



Research Report of the Month
NOVEMBER 2003

McKenzie, T.L., Donglin, L., Derby, C.A., Webber, L.S., Luepker, R.V., & Cribb, P. (2003).

Maintenance of effects of the CATCH physical education program: Results from the CATCH-ON study.

Health Education and Behavior, 30, 447-462.

The Study

The list of virtues reflected in the design and execution of this study should warm the cold heart of even the most skeptical critic of educational research. For examples, here we see the following:

1. A federal agency spending our tax dollars to support inquiry into a topic that might really be important to the health and lifelong well being of school children.
2. Researchers with various kinds of expertise (physical education, exercise science, public health, epidemiology, statistics) collaborating together to build, execute, and report a powerful study that evaluates a public school program.
3. Various kinds of public institutions (graduate schools of public health, university academic units, medical centers and schools) all acting to allow and encourage their personnel to participate in large scale research collaborations for which none of them exercise unique ownership.
4. Public schools (administrators, teachers, parents, students) cooperating with researchers in terms of allowing open access to ongoing education, and the assignment of school time for teacher development.
5. Researchers following up the long-term sustainability of an earlier school intervention by examining how faithfully a successful program has been continued after the support of added resources, teacher training, and on-site consultation have been withdrawn for five years.
6. A design for follow-up program evaluation that employs direct observation of regular physical education classes as a primary form of data collection.
7. A sample of schools and classes of such size and composition that, at the technical level, confident use of sophisticated forms of data analysis are allowed, and, at the political level, substantial authority is given to the researchers' subsequent assertions and recommendations.

Any one of those characteristics should please you – but here you can have them all assembled in a single study. The resulting research contrasts sharply with the norm for designing such projects. Many so-called "innovative" programs are introduced into schools without adequate provision for careful evaluation of results, and most such interventions ignore the need for long-term follow-up to ascertain how well the imported programs have been maintained after the researchers (and their resources) depart. The cost of those twin omissions is seen in the constant churning that exhausts teachers (who must cope with each innovation flavor of the month), yields little insight into what is effective, and undercuts the power of long-term, stable pedagogical effort.

In the work of McKenzie, et al., however, the physical education components of The Child and Adolescent Trial for Cardiovascular Health (CATCH-PE), a 1991-94 curriculum and teacher training intervention, taken together with the large-scale follow-up study conducted in 1998-2000 (presented here as CATCH-ON), you have a demonstration that neither of those design limitations need be true of how new physical education programs are evaluated. Moreover, the results derived from CATCH-ON point directly at what will be required if the next "innovative" school program is to persist in ways that allow it to exert an influence on children's lives that is both powerful and sustained.

Supported with federal funds, CATCH-PE had been a 2.5-year intervention (meeting the requirements for a true experiment) in third, fourth, and fifth grade physical education classes in 96 public elementary schools in four geographically and culturally diverse regions. Including PE curriculum and materials, professional development (in-service training in use of the curriculum for both PE specialists and classroom teachers), and continuing on-site consultations with teachers, CATCH-PE represented the largest-ever study of a PE curriculum and professional development program. Complete details concerning the original intervention may be found in any of the several CATCH-PE reports listed in the references for the present study.

Because one of the central intentions of the CATCH-PE curriculum was increasing the proportion of class time devoted to physical activity, outcome criteria included measurement of lesson time in which students were engaged in moderate to vigorous physical activity (MVPA%), or in vigorous physical activity (VPA%). The results were modest but very encouraging. Given CATCH-PE training and curriculum, both PE specialists and classroom teachers were able to produce outcomes on criterion measures that were significantly superior to those observed in control schools.

The researchers, however, were cautious – and with good reason. Previous experience with a similar program had suggested that when support was withdrawn some of the desirable results might erode over time. Teacher turnover (retirement, reassignment, resignations) alone might be expected to undercut program maintenance if continued indoctrination was not provided for new or new-to-system teachers. Also, there was particular concern about the ability of classroom teachers to sustain enthusiasm for the difficult burden of physical education once on-site support was withdrawn and barriers to enhanced performance might begin to reemerge. For those reasons (among others), long-term follow-up had been envisioned as part of the CATCH-PE design from the outset, and fortunately, the National Heart, Lung, and Blood Institute agreed that the follow-up strategy would be worthy of further support, and five years later, CATCH-ON was underway.

