). However, sample sizes were relatively large, retention rates were good and the study does provide data on short-term impact of one and two years of exposure to a longer program.

Conclusion

This evaluation demonstrates that EPEC appears to represent a new generation of motor skill focused curricula in which motor skill acquisition and performance occur in the context of learning both individual and team physical activities. These gains in skills may ultimately enable life long fitness.

It is the recommendation of the US Centers for Disease Control and Prevention that all children pre-kindergarten through 12th grade receive: School programs—including quality, daily physical education; health education; recess; and extracurricular activities—that help students develop the knowledge, attitudes, skills, behaviors, and confidence to adopt and maintain physically active lifestyles, while providing opportunities for enjoyable physical activity. (CDC, 2006)

"It has been hypothesized that poor motor performance and/or poor social skills lead to exclusions from games, creating a vicious cycle of decreasing participation, decreasing competence, a deterioration of self-worth and increasing social maladjustment." (Bluechardt, Wiener, & Shepard, 1995)

Introduction

CDC Evaluation Technical Assistance Program

In 1988, the Centers for Disease Control and Prevention (CDC) established the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), within which it created the Division of Adolescent and School Health (DASH). The Division of Adolescent and School Health (DASH) seeks to prevent the most serious health risk behaviors among children, adolescents and young adults. One approach that DASH uses is to conduct evaluations of innovative school-based programs, policies, or initiatives for the prevention of childhood obesity to provide information about their impact.

ETR Associates conducts in-depth evaluations as technical assistance (TA) to state and local education and health agencies that request technical assistance to evaluate program or policies. ETR Associates serves as a technical assistance provider through a TA contract with CDC (#200-2002-00800). ETR's role in this partnership includes designing the evaluations with selected sites; conducting all aspects of the evaluation; and helping to prepare reports and manuscripts for dissemination.

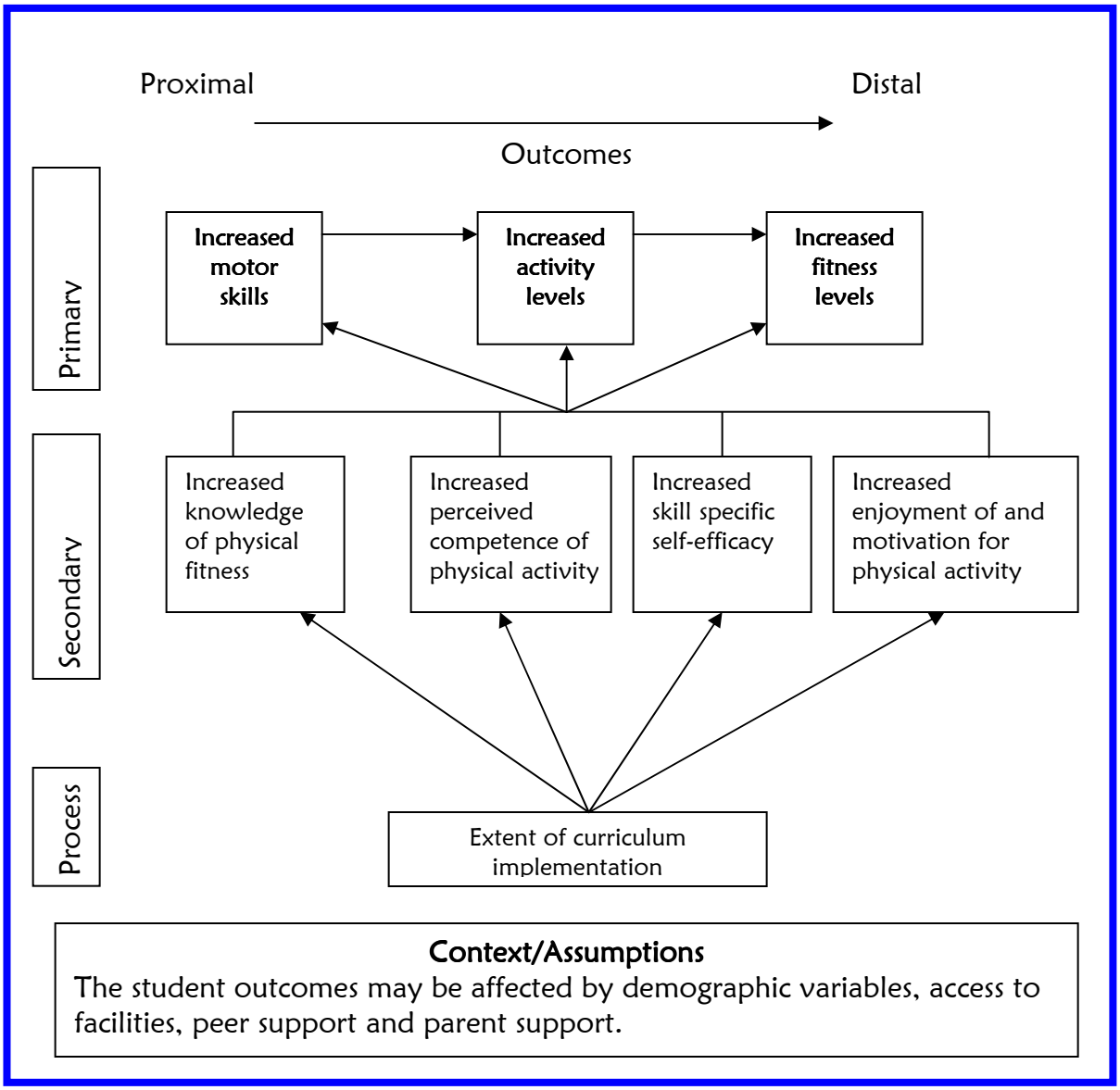
In the fall of 2002, the Michigan Department of Education requested technical assistance in evaluating the effectiveness of the Exemplary Physical Education Curriculum (EPEC). In December 2002, DASH staff and ETR evaluation team leaders visited representatives of the Michigan Department of Education and the Michigan Fitness Foundation to learn more about the EPEC program and to help design and implement an evaluation of EPEC.

The Michigan Physical Education Evaluation

As compared to their peers in other states, the youth of Michigan exhibit several elevated health risk factors (physical inactivity, obesity, elevated cholesterol and high blood pressure). They also do not appear to be acquiring the level of motor skills necessary to enable physically active lifestyles (CDC, 2003). Research has shown that physical inactivity is the most common risk factor for chronic disease (USDHHS Dietary Guidelines, 2005). To address this, the Michigan Departments of Education and Health have supported the development of the Exemplary Physical Education Curriculum (EPEC). EPEC is a program designed to enhance physical activity knowledge; personal and social skills; motor skills; and physical activity and fitness levels to equip students to be active for life. Over time, increased competence in these skills is postulated to lead to improved confidence and fitness levels.

EPEC is grounded in the belief that a planned and sequential physical education curriculum that offers students scientifically-defensible and socially-relevant objectives equips them with the knowledge and skills required to live a healthy life (Michigan's EPEC, 2000). EPEC bases physical education instruction on clearly defined objectives that build skill levels with each consecutive grade. The introduction of this curriculum into schools and districts changes how physical education (PE) is taught, including changes in the scope and nature of physical education curriculum delivery. PE teachers focus on specific and sequential learning progressions for the development of psychosocial and motor skills as well as on-going skill assessments to insure that the curriculum builds a broad physical education foundation for students.

The Michigan Physical Education Evaluation was a study designed to examine the extent to which children who are exposed to EPEC in elementary school are more physically educated for life's demands compared with children who are exposed to other PE curricula. The relationships between exposure to EPEC and short-term and long-term outcomes are described in the logic model that follows.



To longitudinally measure student-level changes in behavior, knowledge, affect, and skills a quasi-experimental pretest-posttest-delayed posttest design was used including 16 schools. The primary outcomes of interest included: 1) increased motor skills; 2) increased physical activity levels; and 3) increased fitness levels. The secondary outcomes of interest included knowledge and psychosocial factors: 1) increased knowledge about the benefits physical activity; 2) increased perceived competence in physical activity; (3) increased skill specific self-efficacy and (4) increased enjoyment of, and motivation for, physical activity. Known covariates of physical activity were also assessed. These

covariates included positive social support and peer norms for physical activity, including increased communication with parents about physical activity, access to facilities/resources that promote physical activity, and demographic variables. The process evaluation focused on variables measuring how EPEC is implemented including: how many lessons are taught, how many students are reached, extent to which all curriculum materials are used, and satisfaction with the curriculum. Indicators of program outcomes are described in the specific research questions that follow.

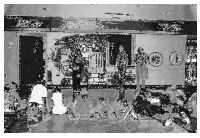
Evaluation Goals and Questions

The evaluation of Michigan's Exemplary Physical Education Curriculum (EPEC) featured outcome and process components. The goal of the *outcome* evaluation was to measure the effectiveness of EPEC in answering the evaluation questions. These objectives were selected as the primary outcomes because they represent important milestones and were hypothesized to lead to changes in student knowledge and skills—the program outcomes. The goal of the *process evaluation* was to assess the level and quality of EPEC implementation (what, how much of, and how well the curriculum was implemented), coverage (how many students are reached), fidelity (the extent to which the curriculum was implemented as designed), and reaction (participants' reaction to and satisfaction with the curriculum).

Evaluation Questions
Student Psychosocial Outcomes
Does EPEC affect students' skill specific self-efficacy?
Does EPEC increase students' physical activity competence?
Does EPEC increase students' knowledge of the benefits of physical activity?
Does EPEC increase student's interaction with parents through homework sharing activities?
Student Motor Skill Outcomes
Does EPEC increase students' locomotor and object control motor skills (as indicated by leap and overhand strike, respectively)?
Does EPEC improve students safety (as indicated by lift and carry posture)?
Student Physical Activity Outcomes
Does EPEC motivate students to be physically active?
Student Fitness Outcomes
Does EPEC improve student fitness levels (aerobic fitness, muscle strength, and flexibility)?
Teacher Behavior (process)
To what extent do teachers implement EPEC?

Evaluation Design

The evaluation design of EPEC was a quasi-experimental design with two conditions, including both outcome and process components. One condition consisted of eight schools who were high implementers of EPEC (reported using 50% or more of the EPEC lessons in the EPEC Implementation Survey - February 2003). The second condition was the comparison condition, which consisted of eight schools that did not use EPEC. In each school, a cohort of 4th graders and a cohort of 5th graders were followed for two academic years. A pretest-posttest-delayed posttest design was used to examine student outcomes over time.



Methods

School Selection Process

The Michigan Physical Education Evaluation sought to examine school level effects of the use of EPEC. Sample size was determined through power calculations (see Appendix A for more details). The school sample selection was then completed using a three step process. The selection of schools was based on the need to balance the intervention and comparison groups on a number of factors that could bias student outcomes. To facilitate a two-year study of a cohort of 4th graders and a cohort of 5th graders, the 16 study schools were restricted to schools that included grades 4, 5, and 6. The schools were selected based on ten basic criteria (see Table 1.1). Eight schools teaching EPEC and eight schools teaching a standard physical education curriculum were invited to participate on a voluntary basis.

Table 1.1: Matching Criteria Reviewed to Select Study Schools

Characteristics Reviewed for Each School
▸ Region within Michigan (http://www.michigan.gov/mde)
▸ School size and grade levels taught (http://www.michigan.gov/mde)
▸ Physical education curriculum used to determine study arm classification (EPEC sales and training records, EPEC implementation survey, school-level telephone interview)
▸ Number of hours of PE required (school-level telephone interview)
▸ PE instructor qualifications (school-level telephone interview)
▸ Proportion of students eligible for free lunch (http://www.michigan.gov/mde)
▸ Standardized test scores (Michigan Education Assessment Program - http://www.michigan.gov/mde/0,1607,7-140-22709_31168---,00.html)
▸ Proportion of economically disadvantaged (Based on reported median income - http://www.census.gov/census2000/states/mi.html))
▸ District expenditure per student (http://www.michigan.gov/mde)
▸ General indicators (population size and urbanicity) (http://www.census.gov/census2000/states/mi.html)

In step 1 of the process, a pool of eligible elementary schools in Michigan that include the 4th, 5th, and 6th grade was generated. A pre-intervention implementation survey was conducted with all physical education teachers who had purchased and/or

been trained in EPEC. The survey asked teachers to indicate how extensively they were using the curriculum. The survey results led to the identification of a pool of teachers who taught 50% or more of the EPEC lessons (high implementers).

In step 2, schools which were identified as high implementers were invited to take part in the study via a phone call and letter. The letters were sent from the Michigan Department of Education (see Appendix B for recruitment materials) to the physical education teacher and the principal. The phone calls were followed by letters to the PE teachers from the Department of Education. During the initial telephone calls, information was collected to better understand the PE program at each school (see Appendix B). Michigan Department of Education staff made these initial telephone calls, and the MPEE project coordinator made the follow-up calls. Upon agreement to participate in the study, school principals were asked to sign a Memorandum of Understanding (See Appendix B).

In step 3, after intervention schools were identified, comparison schools were then identified by matching on the pre-determined criteria. Schools were matched on the demographic characteristics of the intervention and comparison schools. Table 1.2 describes several important demographic characteristics of the schools that agreed to participate in the evaluation study.

The participating school sites were located in four general regions of Michigan. These regions were Southern Michigan (2 schools), Detroit Metropolitan area (4 schools), Northern Michigan (6 schools), and the Upper Peninsula of Michigan (4 schools). Under the above mentioned constraints of site selection, these sites are a good representation of the diverse make-up of the population of the state. There are large urban schools, small rural schools and medium-size town/suburban schools.

Table 1.2: Demographic Characteristics of Selected School									
School	District	Region *	Grades served*	Enrollment*	4th Grade cohort*	5th Grade cohort*	% Econ disadv¤	MEAP % passing¤	Student: teacher ratio*
George D. Gilbert School	Gwinn Area Community Schools	1	K-6	284	39	39	42.8	5.3	15
Lake Linden School	Lake Linden-Hubbel Schools	1	PreK-6	289	40	36	46.7	61.6	15.8
K. I. Sawyer School	Gwinn Area Community Schools	1	K-6	483	59	81	54.1	61.9	16.3
Stephenson School	Stephenson Area Schools	1	4-6	204	59	59	51.5	51	14.6
Atlanta Community School	Atlanta Community Schools	2	K-6	252	35	36	70.0	47.2	14.2
Wilson School	Alpena Public Schools	2	K-6	214	31	37	48.6	48.3	18.4
Lewiston School	Johannesburg-Lewiston Schools	2	K-8	244	42	29	50.2	57.8	16.6
Buckley	Buckley Community Schools	5	K-6	247	33	33	49.4	35.4	15.3
Bertha Vos	Traverse City Area Public Schools	5	K-6	214	38	38	19.3	78.6	17
Long Rapids	Alpena Public Schools	2	K-6	130	23	29	40.3	58.5	15.4
Garfield School	Livonia Public Schools	6	K-6	423			21.0	52.2	16.2
Eureka Heights School	Taylor Public Schools	6	K-6	411	74	64	39.9	63.9	22.7
Monnier	Detroit Public Schools	6	K-6	410	75	75	86.0	80.9	15.8
Myers	Taylor Public Schools	6	K-6	350	60	60	75.4	20.7	13.5
Central Elementary School	White Pigeon Community Schools	3	K-6	389	75	80	48.5	50.7	15.8
Centreville Elementary School	Centerville Public Schools	3	K-6	454	71	77	41.6	60.0	16.5

*http://www.mcgi.state.mi.us/mischoolinfo/ accessed May, 2003

¤*http://www.state.mi.us/mde/cfdata/k12db/availdata.cfm?psource=MDEWeb accessed May, 2003*

Study Conditions

All 4th and 5th graders in participating schools received their physical education curriculum as part of their regular school schedule. In both study arms, physical education instructors taught physical education two to three days each week for about 40 minutes at each session.

