The Relationship Between the Sex Composition of Physical Education Classes and Teacher/Pupil Verbal Interaction

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University of Queensland

This study examined the relationship between the sex composition of physical education classes and teacher/pupil interactions. Eighteen Grade 9 or 10 hockey lessons were videotaped and verbal interactions were coded using a modified interactional analysis observation system. All teacher/pupil interactions were classified into one of six categories and the relative frequency of each interactional type was compared as a function of the class composition and the sex of the teacher using nonparametric analyses of contingency. To account for variations in lesson duration, interaction rates were also computed and compared between groups using analysis of variance. The results showed that female teachers gave proportionally more skill based interactions than did male teachers in mixed-sex and in all-girls classes. In mixed-sex classes, boys had a greater proportion of verbal interactions as well as more positive interactions with the teacher than girls did. To gauge the perceptions and attitudes of teachers and students toward stereotyping in physical education, interviews were conducted with the teachers and all pupils completed a standardized 35-item questionnaire. Most girls (90%) did not perceive boys as being favored, but 43% felt that teachers expected boys to perform skills better than girls. A greater percentage of boys (63%) than girls (48.5%) agreed that physical education in schools should be made more important.

The major impetus for this study was the recognition by the Australian government that girls have been suffering educational discrimination. An expression of such discrimination is the social process of sex role stereotyping whereby children are expected to pursue interests, school subjects, careers, and lifestyles based on gender rather than on individual potential and talent (Queensland Education Department, 1986). Girls’ successful participation in physical education has been an issue of concern (Rutter, 1984). Girls drop out earlier than boys from

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regular physical activity (Coles, 1980), while those who continue adopt low expectations for their performance (Dyer, 1982; Samson, 1979).

A major program presently being run by the Australian government, the "Participation and Equity Programme" (PEP), focuses on groups with special needs, and equity and increased participation by girls in nontraditional endeavors is a major goal (Taylor, 1984). To date, various studies in science (Schibeci, 1984; Skeinkamp & Maehr, 1983) and mathematics (Brassell, Petry, & Brooks, 1980; Carss, 1984; Smail, Whyte, & Kelly, 1981) have prescribed some effective strategies for class grouping and nonsexist teacher behaviors to promote participation and equity in these subjects. Suggestions include moving away from routine practices toward more exposition, discussion, practical work, and investigation as well as implementing single-sex classes.

There is a growing body of knowledge indicating how teachers contribute to the general problem of sex role stereotyping with their own unexamined assumptions and expectations about the different interests and abilities of girls and boys (Taylor, 1984). Woods (1980) has argued that it is in the "hidden curriculum," those messages given to pupils whether conscious or nonconscious, that sexism is most evident. One way in which teachers' differing expectations or messages of sex role stereotyping are transferred to the pupils is through their preferential verbal interaction with boys in mixed-sex classes. Researchers have revealed that not only do boys have an increased number of interactions with the teacher, hence the teacher knows them better (Ramsay, 1983; Scutt, 1985), but that these interactions tend to be more sustained (Commonwealth Schools Commission, 1984; Spender, 1982), contain more praise, and have a higher management component (Becker, 1981; Spender, 1983).

Some researchers have also maintained that the teacher's sex is a significant variable within the hidden curriculum, giving rise to differential teaching behaviors (Bain, 1976; Good, Sikes, & Brophy, 1973). Others have found minor if any differences between male and female teaching styles (Cheffers & Mancini, 1978; Keane, 1976; Lewis & Lovegrove, 1983).

However, to concentrate on treating both sexes alike in a coeducational environment is not considered by many educators to be sufficient (Blackburn, 1982). A notable criticism of coeducation is that girls in these situations suffer lower self-esteem and negative self-concepts (Daniels & Dyer, 1986; Rutter, 1984; Spender, 1982). In order to achieve social equality, affirmative action has been called for in schools to mitigate some of the debilitating factors for girls. In line with the affirmative action philosophy, single-sex classes have been proposed by some as an opportunity to compensate for the disadvantages accruing from earlier sex role stereotyping. It is argued that in single-sex groupings the teachers are less likely to behave in ways that reinforce girls' submissive role.