Participants and Context

Over a period of two years, the CATCH-ON study collected data during two randomly selected weeks from 1,904 PE lessons in 56 former CATCH-PE intervention schools, and 20 randomly selected (from the original 40) former CATCH-PE control schools.

Design and Method

For CATCH-ON the same observation instruments and research protocols used in CATCH-PE were used at the same grade levels. The outcome measures for MVPA% and VPA% were recorded for lessons in both intervention and control schools from the original study, and then divided to allow inspection and analysis of changes over the 5 intervening years (by grade level, controlling for teacher gender and specialty [physical education specialist or classroom teacher], and location of lessons either indoors or outdoors). Because both PE specialists and classroom teachers had received varying degrees of CATCH-PE training (this was particularly true in control schools where the in-service intervention had been made available subsequent to completion of the original CATCH-PE study), it also was necessary to carefully track "extent-of-training" as an additional variable.

Results

It is important to understand that the teachers for the lessons observed in CATCH-ON were not selected because they had received some (or all) of the available CATCH-PE training, or because they were using the CATCH-PE curriculum (with or without prior training). Thus, barely half (51%) of the teachers observed in intervention schools had some prior exposure to CATCH-PE, and the proportion of those with such training was even lower in control schools (36%). The normal process of information diffusion (the spreading through a school faculty of new ideas about teaching), however, meant that many teachers who had not been involved in the original study were (by 1999) employing some or all of the CATCH-PE materials and teaching protocols.

From that, you can see that the question addressed by the study was not simply directed at how well the skills and content of CATCH-PE had survived in trained teachers, but at how extensively (and faithfully) the program had persisted in each school. That kind of question involves the broader matter of "institutionalization" for an innovation, the degree to which it becomes a permanent regularity of what happens within a school -- rather than just the degree of persistence for a set of behaviors in particular members of that school community.

A few of the results catch the eye immediately. While in former intervention schools MVPA% was either maintained 5 years later (fourth and fifth grades), or increased (third grade), the proportion of lesson time spent in VPA declined at each of the three grade levels – and dramatically so. Meanwhile, over the same period of time, in the 20 former control schools MVPA% improved sufficiently to leave no significant difference between the two groups of schools – probably a consequence of the delayed training opportunities and subsequent adoption of CATCH-PE materials. In addition, overall results show that sustainability of outcome results was somewhat better for PE specialists than for classroom teachers, although the difference was not as large as one might have expected.

Discussion

Interpretation of these results does not seem difficult. Some of the effects of the CATCH-PE intervention were clearly visible 5 years after its implementation. The generalization could be made that the greater the initial level of training and support, the higher the level of program persistence. There also was evidence to suggest, however, that if they were to maintain improved forms of teaching, classroom teachers would require both more initial training and a more extended period of support than did PE specialists.

Feedback from participating teachers (by means of a questionnaire) indicated that an increase in the amount of in-service training for physical education, a higher level of administrative support, and a decline in the number of barriers to quality physical education were persistently associated with the extent to which the CATCH-PE curriculum was used in a school – all positive signs of institutionalization. Nevertheless, it was equally clear that natural turnover in the teacher cadre (and quite possibly other attenuating factors as well) could produce erosion of those emerging school characteristics. All of which makes obvious the need for continuing professional development if the original investment of resources is to be protected – and continuing benefits are to be preserved.

As to the sharp decline in VPA, the authors offer several hypotheses. Perhaps marginally skilled teachers are less effective in managing classes when vigorous fitness activities are included – and thus are inclined to select less active content. Also, many teachers find games easier to teach than fitness activities, but children are generally less active during games and skill instruction. It is not difficult to imagine yet other scenarios to account for the observation, and until further study attends to the matter one guess is as good as any other. I suspect, however, that finding the correct interpretation has an importance that goes beyond the physiologic benefits of more time spent being very active. My guess is that the decline in VPA% signals something about the vulnerability of program interventions like CATCH-PE – something that if diagnosed correctly might be corrected through improved program design. Surely we have not heard the last of CATCH-PE and we can look forward to a new generation of projects that yield more answers to the tough questions about improving public school physical education.