Intervention Curriculum: EPEC is a curriculum designed to enhance fitness levels, motor skills, activity-related knowledge, and personal and social skills through a sequence of teaching/learning progressions that take students from entry-level ability through competent skill application. Over time, increased competence in these skills is postulated to lead to improved confidence and fitness levels. EPEC was designed to fit with the most common Michigan physical education class time frame of 2 days per week for 30 minutes each time. The curriculum includes 51 lessons per grade covering physical fitness, motor skills, activity related knowledge, and personal and social skills. Individual lessons focus on introducing content, reinforcing, reviewing and practicing content, and assessing content progress.

Comparison Curricula: The comparison schools taught a standard care physical education curriculum. Physical education teachers in the comparison schools taught approximately 48 lessons each year using a combination of educational resources including their school curriculum, personal experience, resource books, and lesson plans obtained during conferences.

Evaluation Sample

All 4th and 5th grade students in the selected schools were invited to participate in the study activities (student survey, Self-Administered Physical Activity Checklist, fitness assessments, and motor skill assessments). Students with a pre-existing and diagnosed physical or medical condition that might cause health problems during the motor skills and fitness tests (e.g., uncontrolled asthma) were identified by school personnel or parents and were excluded from the study. No additional students were added to the cohort during year two of the study.

The total sample size at baseline was 1464 students, of which 760 were intervention and 704 were comparison students. At the final data collection time, the total sample consisted of 1195 students, 600 in the intervention and 595 in the comparison group. Table 1.3 provides an overview of the measurement periods for each grade level.

Table 1.3: MPEE Student Sample for each Measurement Period

Grade Level at Pretest	Pretest (T1) Fall 2003	First Posttest (T2) Spring 2004	Delayed Posttest (T3) Fall 2004	Delayed Posttest (T4) Spring 2005
4th grade cohort				
Intervention Sample Size	N=363	N=351	N=300	N=285
Comparison sample size	N=351	N=335	N=302	N=290
5th grade cohort				
Intervention Sample Size	N=397	N=375	N=331	N=315
Comparison sample size	N=353	N=337	N=312	N=305
Total Sample	**N=1464**	**N=1398**	**N=1245**	**N=1195**
Retention Rate		**96%**	**85%**	**82%**

Student demographic characteristics. Baseline characteristics of the students completing all data collection instruments are provided in Table 1.4. The majority of the students were white. The sample included slightly more males than females. The mean age of the 4th and 5th grade students was 9.8 years, ranging from 8 to 12 years.

Table 1.4: Baseline Demographic Characteristics of Students Who Participated in the MPEE by Study Condition (n=1464)

	Gender		Race					Age
	Female %	Male %	White %	African American %	American Indian %	Mulit-racial %	Other %	Years
Intervention	50%	50%	68%	16%	7%	6%	3%	Range: 8-12 Mean:9.8
Comparison	48%	52%	76%	11%	5%	5%	3%	Range: 8-12 Mean:9.8

Instrumentation

A number of different data collection instruments were used during the evaluation (see Table 1.5 for summary). Some instruments were drawn from existing tools, and others were developed expressly for this evaluation. Data collection with students focused on outcome and covariate measures while data from teachers were focused on curriculum process information. Copies of the study instruments are included in Appendix D.

Table 1.5: Evaluation Instruments Used in the Michigan Physical Education Evaluation				
Instrument	**Instrument Sources**	**Constructs**	**Time Required**	**Participants**
Student Data				
MPEE Student Survey	• Amherst Health and Activity Study (AHA) Student Survey Sallis (1999) • California Healthy Kids Survey • ETR/EPEC Team • Youth Risk Behavior Survey	• Demographics • Motor skill efficacy • Psycho-social skill efficacy • Physical activity perceived confidence • Knowledge of benefits of PA • Interaction with parents • Peer support • Community demographics/access • PE enjoyment • PA enjoyment and participation • TV watching • Satisfaction with PE class	30-40 minutes	All cohort students
Self-Administered Physical Activity Checklist (SAPAC)	• CATCH (Sallis, 1993)	• Type of physical activity participation yesterday • Duration of activity • Intensity of activity	30-40 minutes	All cohort students
Motor skill assessments (forehand strike, leap, lift and carry posture)	• Michigan Fitness Foundation • NASPE PE standards	• Motor skill form • Motor skill function	30-45 minutes	All cohort students
Fitness tests (PACER, sit and reach, curl-up, push-up)	• Fitnessgram, Coopers Institute (2001)	• Fitness activity completion	30-45 minutes	All cohort students
Staff Data				
Teacher Survey	• ETR/EPEC Team • CATCH (McKenzie, 1994)	• Level of training • Curriculum used • Format and content of classes • Level of support from school stakeholders.	Approximately 20 minutes per survey	All PE teachers
Teacher Implementation log	• ETR/EPEC Team • CATCH (McKenzie, 1994)	• Type of lesson, content, and format • Lesson activities (time spent and factors influencing implementation) • Curriculum modifications • Completeness of curriculum implementation	Approximately 5-10 minutes per lesson	All PE teachers

Pilot testing. All student data collection instruments and procedures underwent two consecutive pilot tests with schools not involved in the main portion of the study to test the feasibility of procedures, the readability, and appropriateness of the items and wording. The first pilot was conducted with 4th and 5th grade students at an elementary school located in West Michigan. Following the debriefing of both students and data collectors, it was found that no changes were suggested for the student survey or the SAPAC; however changes in the logistics of the physical assessments were needed. The two recommended changes to the physical assessments were: streamlining routing of student assessment rubrics and pre-printing names; and combining different fitness and motor skill assessments to allow the station sequence to fit in the gym and to fit into the 30-minute time period. Within this context, it was determined that only one class of 25-30 students at a time could be accommodated in a typical elementary gymnasium.

After making the necessary adjustments to the data collection procedures, a second pilot test was conducted with 6th graders at a middle school in Western Michigan. These students participated in the fitness and motor skill activities. The pilot test verified that the new procedures enabled data collection activities to be implemented within the allotted time.

Human Subjects Protection

Study protocols and informed consent procedures were approved by two human subjects protection committees, the Institutional Review Boards at ETR Associates and at the Centers for Disease Control and Prevention.

Consistent with local practice in the study schools, we used passive parental permission for all student measures (Appendix C). The parent permission forms were distributed by the school level physical education teacher through the classroom teachers. The forms explained the voluntary nature of the study as well as all procedures and data collection activities. Youth with parent permission were also asked to assent to participation in the study (see Appendix C for copies of the assent forms). To ensure students had the information they needed to give their assent, the student assent form

was read aloud while students read along. Students were then given an opportunity to ask questions of the data collector before providing their assent.

Data Collection

The evaluation was conducted during the 2003-2004 and 2004-2005 school years. ETR coordinated and collected the evaluation data. Data were collected from both students and adult physical education teachers. To measure student physical activity levels, a self-report of physical activity was administered to students two times during each school year (four times total throughout the course of the evaluation). To measure student levels of change in fitness and motor skills, students were observed during physical education classes in the fall and spring of both years of the study. Highlights of the data collection methods are described below.

Student pretest-posttest surveys. To assess changes in the knowledge, attitudes, and behaviors of students receiving the curriculum, data were collected using paper-pencil surveys administered on a pretest-posttest-delayed posttest basis. Students completed the pretest during class time at the beginning of the 2003-04 school year (T1). Posttests were administered in the following sequence: the initial posttest (T2) was completed at the end of the 2003-04 school year, a delayed posttest (T3) was completed in the fall of 2004, and another delayed posttest (T4) was completed in the spring of 2005. The data were collected by contracted data collectors hired and trained by ETR Associates. At the end of each school year (T2 and T4) posttest surveys also measured students' satisfaction with the physical education class and sought input regarding ways to improve the implementation of the curriculum.

As noted previously, students had parental permission and provided their own assent at baseline to complete all study activities. Students filled out the paper-pencil surveys individually during class time; most students finished their surveys in approximately 35-40 minutes, with another 5 minutes for the student assent process.

Student physical activity. To assess the amount of activity students were involved in throughout the day, students completed a one day recall of physical activity using the

Self-Administered Physical Activity Checklist (SAPAC) (Sallis, et al., 1993, 1996). Because children are likely to accumulate activity in many intermittent activity bouts, the SAPAC asked students to report physical activity lasting 5 or more minutes. The SAPAC provides four measures related to a student's estimated daily activity: total minutes of physical activity, minutes of moderate to vigorous activity, physical activity Metabolic Equivalent Task (MET) score, and a weighted MET score.

- Total Minutes of Physical Activity (PA): Sum of self-reported number of minutes spent on different physical activities over the course of the previous day. Students must have spent at least 5 minutes per activity to have the activity included in this and all other scores.
- Minutes of Moderate to Vigorous PA: Number of minutes spent on self-reported moderate or vigorous physical activities the previous day. Moderate to vigorous physical activity (MVPA) for this indicator were determined by student self-reported intensity ratings for which they indicated that the activity made them breathe hard or get tired some or most of the time.
- Physical Activity Metabolic Equivalent Task (MET) Score: Minutes of activity x MET value; summed across all activities. MET values show how much energy is used during an activity. For example the MET values for walking, running, and bicycling are 3.5, 8, and 4, respectively. MET values were obtained from the Ainsworth Compendium of Physical Activities (Ainsworth, 1993).
- Weighted Physical Activity MET Score: Minutes of activity x MET value x student intensity rating; summed across all activities. MET values were taken from the Ainsworth Compendium of Physical Activities.

Students completed the SAPAC instrument two times each year on the same schedule as the student survey. Since the checklist asked students to report on their activity from the previous day, administration of the SAPAC was restricted to Tuesday, Wednesday, Thursday and Friday. This helped to insure that students were reporting activity from school days, to reduce to the variation possible on weekends. Administration occurred at the beginning and end of the 2003-04 and 2004-05 school years. The contracted data collectors hired and trained by ETR Associates administered the SAPAC using a standard protocol developed by the instrument authors and adapted

to meet local needs by the MPEE team. Students completed both the survey and the SAPAC individually during class time; most students finished each instrument in approximately 30 minutes.

Motor skill. Motor skills enable students to perform specific physical activity tasks. The EPEC curriculum focuses on twenty different motor skills in upper elementary school. Three motor skills were selected for assessment based on the fact that they are vital to the development of higher skills, they should ideally be mastered by the 5th grade, and they are used in a variety of physical activities and sports. ***Leap*** was selected as the indicator of locomotor skills, ***forehand strike*** was selected as the indicator of object control skills, and ***lift and carry posture*** was selected as the indicator for safety skills. All measures were observed during a physical education class. ETR data collectors observed groups of 8-10 students as they rotated through 3 stations at set time intervals. Each station measured a different motor skill. Data Collectors provided students with a demonstration and verbal directions and then observed and rated student performance based on an observation rubric that systematically analyzed form and function elements of each observed skill. Form elements included the specific physical movements required to complete the skill; function elements rated the achievement of an outcome (e.g. the number of hurdles cleared during leap, the placement of the tennis ball for forehand strike, and the ability to walk a prescribed path for lift and carry posture). Students were allowed multiple attempts to demonstrate each skill. For *leap*, students were given two attempts to demonstrate a total of 7 elements—4 form elements and 3 function elements. For *lift and carry*, were given two attempts to demonstrate 11 elements—9 form elements and 2 function elements. For *forehand strike*, were scored on four attempts on 9 elements—7 form elements and 2 function elements each time.

Fitness assessments. Four fitness tests from the Fitnessgram (The Cooper Institute, 2001) battery were used to assess students' fitness levels. All measures were observed during a physical education class. ETR data collectors observed groups of 8-10 students as they rotated through 4 stations at set time intervals. Each station measured a different component of fitness. Data collectors provided students with a demonstration and verbal

directions and then observed and rated student performance based on an observation rating sheet.

Curl-ups were used to measure abdominal strength, and *Push-ups* were used to measure arm strength. Both the curl ups and push ups were performed to a cadence on a tape; the number completed with correct form was recorded. *Sit and Reach* was used to measure lower body flexibility. Students sit with one leg stretched out with the foot flat against a measuring board and the other leg bent at the knee. Students then stretch forward with both arms, palms on top of each other, sliding across a measuring strip. The number of inches stretched for each leg is recorded. *The Progressive Aerobic Cardiovascular Endurance Run (PACER)* is a multistage fitness test adapted from the 20-meter shuttle run to music played from a CD. Beeps on the sound track indicate when a person should reach the ends of the course. A participant continues running until the pace can no longer be maintained, and the number of completed laps is recorded. The longer a person continues, the higher the rate of estimated oxygen uptake.

Teacher checklists/log. All physical education teachers were asked to complete an implementation log following each PE lesson. The logs assessed whether or not teachers completed each activity (with or without modifications), time spent on the lesson, and factors that influenced implementation. The logs also included ratings of students' level of engagement in the class. Logs were also used to assess the completeness of curriculum implementation (i.e., percentage of activities/lessons taught, time spent on each activity/lesson, and extent of modifications).

Teacher Survey. Each year of the MPEE study, surveys were sent to all participating physical education teachers. In Year 1, the teachers were asked to complete an on-line version of the survey. In Year 2, teachers were sent a paper copy of the survey with the response fields populated with their responses from Year 1 when responses were not expected to change. This technique was used to decrease the burden and increase the response rate. Teachers were asked to verify if their answers from the previous year were still accurate. Questions pertaining to specific characteristics and attributes of the current year's PE classes were left blank. The survey sought to better understand the level of

training teachers had undergone, the type of curriculum used, the format and content of the classes, and level of support received from key stakeholders.

Incentives. Numerous incentives were used to acknowledge study participation.