An underlying assumption of an equitable education program is that boys and girls benefit equally from participation in all spheres of schooling, physical education being no exception. Where most high school girls prefer to avoid physical activity, a significant problem of equity exists (Darlison, 1980). Australia introduced its Sex Discrimination Bill in 1984 but the bill does not stipulate what organization should be adopted within the schools to teach nonsexist physical education. Therefore, as a contribution to increased knowledge in this area, this study addressed four questions: Do the interactions in mixed-sex classes perpetuate those
behaviors and perceptions consistent with sex role stereotyping? Do pupils in mixed-sex and single-sex classes perceive the teacher as treating boys differently from girls? Do pupils in mixed-sex and single-sex classes have differing attitudes toward physical education? Do male and female teachers have differing patterns of interaction in their classes?

Methods

Subjects and Setting

Twelve physical education teachers (six males and six females) in five metropolitan high schools of similar socioeconomic background in Brisbane, Queensland, were used in this study. Between 70 and 80 Grade 9 or 10 pupils (age 14–16 years) from each school participated in one of the three class conditions: all boys, all girls, or mixed sex (approximately 50% of each sex). This age group was selected because at the age of 14 girls’ participation in physical activity tends to decrease rapidly and therefore it is a critical point at which to take action (Hall & Richardson, 1982; Rutter, 1984; Woods, 1980; Yates, 1985).

In each class hockey skills were taught. Hockey was selected as a physical activity suitable for male and female participation (Saunders & Jobling, 1983). To determine whether hockey was an activity regarded as equally suitable for male and female participation according to the perceived limitations of sex roles, the pupils involved in this study had their attitudes toward hockey assessed by use of a questionnaire. Responses revealed that most pupils felt the playing of hockey was consistent with their gender role.

Instrumentation

The observation system used for lesson analysis was adapted from that designed by the Girls and Physical Activity Project Team in South Australia (Commonwealth Schools Commission Project, 1986). There were five categories of teacher behavior based on information contained in Good and Brophy’s Looking in Classrooms (1984). Their model was subsequently modified for the purposes of this study (see Table 1) by introducing categories and labels from previously used observation systems (Cheffers & Mancini, 1978; Dougherty, 1971; Yokoyama, 1979).

The system allowed teachers’ interactions with individual pupils, groups of pupils, and the whole class to be coded. All teacher/pupil interactions—positive, neutral, and negative in nature—were coded, as well as the sex of the pupils in mixed-sex classes. Behaviors were recorded every 3 seconds.

Researchers are increasingly using qualitative research techniques to gain an understanding of how physical education classes work, as distinct from a description of what is going on in class (Kirk, 1988; Locke, 1982). Hence, for this study the researcher acted as an informed observer and supplemented the descriptive analytic techniques with interviews conducted with the teachers involved. These interviews were taped and later transcribed.

Additionally, a 35-item questionnaire was administered to all pupils involved in the study. Its objectives were to determine (a) whether pupils held sex-role-specific attitudes toward physical activity, (b) positive and negative attitudes of boys and girls toward the physical education lessons, (c) whether girls saw boys as more successful and showing more initiative than girls, and (d) whether pupils perceived differential treatment from male and female teachers.
Table 1
Observation System Used for Lesson Analysis

<table>
<thead>
<tr>
<th>Category</th>
<th>Category description</th>
</tr>
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<tbody>
<tr>
<td>Skill</td>
<td>Specific teaching points or skill instruction that relate to sports skill development</td>
</tr>
<tr>
<td>Transition Management</td>
<td>Class organization; safety</td>
</tr>
<tr>
<td>Pupil talk initiation</td>
<td>Unsolicited comments or questions from the pupils directed toward the teacher</td>
</tr>
<tr>
<td>Teacher response</td>
<td>Comments or questions directed to a pupil that recognizes a pupil’s action or presence</td>
</tr>
<tr>
<td>Extra personal</td>
<td>Comments or questions directed to a pupil that are unrelated to the lesson content or procedures showing a particular interest in that pupil</td>
</tr>
</tbody>
</table>

Procedures

The classes within each class condition (all boys, all girls, mixed) had approximately 25 pupils in each and were taught for 30 to 35 minutes. Each class condition was taught three times by a male teacher and three times by a female teacher and involved at least two different groups of pupils and teachers from at least two different schools. Beginning (1-2 weeks), middle (2-4 weeks), and end-of-unit lessons (more than 4 weeks) were evenly dispersed throughout the different conditions.