- All participating schools (presented to the principal) received a stipend of $500 to use at their discretion, Spring, 2004.
- All participating PE Departments received a $500 gift certificate for PE equipment, Spring, 2005.
- Student participants received pencils and water bottles (Fall, 2003), Frisbees (Spring, 2004), jump ropes (Fall, 2004), and pencils (Spring, 2005). Each participating "regular classroom" received a bag of balls containing: one football, one soccer ball, one volleyball, one basketball, one scoop game, and two "Double Dutch" jump ropes (Spring, 2005) for use during school.
- Grade 4, 5, and 6 classroom teachers and lead secretaries received pedometers for their contributions to the study.
- All schools received the final summary of the evaluation.

Data Collector Selection and Training. ETR recruited a team of MPEE data collectors from a variety of sources including: the Michigan Department of Education, intermediate school districts' personnel, colleges and universities around the state, and personal references from professional physical educators. All potential data collectors provided ETR with a current resume and were interviewed to verify appropriate qualifications. All hired data collectors attended at least one of two all-day training seminars. The first seminar was held in October, 2003 in Livonia, MI, while the second seminar coincided with the pilot test and was held in November, 2003 in Grandville, MI. All data collectors also attended at least one of the two pilot tests. Data collectors were scheduled to work on specific data collection tasks according to their experience, expertise and availability. Data collectors were trained to specialize in specific fitness or motor skills but were also cross-trained on administering all physical activity observations and student self-reports.

Prior to every data collection wave, the data collectors took part in a refresher

training session that included a video training component focusing on inter-rater reliability for the motor skills observations. During the first round of data collection, video training occurred weekly to semi-weekly. During subsequent testing periods, video training occurred at least once per period, often more. During the summer of 2004, before the start of the second MPEE school year, all data collectors attended a refresher training involving demonstrations and scoring practice with youth from a local school who were not participating in the study. This training session was held in Charlotte, MI in August of 2004.

Data Analysis

Outcome measures were compared between the two conditions using multi-level analyses that controlled for baseline differences between conditions, clustering effects within schools. Three-level models were fit for the final analysis, where level 1 was the data collection time point, level 2 was the student, and level 3 was the school. Separate models were fit for each of the outcome measures, with motor skills outcomes being designated as primary. These models allowed for estimation of overall average intervention effects over time as well as individual follow-up time point effects.

For each outcome model, the baseline outcome variable was included as a covariate with follow-up outcome variables as the dependent variables. Additional covariates were included in the outcome models if the following conditions were met: (1) the covariate's distributions differed significantly across conditions at baseline ($p<0.15$), (2) the covariate was related to the outcome at baseline ($p<.015$), and (3) the covariate's regression coefficient was significant at $p<0.15$ in the final model, using the Wald test. Student race, age, gender, parent involvement in physical education, peer support for physical activity, and environmental support for physical activity were screened as covariates. Linear regression models were used for all normally distributed continuous outcomes. Negative binomial models were used for skewed and count data. For each outcome, separate models were run for the 4th grade and 5th grade cohorts. Univariate descriptive and bivariate screening analyses were conducted using SPSS v.12

(SPSS, 2004). MLWin v2.02 (Rabash et al., 2005) was used for the multi-level analyses; statistical significance was set at $P \leq 0.05$.

Attrition analyses. Multi-level analyses were run to determine whether there was significant differential attrition between study arms across data collection time points by grade level for the three primary motor skill outcomes. Attrition analyses included the following baseline characteristics: gender, race/ethnicity, and motor skills scores. Significant differential attrition by treatment group occurred in only two instances: for the 4th grade cohort, at the first follow-up time point for lift and carry and forehand strike. Students in the comparison condition were more likely to be missing at these follow-up points. In addition, no statistically significant differential attrition was found in terms of baseline motor skill levels, with two exceptions: for the 5th grade cohort only, Forehand Strike at the 3rd follow-up time point, and lift and carry at the 2nd follow-up time point. Similar to other studies using these measures (McMurray, et al., 2004), students who had lower performance scores were more likely to be missing at these follow-up points. For multiple outcomes, and across both grades, students who described themselves as African American or other (non-white) were more likely to be missing at one or more follow-up points, most often due to residential mobility.

Results

For ease of review, the results are presented in four major sections—Student Psychosocial Outcomes, Student Motor Skill Outcomes, Student Physical Activity Outcomes, and Student Fitness Outcomes. Within each section, the results are presented by research question. We collected data using multiple data sources and mixed methods (quantitative and qualitative). When multiple data types exist, quantitative data are presented first and are followed by the qualitative data.

Student Psychosocial Outcomes

- **Does EPEC affect students' skill specific self-efficacy?**
- **Does EPEC increase students' physical activity competence?**
- **Does EPEC increase students' knowledge of the benefits of physical activity?**

Skill-specific self-efficacy. Based on data from the student survey over the course of the study, 4th grade students exposed to EPEC reported greater levels of motor skill-specific self-efficacy compared to 4th grade students receiving alternate PE curricula (see Tables 2.1 and 2.2). There were no significant effects observed for the 5th grade students for skill-specific self-efficacy.

Physical activity competence. Based on data from the student survey over the course of the study, there were no significant differences in perceived physical activity competence between the 4th or 5th grade students exposed to EPEC and the 4th or 5th grade students exposed to the comparison intervention (see Table 2.1).

Physical activity knowledge. Based on data from the student survey over the course of the study, 5th grade students exposed to EPEC reported greater levels of physical activity knowledge compared to 4th grade students receiving alternate PE curricula. This positive effect was significant at the first follow-up assessment, but was not sustained over the following year (see Tables 2.1 and 2.3). There were no significant effects observed for the 4th grade students in terms of physical activity knowledge.

Other psychosocial measures. Two other important psychosocial outcomes were measured on data from the student survey over the course of the study, citizenship skill self-efficacy and enjoyment of PE class. There were no significant effects observed for the 4th or 5th grade students in terms of citizenship skills self-efficacy. The 4th grade students exposed to EPEC reported lower levels of enjoyment of physical education class compared to other 4th grade students. This effect was significant only at the last assessment point (see Tables 2.1 and 2.2).

Table 2.1: Final Results Summary: Average Effects Models‡ Psychosocial Outcomes Comparing Intervention and Comparison 4th and 5th Grade Students

Outcome	4th Grade Cohort			5th Grade Cohort		
	P-value§	Effect Direction	Effect Size§	P-value§	Effect Direction	Effect Size¥
Physical Activity Knowledge	0.08	+	0.08	**0.004**	**+**	**0.13**
Motor Skill-Specific Self-Efficacy	**0.01**	**+**	**0.13**	0.64	+	0.02
Perceptions of Physical Activity Competence	0.60	+	0.03	0.39	-	0.04
Citizenship Skill Self-Efficacy	0.85	+	0.01	0.26	+	0.05
Enjoyment of Physical Education Class	**0.03**	**-**	**-0.11**	0.44	-	0.04

‡The "Average Effects Model" addresses the difference between comparison and treatment groups averaged across all three follow-up time points.

§Significant p-values are **bolded**.

¥ES=Effect Size (Cohen, 1988). ES represents the difference in the standardized mean for comparison vs. intervention groups at follow-up relative to baseline, averaged over all three follow-up time points. Cohen defines small, medium and large ES's for behavioral studies to be 0.2, 0.5, and 0.8 respectively.

Table 2.2: Detailed Final Results: Time-Specific Treatment Effects Comparing Intervention and Comparison 4th Grade Psychosocial Outcomes

Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value ∞,§	Spring 2005 p-value∞,§	Covariates Retained
Physical Activity Knowledge	Tx	348	0.06	0.20	0.38	Peer Support 2
	Ctr	333				
Motor Skill Specific Self-Efficacy	Tx	350	**0.02**	**0.003**	0.12	Environmental Support
	Ctr	334				
Perceptions of Physical Activity Competence	Tx	327	0.35	0.96	0.83	Parental Involvement
	Ctr	317				
Citizenship Skills Self-Efficacy	Tx	351	0.55	0.89	0.74	---
	Ctr	335				
Enjoyment of Physical Education Class	Tx	346	0.22	0.16	**0.02**	Parental Involvement
	Ctr	331				

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

Table 2.3: Detailed Final Results: Time-Specific Treatment Effects Comparing Intervention and Comparison 5th Grade Psychosocial Outcomes

Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Physical Activity Knowledge	Tx	376	**<0.001**	0.24	0.07	---
	Ctr	334				
Motor Skill Specific Self-Efficacy	Tx	376	0.86	0.40	0.47	Environmental Support
	Ctr	334				
Perceptions of Physical Activity Competence	Tx	349	0.10	1.0	0.66	Peer Support 1, Environmental Support
	Ctr	326				
Citizenship Skills Self-Efficacy	Tx	377	0.33	0.53	0.12	Race
	Ctr	335				
Enjoyment of Physical Education Class	Tx	371	0.54	0.23	0.83	---
	Ctr	329				

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

In addition to the quantitative rating of enjoyment, students were also given the opportunity to make comments and suggestions of ways to improve PE class. Approximately 33% of students provided input. The majority of the comments focused on having more games, sports and fun activities during PE. Students also expressed an interest in more free time, more PE time, more equipment, more fun, more exercises and running games. Students in the intervention schools more frequently suggested the inclusion of new or more games.

- **Does EPEC increase student's interaction with parents through homework sharing activities?**

Interactions with parents. Student interactions with parents were measured with two questions on the student survey over the course of the study. Students were asked to report how often they showed their parents/guardian a skill learned in PE class or talked to parents/guardian about the ideas learned in PE class. There were no significant effects observed for the 4th or 5th grade students in terms of interaction with parents.

Student Motor Skill Outcomes

- **Does EPEC increase students' motor skills (leap and forehand strike)?**
- **Does EPEC improve students' safety (lift and carry posture)?**

Leap motor skill. Based on data from the motor skill assessments conducted over the course of the study, 4th and 5th grade students exposed to EPEC demonstrated significantly higher leap skill levels compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.4, 2.5, and 2.6).

Forehand strike motor skill. Based on data from the motor skill assessments conducted over the course of the study, 4th and 5th grade students exposed to EPEC demonstrated significantly higher forehand strike skill levels compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.4, 2.5, and 2.6).

Lift and carry posture motor skill. Based on data from the motor skill assessments conducted over the course of the study, 4th and 5th grade students exposed to EPEC demonstrated significantly higher lift and carry posture skill levels compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.4, 2.5, and 2.6).

Table 2.4: Final Results Summary: Average Effects Models‡ Motor Skills Outcomes Comparing Intervention and Comparison 4th and 5th Grade Students

Outcome	4th Grade Cohort			5th Grade Cohort		
	P-value§	Effect Direction	Effect Size¥	P-value §	Effect Direction	Effect Size¥
Forehand Strike – Form & Function¤	**< 0.001**	**+**	**0.36**	**< 0.001**	**+**	**0.40**
Lift & Carry – Form & Function	**0.02**	**+**	**0.11**	**< 0.001**	**+**	**0.16**
Leap – Form & Function	0.09	+	0.08	**0.03**	**+**	**0.11**

‡The "Average Effects Model" addresses the difference between comparison and treatment groups averaged across all three follow-up time points.

§Significant p-values are **bolded**.

¥ES=Effect Size (Cohen, 1988). ES represents the difference in the standardized mean for comparison vs. intervention groups at follow-up relative to baseline, averaged over all three follow-up time points. Cohen defines small, medium and large ES's for behavioral studies to be 0.2, 0.5, and 0.8 respectively.

¤ Due to concerns raised during data collection, additional analyses were run on the Forehand Strike data. Results were examined by form scores alone and form with function scores. Concerns had been raised that students' focus on the function component of the assessment might adversely affect their form score. However, exploratory analyses indicated no difference in program effect on Forehand Strike – Form versus Forehand Strike – Form & Function, therefore only the latter are presented.

Table 2.5: Detailed Final Results: Time-Specific Treatment Effects Comparing Intervention and Comparison 4th Grade Motor Skills Outcomes

Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Forehand Strike – Form & Function	Tx	322				
	Ctr	313	**<0.001**	**0.003**	**<0.001**	Race
Lift & Carry – Form & Function	Tx	322				
	Ctr	313	**0.01**	0.28	**0.003**	Race
Leap – Form & Function	Tx	320				
	Ctr	315	1.0	0.05	0.05	---

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

Table 2.6: Detailed Final Results: Time-Specific Treatment Effects Comparing Intervention and Comparison 5th Grade Motor Skills Outcomes						
Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Forehand Strike – Form & Function	Tx	340	**<0.001**	**<0.001**	**<0.001**	Peer Support 1
	Ctr	319				
Lift & Carry – Form & Function	Tx	339	**0.02**	**0.004**	**<0.001**	---
	Ctr	319				
Leap – Form & Function	Tx	353	0.43	**0.04**	**0.02**	---
	Ctr	327				

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

Student Physical Activity Outcomes

▸ Does EPEC motivate students to be physically active?

Minutes of physical activity. Based on data from the student SAPAC assessments completed over the course of the study, 4th grade students exposed to EPEC reported a significantly greater number of total minutes of physical activity compared to 4th grade students receiving alternate PE curricula (see Tables 2.7 and 2.8). There were no significant effects for 5th grade students on the number of minutes of physical activity. There were no significant intervention effects for either 4th or 5th graders on the reported intensity level of physical activity (moderate or vigorous activity).

Energy expenditure during physical activity. Based on data from the student SAPAC assessments completed over the course of the study, 4th grade students exposed to EPEC reported using a significantly greater amount of energy during physical activity (as measured by the Metabolic Equivalent Task Score) compared to 4th grade students receiving alternate PE curricula (see Tables 2.7 and 2.8). There were no significant effects for 5th grade students (see Tables 2.7 and 2.9).

Table 2.7: Final Results Summary: Average Effects Models‡ for Physical Activity (SAPAC) Outcomes Comparing Intervention and Comparison 4th and 5th Grade Students

Outcome	4th Grade Cohort			5th Grade Cohort		
	P-value§	Effect Direction	Effect Size¥	P-value§	Effect Direction	Effect Size¥
Total Minutes of Physical Activity	**0.04**	**+**	**0.10**	0.64	-	0.02
Minutes of Moderate to Vigorous Physical Activity	0.12	+	0.09	0.47	-	0.04
Physical Activity MET Score	**0.01**	**+**	**0.12**	0.59	-	0.03
Weighted Physical Activity MET Score	**0.02**	**+**	**0.14**	0.30	-	0.06

‡The "Average Effects Model" addresses the difference between comparison and treatment groups averaged across all three follow-up time points.

§Significant p-values are **bolded**.

¥ES=Effect Size (Cohen, 1988). ES represents the difference in the standardized mean for comparison vs. intervention groups at follow-up relative to baseline, averaged over all three follow-up time points. Cohen defines small, medium and large ES's for behavioral studies to be 0.2, 0.5, and 0.8 respectively.

Table 2.8: Detailed Final Results : Time-Specific Treatment Effects Comparing Intervention and Comparison 4th Grade Physical Activity (SAPAC) Outcomes

Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Total Minutes of Physical Activity	Tx	326	0.21	0.14	**0.04**	Peer Support 2
	Ctr	310				
Minutes of Moderate to Vigorous Physical Activity¤	Tx	2643	0.66	0.11	0.08	---
	Ctr	2543				
Physical Activity MET Score	Tx	326	0.07	0.07	**0.02**	Peer Support 2
	Ctr	310				
Weighted Physical Activity MET Score	Tx	2633	0.06	**0.05**	**0.04**	Peer Support 2
	Ctr	2543				

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

¤Due to the complex nature of the SAPAC form, not all students provided complete intensity rating data on their forms. Exploratory analyses used imputed intensity ratings; however, the conclusions did not differ from analyses run with complete data. Therefore data from incomplete forms were not included in the final analyses presented above.

Table 2.9: Detailed Final Results : Time-Specific Treatment Effects Comparing Intervention and Comparison 5th Grade Physical Activity (SAPAC) Outcomes						
Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Total Minutes of Physical Activity	Tx	337	0.79	0.37	0.95	---
	Ctr	306				
Minutes of Moderate to Vigorous Physical Activity¤	Tx	284	0.79	0.08	0.81	---
	Ctr	262				
Physical Activity MET Score	Tx	337	0.83	0.35	0.87	---
	Ctr	306				
Weighted Physical Activity MET Score	Tx	284	0.54	0.08	0.82	---
	Ctr	261				

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

¤Due to the complex nature of the SAPAC form, not all students provided complete intensity rating data on their forms. Exploratory analyses used imputed intensity ratings; however, the conclusions did not differ from analyses run with complete data. Therefore data from incomplete forms were not included in the final analyses presented above.

Student Fitness Outcomes

- **Does EPEC improve student fitness levels (aerobic fitness, muscle strength, and flexibility)?**

Abdominal strength. Based on data from the curl up fitness assessments conducted over the course of the study, there were no significant differences in abdominal strength for 4th and 5th grade students exposed to EPEC compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.10, 2.11, and 2.12).

Arm strength. Based on data from the push up fitness assessments conducted over the course of the study, there were no significant differences in arm strength for 4th and 5th grade students exposed to EPEC compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.10, 2.11, and 2.12).

Lower body flexibility. Based on data from the curl up fitness assessments conducted over the course of the study, there were no significant differences in lower body flexibility for 4th and 5th grade students exposed to EPEC compared to 4th and 5th grade students receiving alternate PE curricula (see Tables 2.10, 2.11, and 2.12).

Aerobic capacity. Based on cumulative data from the PACER fitness assessments conducted over the course of the study, there was no significant intervention effect for aerobic capacity (VO2max). At one measurement time, the 4th grade students exposed to EPEC showed a significantly greater capacity, but this was not sustained over the two years and was not observed in the 5th grade students (see Tables 2.10, 2.11, and 2.12).

Table 2.10: Final Results Summary: Average Effects Models‡ Fitness Outcomes Comparing Intervention and Comparison 4th and 5th Grade Students

Outcome	4th Grade Cohort			5th Grade Cohort		
	P-value§	Effect Direction	Effect Size¥	P-value§	Effect Direction	Effect Size¥
Pacer VO2max	0.19	+	0.06	0.75	-	0.01
Curl-ups (count)	0.85	+	0.009	0.94	+	0.003
Push-ups (count)	0.67	+	0.02	0.97	-	0.002
Sit & Reach LEFT	0.94	-	0.004	0.50	-	0.03
Sit & Reach RIGHT	0.95	+	0.003	0.46	-	0.03

‡The "Average Effects Model" addresses the difference between comparison and treatment groups averaged across all three follow-up time points.

§Significant p-values are **bolded**.

¥ES=Effect Size (Cohen, 1988). ES represents the difference in the standardized mean for comparison vs. intervention groups at follow-up relative to baseline, averaged over all three follow-up time points. Cohen defines small, medium and large ES's for behavioral studies to be 0.2, 0.5, and 0.8 respectively.

Table 2.11: Detailed Final Results : Time-Specific Treatment Effects Comparing Intervention and Comparison 4th Grade Fitness Outcomes						
Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Pacer VO2max	Tx	327				
	Ctr	317	0.48	**0.01**	0.90	---
Curl-ups (count)	Tx	331				
	Ctr	320	0.31	0.16	0.63	---
Push-ups (count)	Tx	329				
	Ctr	318	0.86	0.62	0.63	Peer Support 2
Sit & Reach LEFT	Tx	329				
	Ctr	317	0.61	0.65	0.95	---
Sit & Reach RIGHT	Tx	328				
	Ctr	317	0.63	0.43	1.0	---

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

Table 2.12: Detailed Final Results : Time Specific Treatment Effects Comparing Intervention and Comparison 5th Grade Fitness Outcomes						
Outcome	Group	N	Spring 2004 p-value∞,§	Fall 2004 p-value∞,§	Spring 2005 p-value∞,§	Covariates Retained
Pacer VO2max	Tx	358				
	Ctr	329	0.50	0.50	0.38	---
Curl-ups (count)	Tx	355				
	Ctr	327	0.66	0.92	0.90	---
Push-ups (count)	Tx	359				
	Ctr	327	0.61	0.92	0.54	---
Sit & Reach, Left Leg	Tx	358				
	Ctr	329	0.68	0.28	0.95	Race
Sit & Reach, Right Leg	Tx	358				
	Ctr	329	0.63	0.43	1.0	Race

∞This is the p-value for the difference between comparison and treatment group means at that time point relative to the difference at baseline, controlling for covariates.

§Significant p-values are **bolded**.

Teacher Behavior (Process Outcomes)

To what extent do teachers implement EPEC?

Teacher surveys. Based on data from the teacher survey completed in Spring, 2004 and Spring, 2005 of the seven EPEC teachers surveyed, five were certified to teach Physical Education in elementary school. In the comparison schools, all eight teachers indicated they were certified for grades K-12. All the teachers in the EPEC schools indicated that they had received training to teach the EPEC curriculum at the fourth and fifth grades, but only four of seven teachers indicated that they had received training for the sixth grade curriculum. In the comparison schools, fewer than half the teachers reported having been trained on the curriculum they used with students.

Class size differences were noted only in the first year of the study. In Year 1, 5th grade teachers in the EPEC schools reported teaching statistically significantly more students; an average of 45.3 students to 26.3 students reported by teachers in the comparison schools. In the second year, student enrollment was no longer a statistically significant factor between schools. In both years, teachers in the EPEC schools reported having had more PE classes cancelled than the teachers in the comparison schools. In Year 1 of the study, EPEC teachers had an average of 6.1 cancelled 4th grade classes per school in contrast with 3.7 classes in the comparison schools; the differences continued to be statistically significant in the second year of the study for the fifth and sixth grade classes.

In the first year of the study, although the differences were not statistically significant, teachers in the comparison schools consistently rated school level support higher than intervention schools. In the second year, the level of support appeared to have decreased in the comparison schools while support in the EPEC schools remained about the same (teachers perceived overall school support to be between 'somewhat supportive' and 'neutral').

In both years, the majority of the teachers using the EPEC curricula reported that all three motor skills (leap, forehand strike, and lift and carry) were included within their

lessons. In contrast, between one-third and one-half of the teachers in the comparison schools reported that their curricula included the use of leap and forehand strike; none of the comparison schools taught lift and carry.

Teacher logs. The results of the teacher implementation logs, completed by all teachers, highlighted several important conditions that may have affected the results of the Michigan Physical Education Evaluation. Intervention teachers taught approximately 75% of the EPEC lessons available in the curriculum. Comparison teachers taught an array of other PE curricula, most commonly their school's curriculum or their own curriculum. The number of PE lessons was comparable across intervention and comparison conditions in Year 1 but favored the comparison condition in Year 2. Although the majority of lessons taught in intervention schools used EPEC, several other curricula and activities were used to supplement the curriculum for about 30% of the lessons.

EPEC and comparison teachers described spending similar amounts of class time on various lesson components (explaining, demonstrating, practicing, and reviewing skills, and classroom management). In EPEC schools, of the selected motor skills, forehand strike was taught most often; and aerobic capacity was the most common fitness component included in lessons.

Intervention teachers reported following the written lesson plans between somewhat and very closely. This implies that, although the curriculum was implemented as designed most of the time, there were some adjustments and changes made when implementing the lessons. Teachers in the comparison condition reported teaching lessons with fewer written plans but described adhering very closely to the lessons that did have written plans.

Discussion

As health status indicators clearly demonstrate, there is concern surrounding the lack of physical activity, particularly among children, when "physical inactivity has contributed to the 100% increase in the prevalence of childhood obesity in the United States since 1980" (CDC, 2006). With approximately 53 million young people attending U.S. schools each day (U.S. Census Bureau, 1999), schools are the logical place for children to gain health-related knowledge, adopt positive attitudes towards health enhancing behaviors, and learn skills that contribute to a healthy lifestyle (CDC, 2001). To improve the physical education and health of children attending schools, the National Association for Sport and Physical Education (NASPE) has developed Content Standards in Physical Education for K-12. In these standards, a physically educated person is someone who has learned skills necessary to perform a variety of physical activities, be physically fit and participate regularly in physical activity; has acquired knowledge of the implications and benefits from involvement in physical activities; and has developed values for physical activity and its contribution to a healthful lifestyle in order to pursue a lifetime of healthful physical activity (NASPE, 2004).

Some physical educators have argued that early and adequate development of motor skills enables students to perform specific physical activity tasks and to feel more competent in a variety of physical activities, games, and sports (Okely, Booth & Patterson, 2001; Taylor, et al. 1999). Among youth, both motor skill level and perceived physical activity competence have been associated with increased levels of physical activity (Dishman et al., 2004; Okely, Booth & Patterson, 2001; Sallis, Prochaska & Taylor, 2000; Taylor et al., 1999). Past and current research has shown that health-related interventions are most effective when they are applied in the primary school years and are sustained through adolescence (Smedley & Syme, 2000). Evidence suggests that the earlier children receive health-related interventions, the more effective and long lasting the effects will be. Through its focus on developmentally tailored skill progression, the EPEC K-5 curriculum is well positioned to have a potential impact on youth. The

MPEE results showed this impact was realized for motor skills and to a lesser degree for the psychosocial outcomes.

Measuring the impact of a school-based physical education program can present several challenges in both the measurement and the interpretation of the results. Psychosocial factors, motor skills, physical activity levels and fitness levels may be affected by multiple complex factors including gender, heredity, age, maturity, weight, body mass and body fat, racial and ethnic factors, socioeconomic status, peer and parental influence, and environmental influences (Pender, 1998). Given resource limitations, the MPEE attempted to include and test for as many covariates as possible. Many of these were measured through the student survey and were included in the analysis models as appropriate. Sample and sub-sample size limitations limited the ability to fully test all possible correlates of physical activity.

Student Psychosocial Outcomes

In addition to measuring motor skills, fitness levels, and physical activity, it is important to examine students' attitudes, perceptions, and knowledge of physical education and physical activity because these psychosocial factors are affected by experience with PE and may impact the long-term sustainability of activity patterns. A person's attitude about physical education or physical activity has been shown to be influenced by their experience in PE class. Specifically, student psychosocial factors related to physical education and physical activity are affected by teacher behavior, curriculum content, structure of the curriculum, gender, age, perceived marginality of PE status in the school, and skill level of students (Silverman and Subramaniam,1999).

The MPEE results suggest that EPEC was more effective than alternate PE curricula at increasing motor skill-specific self-efficacy for the 4th grade cohort. The 5th grade EPEC students had significantly higher overall physical activity knowledge compared to students taught a standard PE curriculum. The 4th grade EPEC students' physical activity knowledge showed a trend towards higher levels but did not reach significance.

Interestingly, the 4th grade students also reported lower enjoyment of PE class.

These results are consistent with feedback the EPEC program developers have received from some teachers in the past suggesting teachers and students would like more "fun" games and activities. This suggestion is being addressed through curriculum revisions to include additional activities.

Student Motor Skill Outcomes

The mastery of fundamental motor skills by children is essential to develop higher level complex motor skills. The National Association for Sport and Physical Education (NASPE) has defined motor skill performance as the first of six content standards for teaching physical education to youth in grades K-12. The standard elaborates on the need for students to: Demonstrate motor skills and movement patterns to perform a variety of physical activities.

The MPEE results suggest that EPEC was more effective than alternate PE curricula at improving motor skill performance, for all three indicators of motor skill development, for both the 4th and 5th grade cohort. The three measured motor skills are fundamental to participation in a variety of physical activities and sports. Acquisition of these skills may lead the intervention students to feel more comfortable participating in sports and activities that incorporate these skills (such as soccer, tennis, badminton, tetherball, and golf). The two-year study was not of sufficient duration to determine whether EPEC students would maintain these improvements during adolescence and adulthood.

Student Physical Activity Outcomes

Once students acquire motor skills, it is postulated that they will be able to use those skills and their self-efficacy and competence to engage in more physical activities which in turn leads to improved fitness. Physical activity is therefore an intermediate outcome for the Michigan Physical Education Evaluation; some initial change on this measure may be expected over the short duration of this study. As described above, there are several psychosocial and demographic factors that may impact a young person's physical activity level.

In order to accurately assess if children are adopting levels of physical activity that enable them to maintain active lifestyles, it is important to assess both the minutes of time engaged in activity and the energy expenditure levels (Sallis, et al, 1993). Children's physical activity is highly transitory in nature; they have short intermittent bouts of vigorous activity with frequent periods of rest that last longer than the activity (Welk, Corbin & Dale, 2000). Therefore, children are likely to accumulate activity in many short periods of activity throughout the day (often no greater than 10 minutes) rather than single bouts of continuous activity like adults. For this reason, the SAPAC asked students to report physical activity lasting 5 or more minutes.

The results suggest that intervention curriculum had an impact on the 4th grade students' total number of minutes of physical activity as well as the amount of energy used during physical activity, compared to students receiving alternate PE curricula. For all significant physical activity results for the 4th grade cohort, peer support was a significant covariate, underscoring the importance of friends encouraging each other to do physical activities or play sports.

Student Fitness Outcomes

When students engage in physical activities on a more regular basis, it is postulated that this is one factor which in turn leads to improved fitness. Improved fitness is therefore a long term outcome for the Michigan Physical Education Evaluation; substantial change on this measure was not expected over the short duration of this study. As described above, there are several psychosocial and demographic factors that may also impact a young person's fitness level.