The 18 lessons were videotaped using a portable cassette recorder and video camera. The sound tracks were recorded on a microcassette audiotape recorder strapped to the teachers’ waist and later dubbed onto the video recordings for lesson analysis. Prior to filming, teachers were told that the observer was interested in the teaching of hockey in secondary school physical education. After each teacher’s interview, conducted at the completion of filming, the purpose of the study was clarified in a debriefing.

All lessons were coded by the researcher. Procedures for establishing reliability were (a) testing interobserver reliability with an experienced user of systematic observation instruments prior to the commencement of coding and for a random 10% of coded lessons ($r=0.85$), and (b) testing intraobserver reliability ($r=0.92$) during coding on 10% of the coded lessons.

Analysis of Data

The frequency of teacher/pupil verbal interaction was categorized into a 2-by-3 contingency matrix with the factors being the sex of the teacher and the class composition. The possible presence of any differences in the frequency of interactions between the male and female pupils and the male and female teachers was addressed using the conventional $\chi^2$ statistic as described by Siegel (1956). As the total number of interactions varied between male and female teachers,
the relative compositions of these interactions in terms of the six behavior categories were computed as percentages rather than as frequencies and are expressed in these units in the text.

In order to make a comparison between single-sex and mixed-sex classes, a measure of teacher/pupil interactions per unit of time was calculated by dividing the total number of interactions in a lesson by the number of minutes for which the lesson ran. As this computation generated parametric data, these rates of interaction between teachers and pupils in classes of different composition and with teachers of different sex were compared using a two-way analysis of variance.

The questionnaire responses were used to provide statistical information on the pupils' attitudes and perceptions of physical education. Responses based upon the pupils' sex, their teachers' sex, and their class composition were converted to percentages and compared using a chi square analysis.

**Results**

**Patterns of Interactions**

Teacher/pupil interactions focusing on skill and transition dominated all class conditions. The percentages for each type of interaction in each condition are presented in Table 2. Management interactions accounted for only 3.9 to 9% of all interactions within a condition (M=7.23). The total percentages of interactions in the three remaining categories—pupil talk, teacher response, and extra personal—ranged from 0 to 5.5%. Boys in single-sex classes initiated the least proportion of interactions whereas this trend was reversed in all-girls classes.

In addressing the question concerning male and female teachers' differing patterns of interaction, the teachers' differing rates, distributions, categories, and quality of interactions were ascertained. Table 3 indicates that the rates of interaction ranged from 7.52 per minute for male teachers in mixed-sex classes to 13.93 interactions per minute for female teachers in all-boys classes. An analysis of variance showed that female teachers (M=11.4) had a significantly greater

**Table 2**

Interactions Expressed as Percentages of Total Interaction for the 6 Class Conditions

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Female teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All girls</td>
<td>54.8</td>
<td>27.2</td>
<td>7.1</td>
<td>4.7</td>
<td>3.9</td>
<td>0.5</td>
</tr>
<tr>
<td>Mixed sex</td>
<td>57.3</td>
<td>34.5</td>
<td>6.5</td>
<td>1.8</td>
<td>2.9</td>
<td>0.8</td>
</tr>
<tr>
<td>All boys</td>
<td>56.2</td>
<td>30.0</td>
<td>8.1</td>
<td>0.8</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Male teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All girls</td>
<td>37.4</td>
<td>51.5</td>
<td>9.0</td>
<td>2.3</td>
<td>1.9</td>
<td>0</td>
</tr>
<tr>
<td>Mixed sex</td>
<td>31.3</td>
<td>45.4</td>
<td>8.8</td>
<td>5.5</td>
<td>5.0</td>
<td>2.3</td>
</tr>
<tr>
<td>All boys</td>
<td>45.2</td>
<td>43.5</td>
<td>3.9</td>
<td>1.6</td>
<td>1.5</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3
Mean Number of Interactions Per Minute for Male and Female Teachers in the 3 Class Conditions