There was no evidence that EPEC students became more physically fit than other students during the two years of the study; this finding was somewhat expected, given that EPEC focuses more on motor skill development than on fitness. In addition, improved fitness is expected to be a long term benefit of motor skill acquisition and skill application. Longer term follow up of students would be required to truly assess the impact on this outcome measure.

Teacher Behavior (Process) Outcomes

The results of the teacher surveys and teacher logs provided contextual information that help inform the understanding of the study. The Michigan Physical Education Evaluation was conducted in a natural setting; teachers in both comparison and intervention schools were asked to report how their PE classes were implemented without any additional supports or resources from the study. These results showed there were many similarities between the PE teachers and the way PE classes were implemented across schools. EPEC and comparison teachers described teaching a comparable number of PE lessons and spending similar amounts of class time on lesson components and standards. Intervention teachers reported following the written lesson plans more frequently and having less paid preparation time than comparison teachers. This additional information helps support the strength of the changes that were observed in the student outcome.

Limitations and Strengths

Because we used a quasi-experimental design, we were able only to control for measured differences between study conditions; other uncontrolled differences related to outcomes may have existed. Some study data, such as the Self Administered Physical Activity Checklist (SAPAC), were self-reported and were not verified, given finite resources. Investigators using the SAPAC and similar measures have noted that young students tend to significantly overestimate their physical activity levels on self-report compared with activity monitors (McMurray, 1998). If this error is stable, then such measures still may be useful for purposes of assessing change. However, it is unclear how stable the overestimation tendency is among 4th and 5th grade students. We observed, for instance, that students initially struggled with the time estimates required by the SAPAC but became increasingly more comfortable with time estimation each time they completed the SAPAC. This observation held for students in both arms of the study and was likely due both to cognitive development and practice. We could not determine whether observed differences on the SAPAC between study conditions were due to

differences in perceived physical activity levels or to differential changes in ability to report such information.

Although the motor skills rubrics were developed based on current accepted standards for motor skills performance, there were no published gold standard measures with which to compare our rubrics. Although inter-rater reliability was high, due to resource limitations, student performance was only rated "live" not via videotaping. The inability of data collectors to review performance demanded vigilance and attention to detail over the entire testing period, fatigue and variability may have affected scoring. However, data collectors were blinded to study arm so this limitation would equally affect intervention and comparison schools. For both the motor skills performance measures and the Fitnessgram assessment, student motivation could clearly impact performance. However, the data collection team focused on creating an encouraging and supportive testing environment in all schools. It is unclear whether there was any differential in motivation across study arms.

We argue that a strength of this study was its naturalistic design and suggest that these results could be obtained in similar real-world settings. We invited existing PE teachers to join the study and asked them to document how and what they taught. A balance appeared between correlates of curriculum fidelity and reported curriculum modifications and adaptations for teachers in both study arms. Several factors that are often associated with higher levels of implementation fidelity were reported by the EPEC teachers, such as having a well organized written curriculum guide, teacher training, administrator support, adequate educational supplies, and adequate teaching environments. In addition, the study benefited from a relatively large sample size and high retention rates.

Conclusions

We argue that a potential strength of this study was its naturalistic design and suggest that these results could be obtained in similar real world settings. It was tested under conditions of typical use by schools. We invited existing EPEC teachers to join the study and asked them to document how and what they taught of EPEC. There appeared to be a balance between correlates of curriculum fidelity and reported curriculum modifications and adaptations. Several factors that are often associated with higher levels of implementation fidelity were reported by EPEC teachers such as having a well organized written curriculum guide, teacher training, administrator support, adequate educational supplies, and adequate teaching environments (e.g., indoor and outdoor facilities). EPEC teachers also reported a high level of curriculum completeness with some modifications and adaptations, as might be expected of teachers that are comfortable with a curriculum.

Unlike several other school based physical education interventions (e.g. CATCH – Luepker, et al., 1996; SPARK - Sallis, et al., 1997), EPEC does not focus specifically on increasing the amount of moderate to vigorous physical activity during PE class. EPEC has deliberately focused on providing a sequential curriculum using skill progression frameworks to help students develop motor skills. The "Move it Groove it" program (van Beurdan et al., 2003) examined the impact of a curriculum that attempted to combine both fundamental motor skill development and increased physical activity levels in physical education class. The results of this study indicated that it was not feasible to successfully improve motor skill mastery and increase physical activity levels without increasing the number of PE lesson per week. Increasing PE time each week or teacher-student ratio reductions may be necessary strategies to improve fitness levels, when the curriculum focus is on motor skill development.

Some have argued that, historically, physical education has focused on motor skill acquisition largely in the context of competitive team sports (Trost et al., 2004). Trost and his colleagues also point out that the most common adult physical activities are

individual activities, not team endeavors. EPEC appears to represent a new generation of motor skill focused curricula in which motor skill acquisition and performance occur in the context of learning both individual and team physical activities, skills which may ultimately enable life long fitness.

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Appendix A

Sample Size and Power Calculations

Sample size and power calculations were completed to determine the number of schools necessary to sample in order to detect meaningful intervention effects with adequate power (80%). Based on a review of the literature and consultation with experts, the power calculations were based on data for two different outcome variables, the 20-m shuttle run and sedentary minutes. These two variables appeared to be the best dependent variables, and also have the highest variation, making them the most sensitive for sample size (see Table 1.1).

Table 1.1: Assumptions for Power and Sample Size Calculations

Variable	Mean (comparison)	s.d	ES	Mean (interv)	Alpha	Power	ICC	Attrition
20-m shuttle run	54	24	.24	59.8	0.05	80%	0.006	20%
Sedentary minutes	186.7	217	.25	132.7			0.011	20%

Using these assumptions, as well as the assumption that 2-sided T-tests would be used to evaluate the intervention effect, sample sizes were determined (see Table 1.2). Two options were identified, depending on the number of students participating at each school. Based on this information and to assure adequate power across all variables with and average cluster size being 75, it was determined that 8 schools in the comparison group and 8 schools in the intervention group would be the most conservative, appropriate sample size for this study.

Table 1.2: Sample Size Calculations

Variable	Cluster size	# Schools needed per arm
20-m shuttle run	50	9
20-m shuttle run	100	6
Sedentary minutes	50	10
Sedentary minutes	100	7

Appendix B

Michigan Department of Education
"EPEC" CDC Evaluation
May 2003

Invitation to Participate Telephone Interview Protocol for Intervention Schools

Date of Call:_____ **PE Teacher:**_____

Caller:_____ **School:**_____

District: _____ **Region:** _____

Hi, my name is **[INSERT NAME OF PERSON CONDUCTING INTERVIEWS]** from the Curriculum Leadership Unit at the Michigan Department of Education. First we would like to thank you for responding to the recent survey about your use of the physical education curriculum - *EPEC* in your schools. Because of your experience with the curriculum, we would like to invite you to take part in a special project to help us evaluate *EPEC.* As you may know, our office receives funding from the Centers for Disease Control and Prevention (CDC) to work with the Governor's Council on Physical Fitness, Health, and Sport to help train teachers on *EPEC*. CDC is now helping us evaluate this program to better document its impact on our students. This evaluation will provide important information about the *EPEC* curriculum. It will also help us to improve our physical education activities in the future to ensure our youth are making healthy choices to stay fit for life.

We are hoping that you will be interested in participating in this project. I have an invitation letter that I would like to fax to you and mail to your principal inviting you to participate in this project. But now, over the phone, I wanted to give you an overview of what the project will involve. I'd like to highlight the key expectations and incentives. Feel free to ask questions as they come up for you. The first thing I'd like to clarify is that the purpose of this evaluation is to determine the impact of the K-5 *EPEC* curriculum. It is not an evaluation of your school.

If a PE teacher and the school principal agrees and is selected to participate as part of the *EPEC* **implementation group**, here is what will be required:

- Your school would be asked to continue teaching the K-5 *EPEC* curriculum for the next two years.
- Students entering grades 4 and 5 in the fall 2003 would be asked, with parental consent, to take a survey in their classrooms four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The survey will assess student

knowledge and attitudes about physical activity and require about 30 minutes of regular class time (*not during PE class*) each time it is given. CDC's contractor, ETR Associates, will work with each school to coordinate the surveying process.

- Students entering grades 4 and 5 in the fall 2003 would be asked to complete fitness and motor skill assessments **during PE class** four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The activities will require about 60 minutes of class time each time it is given. CDC's contractor, ETR Associates, will work with each physical education teacher to coordinate the assessment process.
- Students entering grades 4 and 5 in the fall 2003 would be asked to complete a self-report physical activity checklist **during PE class** four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The activities will require about 30 minutes of class time each time it is given. CDC's contractor, ETR Associates, will work with each physical education teacher to coordinate the assessment process.
- Physical education teachers of grades 4 and 5 would be asked to complete a survey each year after they teach *EPEC*.
- Administrators would be asked to sign a letter of agreement acknowledging their school's commitment to complete the evaluation activities.

As an incentive, all schools that take part in the project for two years will receive the following:

- All participating schools will receive a stipend of $500 to use at their discretion.
- All participating PE Departments will receive a $500 gift certificate for PE equipment.
- All students in grades 4 and 5 will receive small gifts (e.g., pencils, stickers) for their participation each time they take the surveys.
- All schools will receive a summary of the evaluation at the end of the study. (***Note: This may or may not be site-specific.***)

Do you think this is something you would be interested in being a part for the next two school years? _____

In the letter I am about to fax to you, there is a form we would like you to complete and fax back to us that indicates you are interested in participating. If possible, we would appreciate it if you can fax the form back to our office as soon as possible, and by June 3rd at the latest.

If they express interest: continue with the following questions.

Transition: "Before we can make final decisions regarding school involvement in the study, we need a little more information about your school and students. We need this information as background to help us plan the evaluation."

1. We would like to confirm which grade levels are taught in your school.
   K _____Yes _____No
   1st _____Yes _____No
   2nd _____Yes _____No
   3rd _____Yes _____No
   4th _____Yes _____No
   5th _____Yes _____No
   6th _____Yes _____No

2. About how many students are enrolled in grades 4, and 5?
   Grade 4 _____
   Grade 5 _____

3. Does your school provide physical education?
   ❍ No
   ❍ Yes

4. Which PE curriculum do you use?
   ❍ EPEC
   ❍ Other _____

5 A what grades is EPEC (or other curriculum) taught?
   ❍ K ❍ 1 ❍ 2 ❍ 3 ❍ 4 ❍ 5 ❍ 6

6. How many days of PE is taught at this school for 4th and 5th graders?

   ❍ 1
   ❍ 2
   ❍ 3
   ❍ 4
   ❍ 5

7. Are you the only PE teacher at this school?
   ❍ Yes
   ❍ No

8. What is your teaching qualification? _____

That's the last of our questions. We are in the process of talking with schools this week. Our next step is to make the final school selection for this project. We are excited about

this project and are inviting a number of schools to participate; however, we may not be able to include all schools that express an interest to take part--the final selection of schools will be based on the need to balance geographic region and other factors such as school size.

We will follow up with you before school is out to finalize our plans and talk about next steps. In the meantime, if you have questions or need more information, you can contact Elizabeth Haller via e-mail (hallere@michigan.gov) or telephone (517) 335-0565.

For planning purposes, when does your school close for summer?

_____

If we need to reach you, how long will you be available once school is out?

_____

What is the best way to reach you?

_____

When does school begin next school year?

_____

Thank you again for your interest in this project. Do you have any questions or need any additional information at this time?

Michigan Physical Education Evaluation K-5

August 2003

Dear Principals,

Thank you for your initial interest in the *Michigan Physical Education Evaluation.* Your physical education teacher has indicated that your school is interested in participating in this two year study. The purpose of the evaluation is to examine what students are learning about physical activity and fitness in their physical education classes, comparing the Exemplary Physical Education Curriculum (EPEC) to other physical education curricula. There will be 20 schools and approximately 800 students across Michigan who will be part of this project.

We will be inviting all of the students entering 4th and 5th grade in the fall at this school to participate in the study for the next two years. All aspects of the study would occur at school during school time. The students will be asked to complete two different surveys and a series of exercise tests four times over the next two years. The surveys and exercise tests together will take about 2.5 hours each time. These will be spread over several days. We have included an overview of the study and a timeline of the study to give you more information about how the study will work. If you have any questions, please do not hesitate to call either of us.

We are asking that you review the attached Memorandum of Understanding (MOU) that describes the responsibilities of all parties in the study. If you agree to participate, please sign the MOU and mail or fax it back to Elizabeth Haller at the Michigan Department of Education (517) 373-1233.

If you have any questions, please do not hesitate to call. Thank you for your assistance.

Sincerely,

Elizabeth Haller
Michigan Department of Education
Curriculum Leadership Unit, 4th Floor
608 West Allegan Street
Lansing MI 48909
hallere@michigan.gov
(517) 335-0565

Michigan Physical Education Evaluation K-5

Overview

The Michigan Departments of Education and Health, with funding from the Centers for Disease Control and Prevention (CDC) are pleased to announce the initiation of an evaluation of *Michigan's Exemplary Physical Education Curriculum (EPEC)*. This evaluation will provide important information about the *EPEC* curriculum and its impact on students. This evaluation will seek to answer the question: To what extent does the Michigan Exemplary Physical Education Curriculum result in elementary school children who are physically educated for life's demands?

The Problem

As compared to their peers, the youth of Michigan exhibit several elevated health risk factors. They also do not appear to be acquiring the level of motor skills necessary to enable physically active lifestyles. The purpose of EPEC is to provide a physical education curriculum that provides the opportunity for children to understand the importance of physical activity and to acquire the fitness, knowledge, motor skills, and personal/social skills necessary to be fit and active for life.

The Study

The evaluation will include ten intervention schools (teaching the EPEC curriculum) and ten control schools (using other physical education curricula) representing all of the regions of Michigan. Students will be followed for two years to assess changes in their physical activity knowledge and attitudes, levels of habitual activity, motor skills, and fitness levels. Outcomes for students who receive the EPEC curriculum will be compared with student outcomes receiving other physical education curricula.

Where:	20 schools across the state of Michigan ✓ 10 Schools teaching EPEC ✓ 10 schools teaching other physical education curricula
Who:	In these selected schools, all students entering grade 4 and 5 in fall 2003, who have parent consent to participate
What:	Students will be asked to participate in 4 types of pre-post assessment during each year of the study ✓ Physical Activity Knowledge Survey ✓ Physical Activity Checklist ✓ Motor skills assessment ✓ Fitness assessment Physical Education teachers will be asked to complete two forms each year ✓ Curriculum Implementation Log ✓ Teacher survey
When:	For two school years (2003-2004 and 2004-2005)
How:	All evaluation activities will be coordinated by CDC's contractor, ETR Associates. All schools who are selected to participate will receive incentives.

Questions:	Elizabeth Haller, Michigan Department of Education, hallere@michigan.gov or (517) 335-0565 Lisa Russell, PhD, ETR Associates, lisar@etr.org or (800) 875-4093, ext. 184

Michigan Physical Education Evaluation K-5

Timeline of Events

This timeline provides a general overview of key events for the Michigan Physical Education Evaluation. If you have specific questions, please contact Lisa Russell or Elizabeth Haller, as listed below.

2003 **Fall** August/September	Work with ETR to complete a Memorandum of Understanding to participate in the study. Have K-5 teachers attend a brief (2 hour) orientation about the study and continue to teach their current physical education curriculum.
September	Work with ETR to distribute parent consent forms for student data collection.
October	Support ETR in conducting the **first** student surveys and motor skills and fitness testing in grades 4, and 5.
October-February 2004	Teach the current K-5 physical education curriculum. Complete the lesson implementation log after each physical education lesson.
2004 **Spring**	Support ETR in conducting the **second** student surveys and motor skills and fitness testing in grades 4, and 5. Support ETR in conducting a teacher survey for teachers of grades 4 and 5. Receive half of school participation stipend.
2004 **Fall** October	Work with ETR to distribute parent consent forms for any new students joining the study in Year 2. Support ETR in conducting the **third** student surveys and motor skills and fitness testing in grades 5, and 6.
October –February 2005	Teach the current K-5 physical education curriculum. Complete the lesson implementation log after each physical education lesson.
2005 **Spring**	Support ETR in conducting the **fourth and final** student surveys and motor skills and fitness testing in grades 5, and 6. Support ETR in conducting a teacher survey for teachers of grades 5 and 6. Receive remainder of school participation stipend.

ETR Associates
4 Carbonero Way
Scotts Valley, CA
95066

Questions?
Contact Lisa Russell, PhD
lisar@etr.org
(800) 875-4093 ext. 184

Elizabeth Haller, Michigan Dept of Education
hallere@michigan.gov
(517) 373-1233

MEMORANDUM of UNDERSTANDING

"Michigan Physical Education Evaluation" (MPEE)
Funded by the Center for Disease Control-Division of Adolescent and School Health (CDC-DASH)
Technical Assistance by ETR Associates (ETR)
In Coordination with the Michigan Departments of Education and Health
School Year 2003-04

Please return to Elizabeth Haller, Michigan Department of Education, by September 13, 2003

Elementary School: **Principal:**

By signing this Memorandum of Understanding, I am confirming my intent to participate in the Michigan Physical Education Evaluation (MPEE). The requests and benefits of schools participating in the study are delineated below.

I understand that the following will be required as part of the study:

- Physical education teachers will teach the K-5 *EPEC* curriculum for the next two years.
- Students entering grades 4 and 5 in the fall 2003 would be asked, with parental consent, to take a survey in their classrooms four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The survey will assess student knowledge and attitudes about physical activity and require about 30 minutes of class time each time it is given. CDC's contractor, ETR Associates, will schedule and administer all surveys, in coordination with the classroom teacher.
- Students entering grades 4 and 5 in the fall 2003 would be asked to complete fitness and motor skill assessments **during physical education class** four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The activities will require about 60 minutes of class time each time it is given. CDC's contractor, ETR Associates, will schedule and assess all students, in coordination with the physical education teacher.
- Students entering grades 4 and 5 in the fall 2003 would be asked to complete a self-report physical activity checklist **during physical education class** four times over a two year period (fall 2003, spring 2004, fall 2004, and spring 2005). The checklist asks students to document the type of physical activities they participated in during the previous 24 hours and will require about 60 minutes of class time each time it is given. CDC's contractor, ETR Associates, will schedule and administer all surveys, in coordination with the physical education teacher.
- Physical education teachers of students entering grades 4 and 5 in the fall 2003 would be asked to complete a brief survey each year to describe the context of the physical education classes.

- Physical education teachers of students entering grades 4 and 5 in the fall 2003 would be asked to complete a one page implementation log for each physical education lesson they teach throughout the two years.

I also understand that, to help the MPEE be effective, my role as Site Administrator will be to:

- Support the goals and objectives of the MPEE study including assistance with completion of the student surveys.
- Provide overall year-end attendance records for the students entering grades 4 and 5 in the fall 2003.
- Inform data collectors of students who should not participate in the exercise test portion of the study if they have a pre-existing medical condition which normally excludes them from physical education class.
- Follow regular school emergency procedures if any accidents or injuries occur during the motor skills and fitness testing during physical education class. In essence, the school will accept liability since the activities are taking place during the regularly scheduled physical education class.

I understand that the compensation for our time and effort in this project for the next two years is:

- The school will receive a stipend of $500 to use at their discretion.
- The physical education Departments will receive a $500 gift certificate for physical education equipment.
- All students entering grades 4 and 5 in the fall will receive small items (e.g., water bottles, pencils, stickers).
- The school will receive a summary of the evaluation at the end of the study.

Signature Section	
School Principal	Date
MDE Contact Person	Date

Appendix C

Michigan's Physical Education Evaluation
INTERVENTION SCHOOL - PARENT PERMISSION FORM

Note: Reading level is 7.5

What's Going On?

Our school is taking part in a special research study called the *Michigan Physical Education Evaluation.* Our school uses a physical education program called the Exemplary Physical Education Curriculum (EPEC). EPEC teaches students skills to help them be physically fit and active for life. The purpose of the study is to see what students are learning about physical activity and fitness. There are 20 schools and 800 students across Michigan who are part of this study for the next two years.

Who Is Doing the Study?

This evaluation study is through the Michigan Department of Education and the Michigan Department of Health. The Centers for Disease Control and Prevention and ETR Associates, a non-profit health education company, are helping with the study.

What Would Happen?

Students taking part in the study would do four things:

(1) Students would go to their regular *physical education (PE) class. This is a routine school activity; it is not done specifically for this research study. The PE teachers would use the EPEC program* at their school. The lessons would give students knowledge and skills to be physically active. The program would be part of students' normal school day.

(2) Students would fill out a survey four times over the next two years on their knowledge and ideas about physical activity. The survey would take 30 minutes to fill out each time. The survey is not a test. The questions would be easy to answer.

(3) Students would fill out a survey four times over the next two years about the physical activities they did on the previous day. The survey would take 30 minutes to fill out each time. The survey is not a test. The questions would be easy to answer.

(4) Students would do exercise tests four times over the next two years. The tests would be a regular part of PE class. The tests would take 60 minutes to complete each time. The students are not graded on these tests. The activities would be easy to complete.

How Would Children Be Affected?

This evaluation study presents a small amount of risk to students. Students might be uncomfortable answering questions that deal with their skills. The answers on the survey would be private. Students do not have to answer any questions if they do not want to. If a student decides not to take the survey, it would not affect whether he/she can take part in any other school program. And it would not impact their grade.

The exercise tests present a small amount of risk to students. The risks are no greater than the risks of exercise during regular PE classes. Students may have some discomfort, embarrassment, or loss of privacy doing the tests. Students could decide not to take part in these tests. If there is a medical emergency, we will use the school's regular emergency procedures. If a student decides not to do the exercise test, it would not affect whether he/she can take part in any other school program. And it would not impact their grade.

How Would This Help Students?

Students who take part in this evaluation study would help us improve our school physical education programs. All students would get small items such as pencils, stickers, or water bottles for their time and effort in taking part.

Would Anybody Know My Child's Answers?

Your child's answers on all of the surveys would be kept private. Your child's name would not be on the survey. No one at school would know the students' answers. Confidential identification numbers would be used to keep track of students who take part in the survey. The identification numbers would be destroyed at the end of the project (June, 2005). Your child's name would never be in any of our reports. Copies of the surveys may be reviewed upon request.

Does My Child Have to Take Part?

Your child is free to join this evaluation study or not. He/she may stop at any time without any penalty. If your child does not participate in the study, the teacher will give him/her other activities during class time.

Your child should <u>not</u> participate in the exercise test if he/she does not usually go to PE class for medical reasons. Your child should <u>not</u> participate in the exercise test if he/she has a physical or medical condition that might cause health problems during the exercise test. These conditions are listed below.

What if My Child has a Medical Condition?

Your child should **not** participate in the exercise test if he/she has any of these physical or medical conditions. These concerns might cause health problems during the test

- Muscle, bone, or joint problems that limit his/her ability to ride a bike
- Heart problem that requires a limit in physical activity

- Fainting with exercise in the past 6 months
- Uncontrolled asthma
- Very high blood pressure that is not controlled on medication
- Diabetes with frequent very low or very high blood glucose levels (sugars)
- Thyroid problems not controlled on medication
- Seizures not controlled on medication
- Sickle cell disease, cystic fibrosis, anorexia nervosa, severe kidney problems, or severe liver problems
- A blood condition that increases the risk of bleeding

What If I Have Questions?

Here are three people you can call about *EPEC* or the evaluation study:

- Elizabeth Coke Haller, Acting Supervisor, Curriculum Leadership Unit, Michigan Department of Education at (517) 373-1233; hallere@michigan.gov
- Dr. Lisa Russell, ETR Principal Investigator: (866) 659-4093 ext. 184; lisar@etr.org
- Dr. William Kane, ETR Associates IRB Committee Chair: (505) 865-3370; kanb@etr.org

For questions about your child's rights as a participant in this evaluation study call:

- CDC's Deputy Associate Director for Science at 1-800-584-8814. Please leave a brief message with your name and phone number. Say that you are calling about CDC protocol # 4035.

How Do I Give My Permission?

If you give your permission you do not have to do anything. If you do NOT want your child to take part, please fill out the form below and give it to your child's physical education teacher.

Child's Name: _____ Grade:_____

I have read this form concerning the *Michigan Physical Education Evaluation* study.

_____My child **does <u>not</u>** have my permission to take part.

_____ _____ _____

Date Signature of Parent/Guardian Print Parent/Guardian Name

Michigan's Physical Education Evaluation
COMPARISON SCHOOL - PARENT PERMISSION FORM

Note: Reading level is 7.2

What's Going On?

Our school is taking part in a special research study to evaluate a program called the *Michigan Physical Education Evaluation.* Physical education (PE) teaches students how to be physically fit and active for life. The purpose of the study is to see what students are learning about physical activity and fitness from in their PE class. There are 20 schools and 800 students across Michigan who are part of this study for the next two years. Our school is a control school, which means there is no new program. We will continue to teach PE as usual.

Who Is Doing the Study?

This evaluation is through the Michigan Department of Education and the Michigan Department of Health. The Centers for Disease Control and Prevention and ETR Associates, a non-profit health education company, are helping with the study.

What Would Happen?

Students in the evaluation study would do four things:

(1) Students would go to their regular *physical education (PE) class*. *This is a routine school activity; it is not done specifically for this research study.*

(2) Students would fill out a survey four times over the next two years on their knowledge and ideas about physical activity. The survey would take 30 minutes to fill out each time. The survey is not a test. The questions would be easy to answer.

(3) Students would fill out a survey four times over the next two years about the physical activities they did on the previous day. The survey would take 30 minutes to fill out each time. The survey is not a test. The questions would be easy to answer.

(4) Students would do exercise tests four times over the next two years. The tests would be a regular part of PE class. The tests would take 60 minutes to complete each time. The students are not graded on these tests. The activities would be easy to complete.

How Would Children Be Affected?

This study presents a small amount of risk to students. Students might be uncomfortable answering questions that deal with their skills. The answers on the survey would be private. Students do not have to answer any questions if they do not want to. If a student decides not to take the survey, it would not affect whether he/she can take part in any other school program. And it would not impact their grade.

The exercise tests present a small amount of risk to students. The risks are no greater than the risks of exercise during regular PE classes. Students may have some discomfort, embarrassment, or loss of privacy doing the tests. Students could decide not to take part in these tests. If there is a medical emergency, we will use the school's regular emergency procedures. If a student decides not to do the exercise test, it would not affect whether he/she can take part in any other school program. And it would not impact their grade.

How Would This Help Students?

Students who take part in this evaluation study would help us improve our school physical education programs. All students would get small items such as pencils, stickers, or water bottles for their time and effort in taking part.

Would Anybody Know My Child's Answers?

Your child's answers on all of the surveys would be kept private. Your child's name would not be on the survey. No one at school would know the students' answers. Confidential identification numbers would be used to keep track of students who take part in the survey. The identification numbers would be destroyed at the end of the project (June, 2005). Your child's name would never be in any of our reports. Copies of the surveys may be reviewed upon request.

Does My Child Have to Take Part?

Your child is free to join this evaluation study or not. He/she may stop at any time without any penalty. If your child does not participate in the study, the teacher will give him/her other activities during class time.

Your child should <u>not</u> participate in the exercise test if he/she does not usually go to PE class for medical reasons. Your child should <u>not</u> participate in the exercise test if he/she has a physical or medical condition that might cause health problems during the exercise test. These conditions are listed below.

What if My Child has a Medical Condition?

Your child should not participate in the exercise test if he/she has any of these physical or medical conditions. These concerns might cause health problems during the test

- Muscle, bone, or joint problems that limit his/her ability to ride a bike
- Heart problem that requires a limit in physical activity
- Fainting with exercise in the past 6 months

- Uncontrolled asthma
- Very high blood pressure that is not controlled on medication
- Diabetes with frequent very low or very high blood glucose levels (sugars)
- Thyroid problems not controlled on medication
- Seizures not controlled on medication
- Sickle cell disease, cystic fibrosis, anorexia nervosa, severe kidney problems, or severe liver problems
- A blood condition that increases the risk of bleeding

What If I Have Questions?

Here are three people you can call about the evaluation study:

- Elizabeth Coke Haller, Acting Supervisor, Curriculum Leadership Unit, Michigan Department of Education at (517) 373-1233; hallere@michigan.gov
- Dr. Lisa Russell, ETR Principal Investigator: (866) 659-4093 ext. 184; lisar@etr.org
- Dr. William Kane, ETR Associates IRB Committee Chair: (505) 865-3370; kanb@etr.org

For questions about your child's rights as a participant in this evaluation study call:

- CDC's Deputy Associate Director for Science at 1-800-584-8814. Please leave a brief message with your name and phone number. Say that you are calling about CDC protocol # 4035.

How Do I Give My Permission?

If you give your permission you do not have to do anything. If you do NOT want your child to take part, please fill out the form below and give it to your child's physical education teacher.

Child's Name: _____ Grade:_____

I have read this form concerning the *Michigan Physical Education Evaluation* study.

____My child **does <u>not</u>** have my permission to take part.

_____ _____ _____

Date Signature of Parent/Guardian Print Parent/Guardian Name

Michigan's Physical Education Evaluation
STUDENT ASSENT FORM
Intervention & Comparison Schools

Note: Reading level is 4.2

What's Going On?

Our school is part of a study called the *Michigan Physical Education Evaluation.* The purpose of this study is to see what students are learning in PE class. There are 20 schools and 800 students in Michigan in this study. You are being asked to take part in this research study.

Who Is Doing the Study?

The Michigan Department of Education and the Michigan Department of Health is doing the project. The Centers for Disease Control and Prevention and ETR Associates are helping with the study.

What Would Happen?

If you decide to be a part of study, you would do four things. The study will last for 2 years.

(1) You would go to your regular *PE class.*

(2) You would fill out a survey four times about exercise. The survey would take about 30 minutes each time. It is not a test and there are no right or wrong answers. The questions would be easy to answer. It does not affect your grade.

(3) You would fill out a survey four times about the activities you did yesterday. The survey would take about 30 minutes each time. It is not a test. The questions would be easy to answer. It does not affect your grade.

(4) You would do exercise tests four times in PE class. It does not affect your grade.

How Would I Be Affected?

We will do everything we can to keep your surveys and exercise tests private. But there is a small chance that we will not be able to. If a question makes you upset or embarrassed, you do not have to answer it. If you want to stop, you can. We do not want you to feel upset. This would not affect your grade.

We will do everything we can to keep you safe. But there is a small chance that we will not be able to. If you are uncomfortable or get hurt while you are doing the exercise tests, you

can stop. If you are hurt, we would follow the regular school procedures for taking care of the problem. This would not affect your grade.

How Would This Help Me?

Students would get small things for their effort, such as pencils or water bottles. Students who take part in this study would help improve school PE programs.

Would Anybody Know My Answers?

Your answers on all of the surveys would be kept private. Your name would not be on the survey. Your name would never be in any of our reports.

Do My Parents Know About this?

Information about the study was sent home to explain about it to your parents. Your parents can decide that they do not want you to be part of the study. They need to return the permission form to let us know.

Do I Have to Take Part?

You are free to join this study or not. You may stop at any time you want. Your grade will not be affected.

You should not do the exercise test if you do not go to PE class. You should not do these tests if your parents, a nurse, or a doctor has told you not to go to PE class.

What If I Have Questions?

If you have questions about the study, you can ask your parents, the school nurse, your doctor or the people in charge of the study.

Here are two people you can call about the evaluation study:

- Elizabeth Coke Haller, Acting Supervisor, Curriculum Leadership Unit, Michigan Department of Education at (517) 373-1233; hallere@michigan.gov
- Dr. Lisa Russell, ETR Principal Investigator: (800) 875-4093 ext. 184; lisar@etr.org
- Dr. William Kane, ETR Associates IRB Committee Chair: (505) 865-3370; kanb@etr.org

For questions about your rights as a participant in this research study call:

- CDC's Deputy Associate Director for Science at 1-800-584-8814. Please leave a brief message with your name and phone number. Say that you are calling about CDC protocol # 4035.

How do I join the study?

If you want to join, please check the first line on the next page. Then print your name, and sign your name with today's date. You will get a copy of this form.

If you DO NOT want to take part in the study, please check the second line. It is not necessary to print, sign your name, or date the form.

I have read this form that describes what it means to agree to join the study (called the assent form). All my questions were answered. All parts of the *Michigan Physical Education Evaluation* study are clear to me.

Please check one:

_____ YES - I ***give assent*** to be part of the *Michigan Physical Education Evaluation* study and I have received a copy of this assent form.

_____ NO - I ***DO NOT give assent*** to be part of the *Michigan Physical Education Evaluation* study.

_____ _____

Child Name - Please Print Child Signature of Assent

_____

Date

Appendix D

Study Instruments

Student Survey
SAPAC
Motor Skill assessment
Fitness assessment
Teacher Survey
Teacher Log

Michigan Physical Education Survey

- This survey is voluntary. This means that it is up to you whether or not you complete this survey. You do not have to finish it, but we hope that you will.
- This survey is about physical activity. Physical activity is bodily movement such as when you move your arms and legs. You do some physical activities to move from place to place, like running or walking. Some physical activities you do in one place, like throwing a frisbee or sit ups.
- Your answers will help schools find better ways to help students be active and healthy.
- No one but you will know how you answer these questions.
- Please mark only one answer for each question.
- Please fill in the bubbles neatly with a #2 pencil.
- Please read every question carefully.

Today's Date: _____

School: _____

Grade: _____

Name: _____

Survey ID number: _____

Please fill in your name and remove this page from your survey. This page will be collected before we begin.

Thank you for taking this survey!

Please mark one choice for each of the following questions.

1. How old are you?
   - ○ 9 years old, or younger than 9
   - ○ 10 years old
   - ○ 11 years old
   - ○ 12 years old
   - ○ 13 years old, or older than 13

2. Are you a girl or a boy?
   - ○ Girl
   - ○ Boy

3. What grade are you in?
   - ○ 4th grade
   - ○ 5th grade
   - ○ 6th grade
   - ○ Other: (list) _____

4. How many years have you gone to this school, including this year?
   - ○ 1
   - ○ 2
   - ○ 3
   - ○ 4
   - ○ 5
   - ○ 6
   - ○ 7 or more

5. How do you describe yourself? (Select one or more responses.)
   - ○ American Indian or Alaska Native
   - ○ Asian
   - ○ Black or African American
   - ○ Hispanic or Latino
   - ○ Native Hawaiian or Other Pacific Islander
   - ○ White
   - ○ Other: (list)_____

Please mark the circle that describes how sure you are that you can do each thing. How sure are you that you can do each of these things?

6. Run and leap a little bit farther than the length of a yardstick (40 inches)

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

7. Run and leap over four hurdles in a row

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

8. Stand in the ready position with a tennis racquet

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

9. Drop a tennis ball and hit it forward after it bounces one time

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

10. Hop to the beat of fast and slow music

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

11. Hop to the beat of fast and slow music while hopping to the right and left

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

12. Kick a still ball so it hits a target on the gym wall

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

13. Kick a ball that is rolling away from you so it hits a target on the gym wall

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

14. Lift a heavy box off the floor, carry it across the room, and lower it to the floor using proper form

I know I cannot	I'm not sure I can	I think I can	I know I can
○	○	○	○

Please mark the circle that describes how much you *learn about the following skills in physical education class* (or PE class). There are no right or wrong answers.

15. In PE class, how much do you learn about how to cooperate and keep trying even if something doesn't go the way that you want it to?

Not at all	A little	A lot
○	○	○

16. In PE class, how much do you learn about how to disagree without arguing?

Not at all	A little	A lot
○	○	○

17. In PE class, how much do you learn about how to listen without interrupting?

Not at all	A little	A lot
○	○	○

18. In PE class, how much do you learn about how to be prepared for class?

Not at all	A little	A lot
○	○	○

19. In PE class, how much do you learn about how to be honest?

Not at all	A little	A lot
○	○	○

20. In PE class, how much do you learn about how to admit mistakes?

Not at all	A little	A lot
○	○	○

The next questions ask you about yourself.
Mark the box next to the sentence in each pair that is more like YOU. Pick just one.
Pick the one that is true for you <u>most of the time</u>.

21.	I do very well at all kinds of games and sports.	OR	I <u>don't</u> feel I am very good when it comes to most games and sports.
22.	I wish I could be a lot better at most games and sports.	OR	I feel I am good enough at most games and sports.
23.	I think I could do well at most games and sports I have not tried before.	OR	I am afraid I might <u>not</u> do well at most games and sports I have not tried before.
24.	I feel I am <u>better</u> than others my age at most games and sports.	OR	I <u>don't</u> feel I can play most games and sports as well as others my age.
25.	I would rather <u>watch other kids play</u> games and sports.	OR	I would rather <u>play</u> games and sports.
26.	I am <u>not good</u> at most new outdoor games and sports that I try.	OR	I am <u>good</u> at most new outdoor games and sports that I try.

Mark the circle that you think is the best response to the question.

27. Does regular physical activity make your bones strong?

No	Yes	Not Sure
○	○	○

28. Does regular physical activity make your heart beat faster all of the time?

No	Yes	Not Sure
○	○	○

29. Does regular physical activity give you more energy?

No	Yes	Not Sure
○	○	○

30. Do push-ups increase your aerobic (cardiovascular) fitness?

No	Yes	Not Sure
○	○	○

31. Does stretching increase your aerobic (cardiovascular) fitness?

No	Yes	Not Sure
○	○	○

32. Does running increase your aerobic (cardiovascular) fitness?

No	Yes	Not Sure
○	○	○

33. Is finishing a job a sign of being responsible?

No	Yes	Not Sure
○	○	○

34. Is listening without interrupting a sign of being responsible?

No	Yes	Not Sure
○	○	○

35. Is telling others their mistakes a sign of being responsible?

No	Yes	Not Sure
○	○	○

36. Is being prepared for class a sign of self-control?

No	Yes	Not Sure
○	○	○

37. Is telling the truth a sign of self-control?

No	Yes	Not Sure
○	○	○

38. Is walking away to cool off a sign of self-control?

No	Yes	Not Sure
○	○	○

39. How often have you shown your parents/guardian a skill you learned in PE class?

- ○ Never
- ○ A few times
- ○ A lot of times
- ○ All of the time

40. How often have you talked to your parents/guardian about the ideas you learned in PE class?

- ○ Never
- ○ A few times
- ○ A lot of times
- ○ All of the time

The next questions ask about yourself (mark one answer for each question).

During a normal week, how many times do the following things happen?

41. You encourage your friends to do physical activities or play sports?

None	One time	A few times	Almost every day	Every day
○	○	○	○	○

42. Your friends encourage you to do physical activities or play sports?

None	One time	A few times	Almost every day	Every day
○	○	○	○	○

43. Other kids tease you for not being good at physical activity or sports, when they are not joking?

None	One time	A few times	Almost every day	Every day
○	○	○	○	○

The next questions ask you about your neighborhood (mark one answer for each question).

44. At home there are enough supplies and sports equipment (like balls, bicycles, skates) to use for physical activity.

Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
○	○	○	○	○

45. There are playgrounds, parks, or gyms close to my home that I can get to easily.

Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
○	○	○	○	○

46. The playgrounds, parks, or gyms close to my home are in good condition.

Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
○	○	○	○	○

47. It is safe to walk or jog in my neighborhood. (Safe means there is not very much traffic, there are sidewalks, there are no scary dogs, there are no gangs, and so on.)

Strongly disagree	Somewhat disagree	No opinion	Somewhat agree	Strongly agree
○	○	○	○	○

The next question asks you about your PE class (mark one answer for each question).

48. How much do you enjoy physical education classes at school?

Very un-enjoyable	Somewhat un-enjoyable	No opinion	Somewhat enjoyable	Very enjoyable
○	○	○	○	○

The next question asks you about different physical activities. Please circle yes or no if you know how to do each physical activity. Then circle yes or no if you do each physical activity often.

49. Physical Activities	**I know how to do this**		**I do it often** (when the weather is right)	
Bicycling	Yes	No	Yes	No
Skating (in-line, roller, ice, skateboarding)	Yes	No	Yes	No
Swimming	Yes	No	Yes	No
Basketball	Yes	No	Yes	No
Baseball/softball	Yes	No	Yes	No
Football	Yes	No	Yes	No
Soccer	Yes	No	Yes	No
Volleyball	Yes	No	Yes	No
Hockey (street or ice)	Yes	No	Yes	No
Racket sports - like Badminton or tennis	Yes	No	Yes	No
Walking	Yes	No	Yes	No
Running	Yes	No	Yes	No
Gymnastic or tumbling	Yes	No	Yes	No
Jump rope	Yes	No	Yes	No
Dance (any type)	Yes	No	Yes	No
Fitness activities - like push-ups, sit-ups, jumping jacks	Yes	No	Yes	No
Ball playing - like four square, kick ball	Yes	No	Yes	No
Running games - like chase, tag, hide and seek	Yes	No	Yes	No
Outdoor play - like climbing trees	Yes	No	Yes	No
Sledding	Yes	No	Yes	No
Skiing (cross-country or downhill, snowboarding)	Yes	No	Yes	No
Snowshoeing	Yes	No	Yes	No
Other: _____	Yes	No	Yes	No

The next questions ask you about yourself (mark one answer for each question).

50. How much time each day do you usually spend watching TV, videos or DVDs at on a school day but not during school?

- ○ I don't watch TV videos or DVDs on most school days
- ○ Less than 1 hour
- ○ About 1 hour
- ○ About 2 hours
- ○ 3 hours or more

51. How much time each day do you usually spend on the computer on a school day but not during school?

- ○ I don't use the computer on most school days
- ○ Less than 1 hour
- ○ About 1 hour
- ○ About 2 hours
- ○ 3 hours or more

52. How much time each day do you usually spend playing Nintendo, PlayStation or video games on a school day?

- ○ I don't play Nintendo, PlayStation or video games on most school days
- ○ Less than 1 hour
- ○ About 1 hour
- ○ About 2 hours
- ○ 3 hours or more

The next questions ask you about your PE class this past year:

53. Do you think your PE class has helped you become more physically active?

No, not at all	No, not much	Yes, a little	Yes a lot
○	○	○	○

54. Do you think your PE class has helped you learn how to do new things?

No, not at all	No, not much	Yes, a little	Yes a lot
○	○	○	○

55. Do you like going to PE class?

No, not at all	No, not much	Yes, a little	Yes a lot
○	○	○	○

56. Do you think the PE teacher helped you learn about fitness and health?

No, not at all	No, not much	Yes, a little	Yes a lot
○	○	○	○

57. Do you have any suggestions on how to make PE a better class?

Thank you for completing this survey!

Self-Administered Physical Activity Checklist (SAPAC)

Please fill in your name and remove this page from your survey. This page will be collected before we begin.

Please wait for more instructions before starting.

Self-Administered Physical Activity Checklist

Please wait for instructions before starting.

1. Write in the number of minutes you spent in each activity. It only counts if you spent 5 minutes or more on each activity.

2. Put **one** check mark in one of the "None, Some, or Most" columns for each activity.

- Put the check mark in the box under "N" if the activity made you breathe hard or feel tired **none of the time**.
- Put the check mark in the box under "S" if the activity made you breathe hard or feel tired **some of the time**.
- Put the check mark in the box under "M" if the activity made you breathe hard or feel tired **most of the time**.

Activity	**Before school**		**During school**		**After school**	
	Minutes	N-S-M	Minutes	N-S-M	Minutes	N-S-M
1. Walking						
2. Running						
3. Bicycling						
4. Skating (in-line, roller, ice, skateboarding)						
5. Swimming						
6. Basketball						
7. Baseball/softball						
8. Football						
9. Soccer						
10. Volleyball						
11. Hockey (floor, street, or ice)						
12. Racket sports: Badminton or tennis						

Activity	Before school		During school		After school	
	Minutes	N-S-M	Minutes	N-S-M	Minutes	N-S-M
13. Gymnastic or tumbling						
14. Jump rope						
15. Dance (any type)						
16. Fitness activities: push-ups, sit-ups, jumping jacks						
17. Ball playing: four square, kick ball						
18. Running games: chase, tag, hide and seek						
19. Outdoor play: climbing trees						
20. Sledding						
21. Skiing (cross-country or downhill)						
22. Snowshoeing						
23. Outdoor chores: mowing, raking, gardening, shoveling snow						
24. Indoor chores: mopping, vacuuming, sweeping						
25. PE class						
26. Other:						
27. Other:						
28. Other:						
29. Other:						

Michigan Physical Education Evaluation (MPEE) K-5

4th Grade Motor Skills and Fitness Student Data Collection Form

Today's Date: _____

School: _____

Grade: _____

Name: _____

Survey ID number: _____

ID #

Michigan Physical Education Evaluation (MPEE) K-5

4th Grade Motor Skills and Fitness Student Data Collection Form

Curl Ups (Abdominal Strength)

Data Collector:_____ _____Number of Curl Ups

Lift and Carry - 2 tries

Data Collector: _____

4th grade										
 •feet even and wide as box	 •flex hips and knees to grab	 • grab with back straight • grab with both hands		 •lift with back straight by extending hips/ knees	 •carry with back straight and perpendicular to ground, weight over base of support	 • flex hips and knees to lower • lower with back straight •feet wide and even			**Distance** • carry weighted box through course
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

Overhand strike - 4 tries

Data Collector: _____

4th Grade									
 • ready position facing target	 •correct grip	 • side to target, racket hand back	 • step toward target and swing	 • *strike ball at waist height* • swing low to high		 • *finish with hips forward*	***Distance & Accuracy*** • forward 20' in the air △ •forward 35' in the air ☐		
☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	△ △ △ △	☐ ☐ ☐ ☐	

Michigan Physical Education Evaluation (MPEE) K-5

5th Grade Motor Skills and Fitness Student Data Collection Form

Today's Date: _____

School: _____

Grade: _____

Name: _____

Survey ID number: _____

ID #

Michigan Physical Education Evaluation (MPEE) K-5

5th Grade Motor Skills and Fitness Student Data Collection Form

Fitness tests

Curl Ups (Abdominal Strength)

Data Collector:_____ _____Number of Curl Ups

Lift and Carry - 2 tries

Data Collector: _____

5th grade	 •feet even and wide as box	 •flex hips and knees to grab	 • grab with back straight • grab with both hands	 •lift with back straight by extending hips/ knees	 •carry with back straight and perpendicular to ground, weight over base of support	 • flex hips and knees to lower • lower with back straight • feet wide and even	Distance • carry weighted box through course • change directions △
	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐	☐	☐ ☐ ☐ ☐ ☐ △ △

Overhand strike - 4 tries

Data Collector: _____

5th Grade	 • ready position facing target	 •correct grip	 • side to target, racket hand back	 • step toward target and swing	 • strike ball at waist height • swing low to high	 • finish with hips forward	*Distance & Accuracy* • over net without touching net △ • lands inbounds ☐
	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	△ △ △ △ ☐ ☐ ☐ ☐

Michigan Physical Education Evaluation (MPEE) K-5

PACER & Leap Student Data Collection Form

Today's Date: _____

School: _____

Grade: _____5th_____

Name: _____

Survey ID number: _____

Michigan Physical Education Evaluation (MPEE) K-5

ID # _____

Upper Body Strength - Push Ups Data Collector: _____ _____Number of Push Ups	Flexibility - Back Saver Sit and Reach Data Collector: _____ L - _____ R - _____

Data collector Name:_____

❑ Aerobic Capacity - The Pacer: _____ Number of laps

Data collector Name:_____

❑ Leap - 2 tries

5th Grade Leap	 run	 • bend	 • swing lead leg	 • reach opposite hand	 • bend on landing	 run	**Leaping Hurdles** • number hurdles cleared ☐ • smooth and continuous run ☐	
		☐ ☐	☐ ☐	☐ ☐	☐ ☐		☐ ☐	☐ ☐

Michigan Physical Education Evaluation (MPEE) K-5

PACER & Leap Student Data Collection Form

Today's Date: _____

School: _____

Grade: ____4th_____

Name: _____

Survey ID number: _____

Michigan Physical Education Evaluation (MPEE)

ID # _____

Upper Body Strength - Push Ups	Flexibility - Back Saver Sit and Reach
Data Collector: _____ _____Number of Push Ups	Data Collector: _____ L - _____ R - _____

Data collector Name:_____

❑ Aerobic Capacity - The Pacer: _____ Number of laps

Data collector Name:_____

❑ Leap - 2 tries

4th Grade Leap	 run	 • bend	 • swing lead leg	 • reach opposite hand	 • bend on landing	 run	**Distance** • clears 40" • runs • smooth and continuous motion		
		☐ ☐	☐ ☐	☐ ☐	☐ ☐		☐ ☐	☐ ☐	☐ ☐

Michigan Physical Education Evaluation K-5

Teacher Survey

1. Name: _____

2. School: _____ 3. District: _____

4. Date: _____ 5. Gender: F M

6. Are you certified to teach Physical Education in grades K-12?
   - ❑ Yes
   - ❑ No

7. In what field do you have your degree?
   - ❑ Physical Education ❑Kinesiology ❑ Other: _____

8. Please verify your previous responses to the following questions. If this information is correct, please circle yes and continue with the next questions. If the information provided below is incorrect, please circle no and write in the correct information in the next space.

PE Curricula	Correct?	If No, please identify
5th grade curriculum: _____	Yes No	
6th grade curriculum: _____ Our district curriculum: EPEC	Yes No	

9. Have you ever had training for the curriculum you identified above?
   - ➢ 5th Grade Curriculum
     - ❑ Yes - If yes, how many hours did you spend on the training? _____
     - ❑ No
   - ➢ 6th Grade Curriculum
     - ❑ Yes - If yes, how many hours did you spend on the training? _____
     - ❑ No

10. Does the curriculum you identified above require additional or special equipment?
   - ➢ 5th Grade Curriculum
     - ❑ Yes
       If yes, what is the estimated value of the equipment you have purchased or had donated?
     - ❑ No

- 6th Grade Curriculum
  - ❑ Yes
    If yes, what is the estimated value of the equipment you have purchased or had donated? $____
  - ❑ No

11. Please describe any additional PE resources or parts of other PE curricula that you use to supplement or enrich your teaching:

How many years have you been teaching:	Years
12. In this school?	
13. In this district?	
14. At the elementary level?	
15. Physical Education?	
16. The 5th grade PE curriculum identified above?	
17. The 6th grade PE curriculum identified above?	

18. Does your curriculum include a lesson on the following motor skills:

- Leap ❑ No ❑ Yes
- Forehand strike ❑ No ❑ Yes
- Lift and carry ❑ No ❑ Yes

After your initial introduction to the skill, did your students have opportunities in PE class to utilize these motor skills?

- Leap ❑ No ❑ Yes, in how many class periods was this skill used? ___
- Forehand strike ❑ No ❑ Yes, in how many class periods was this skill used? ___
- Lift and carry ❑ No ❑ Yes, in how many class periods was this skill used? ___

19. Please describe the format of your PE classes in the past school year at this school. Please report this for each section of the class that you teach at 4th and 5th grade. (By section, we mean each separate class that comes to you for physical education.)

- How many sections of 4th graders do you teach each week? _____
- How many sections of 5th graders do you teach each week? _____

	Number of students enrolled	Number of teaching aides or co-teachers	Number of days taught per week	Average number of minutes per class period	Total number of class periods cancelled due to school events or activities
5th grade - section 1					
5th grade - section 2					
5th grade - section 3					
6th grade - section 2					
6th grade - section 3					
6th grade - section 4					

20. Please circle the number that reflects your opinion.

This school year how would you rate the support for PE at your school from...?	Very unsupportive	Somewhat unsupportive	Neutral	Somewhat supportive	Very supportive
Principal	1	2	3	4	5
Teachers	1	2	3	4	5
Students	1	2	3	4	5
Parents	1	2	3	4	5

21. Did you have a PE equipment budget this year?

❑ Yes, if yes please identify approximate amount $_____

Approximately how much of this year's budget did you spend?

❑ 0-25% ❑ 26-50% ❑51-75% ❑ 76% or more

❑ No

22. Does your school (or District) provide you with paid class preparation time each week?

❑ Yes, _____ total minutes per week spent preparing for all 5th and 6th grade sections

❑ No

23. Have you received any of the following support for your Physical Education program this year? (Please check all that apply and fill in the blanks where appropriate.)

- ❑ Time donated by the principal, approximate number of hours _____
- ❑ Time donated by other teachers, approximate number of hours _____
- ❑ Time donated by parents, approximate number of hours _____
- ❑ Equipment donated, approximate amount $_____
- ❑ Other: _____

24. Have there been any school-wide events this year that promoted physical activity or otherwise affected students' attitudes or exposure to physical activity (e.g. programs, assemblies, activities, Jump Rope for Heart, etc.)?

25. Please describe any topics that you find challenging to teach at 4th, 5th, or 6th grade level.

26. Any additional comments?

Thank you for completing this survey and for all of your help over the past 2 years!!!

Teacher Implementation Log

MICHIGAN PHYSICAL EDUCATION EVALUATION

Please be sure to complete one log form for every lesson!

Grade:_____ Are you provided with a written lesson plan for this lesson: yes no

Primary source for this lesson: _____

Lesson objectives: _____

Date(s) lesson implemented:_____

Identify which NASPE Content Standards were covered in this lesson (mark all that apply):

- ❑ #1: Motor skills and movement patterns
- ❑ #2: Movement concepts principals, strategies, tactics
- ❑ #3: Regularly physical activity
- ❑ #4: Physical fitness
- ❑ #5: Personal and social behavior
- ❑ #6: Value physical activity

Thinking about all of the sections you taught for this lesson, answer the following questions.

1. How much of your class time was spent on the following activities?

		Didn't do in this lesson	less than 25%	25-50%	51- 75%	more than 76%
a.	Prepare/orient students	O	O	O	O	O
b.	Explain/demonstrate activity or skill	O	O	O	O	O
c.	Practice activity or skill	O	O	O	O	O
d.	Review activity or skill	O	O	O	O	O
e.	Preview next lesson	O	O	O	O	O
f.	Classroom management	O	O	O	O	O

2. Overall how closely did you follow the instructions and prescribed methods for this lesson?

Exactly	Very	Somewhat	A little bit	Not at All
O	O	O	O	O

3. How did you use each section of the written lesson plan? Check all that apply.

Lesson plan sections:	Used as described	Made changes (omitted, added, or revised). Please describe.	NA
Standards			
Materials			
Outcomes			
Approach			
Procedure			
Student assessment			

4. Comments/suggestions for modifications of this lesson (from teacher or students):

Appendix E

Background on Fitness testing

Fitness assessments. Physical fitness is a product of physical activity and includes health-related components, skill-related components, and physiological components. In the school-based physical education setting, the fundamental focus is on functional health and well being (health-related fitness) which then forms the foundation for skill related fitness. Health-related physical fitness includes elements of cardiovascular-respiratory fitness, muscular strength and endurance, flexibility, and body composition.

One of the most widely used standards of fitness testing in school-based physical education classes is the Fitnesgram from The Cooper Institute for Aerobics Research (http://www.cooperinst.org/ftgmain.asp). The Fitnesgram was developed to provide physical education teachers with an easy way to report the results of physical fitness assessments. Students are assessed in three general areas of health-related fitness. Scores are evaluated against objective criterion standards that indicate a level of fitness necessary for health. This battery of tests suggests selecting one test from each category: *Aerobic Capacity (t*he Pacer shuttle run, the one mile walk/run, or the walk test); *Body Composition (*percent body fat - calculated from triceps and calf skinfold measurements or Body Mass Index - calculated from height and weight); *Muscle Strength, Endurance, and Flexibility* (Abdominal Strength: curl-up test; Trunk Extensor Strength and Flexibility: trunk lift; Upper Body Strength: 90 degree push-up, pull-up, flexed arm hang, or modified pull-up; Flexibility: back-saver sit-and-reach or shoulder stretch) (Cooper Institute, 2001).

Fitness assessments were selected based on an analysis of the standard laboratory and common field measures of health-related fitness, the goals and objectives of the EPEC program, and the resources of the evaluation. For cardiovascular or aerobic fitness, the 20 meter Progressive Aerobic Cardiovascular Endurance Run (PACER) was selected. It is a modified multistage 20-meter shuttle run that requires the child to run back and forth over a 20-meter distance at speed increments of approximately one metabolic equivalent until they reach volitional fatigue (Freedson, Cureton, and Heath, 2000). The PACER test is ideal for data collection in the school because the test can be performed indoors in limited space, is fun, and does not require self-monitored pacing (Freedson, Cureton, and Heath, 2000). High reliability coefficients (r=0.93) for the PACER test have been reported in schoolchildren (Boreham, Paliczka, and Nichols, 1990). The maximal oxygen uptake predicted from the shuttle run for 8-19 year olds compared favorably (r=0.71) with directly measured VO_2max (Leger , Mercier, Gadoury, Lambert, 1988).

Research has shown that the curl-up test possesses logical (i.e., content and construct) validity as a test of abdominal strength/endurance. Although there is a lack of definitive criterion measures of abdominal strength, the curl-up appears to be the preferred method

over sit ups (The Cooper Institute, 2001). The Fitnesgram protocol for the curl-up was selected as the measure of abdominal strength.

Student surveys conducted by The President's Council on Physical Fitness and Sports and others have shown that the majority of children can not complete the expected number of pull-ups or flexed arm hangs. However, the majority of children can successfully perform the push-up assessment and have a more favorable experience (The Cooper Institute, 2001). In addition no special equipment is required for this assessment. The Fitnesgram protocol for the push-up was selected as the measure of endurance.

For flexibility in the lower body, the Fitnesgram protocol for the back-saver sit and reach test was selected. Reliability data spanning a period of 50 years have shown that the stand and reach test, the sit and reach test, and the sit and reach test modified to accommodate anatomical differences are extremely consistent. In addition, the assessment protocol allows observers to evaluate each leg separately, which decrease the chance of hyperextensions of both knees and allows for the determination of symmetry (or asymmetry) in hamstring flexibility (The Cooper Institute, 2001).

Research has shown that body fatness in children and youth increase the likelihood of obesity-related adult diseases including coronary heart disease, hypertension and hyperlipodemia and type II diabetes (The Cooper Institute, 2001). However, since the EPEC program primarily focuses on skill acquisition and due to the sensitive nature of the data collection, body composition was not identified as a priority for assessment in this study.