<table>
<thead>
<tr>
<th>Teachers</th>
<th>All girls</th>
<th>Mixed sex</th>
<th>All boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>9.61</td>
<td>10.61</td>
<td>13.93</td>
</tr>
<tr>
<td>Male</td>
<td>9.18</td>
<td>7.52</td>
<td>8.21</td>
</tr>
</tbody>
</table>

number of interactions per minute, $F(1,12) = 5.523, p < .05$, than the male teachers ($M = 8.3$). Girls in single-sex classes tended to experience more interactions with the teacher per minute ($M = 2.5$) than girls in mixed-sex classes ($M = 1.8$) but this difference was not significant, $F(1,12) = 2.95, p < .122$.

The literature suggests that female teachers may have more interactions with small groups and individuals and that their interactions are more positive and skill based than those of the male teachers (Bain, 1976; Good et al., 1973). Results of this study partially conflict with these findings. Male teachers had 290 of their 684 interactions (42.4%) with individuals as opposed to either small groups or the whole class whereas female teachers had 203 of their 771 interactions (26.33%) with individuals. Male teachers also had 7.16% positive interactions while female teachers had 2.33% positive interactions. The trend was reversed in single-sex classes. Female teachers were also found to initiate significantly more skill based interaction as a proportion of total interactions in mixed-sex classes (57.85%) when compared to male teachers (34.34%). Similarly, this pattern of interaction was significant in all-girls classes (54.8% of female and 37.4% of male teachers' interactions were skill based—$\chi^2 = 108.1, p < .05$).

Consistent with the literature, boys had a significantly greater proportion of interactions (54.7%) with the teacher than did girls (45.3%) in mixed-sex classes ($\chi^2 = 4.08, p < .05$). When the sex of the teacher was considered as a variable, the source of this significance was in the female teachers' differential interaction ($\chi^2 = 12.8, p < .05$). Boys in mixed-sex classes also had a greater proportion of positive interaction with the teacher, calculated from the positive interactions over the six categories of interaction ($\chi^2 = 12.25, p < .05$). This difference occurred irrespective of the teachers’ sex ($\chi^2 = 1.7, p < .001$). Girls initiated 6.69% of total interactions with male and female teachers while boys initiated 9.82%. This difference was calculated as not significant, and likewise for the sex of the teacher.

Pupils' Perceptions and Attitudes

Of the pupils surveyed, 63% of the boys and 49.56% of the girls agreed that physical education in schools should be made more important. There was a significantly higher percentage of agreement responses from girls who had male teachers (66.04%) than those who had female teachers (40.95%). However, a greater percentage of pupils in all-girls classes than those girls in mixed-sex classes
agreed that physical education should be made more important, although this was not a significant difference.

Only 2% of the girls currently in mixed-sex classes perceived girls as favored, and 11.53% of girls in single-sex classes recalled from their previous experiences in mixed-sex classes that girls were favored. Thus, with the majority of girls perceiving that in mixed-sex classes the teacher did not favor interaction with girls, the result may be cautiously interpreted as girls having perceived teacher interactions as favoring boys. Forty-one percent of all girls believed that boys were expected to perform better in physical education, while 36.29% believed the opposite.

There was a significant difference in the pupils’ perceptions of skill expectations when the responses of girls in single-sex and mixed-sex classes were compared ($\chi^2=28.47, p<.001$). Girls in mixed-sex classes perceived their teachers (male and female) as having slightly greater expectations of their skills than did the girls in all-girls classes. However, when considering the responses of female-taught girls in all-girls classes and those in mixed-sex classes, a significant difference was found ($\chi^2=20.81, p<.001$). Girls in single-sex classes with a female teacher did perceive their teacher as having higher expectations for their skills in comparison to girls in mixed-sex classes.

**Teachers’ Perceptions and Attitudes**

The following information pertaining to teachers’ perceptions and attitudes was based upon the interview data. Four of the male teachers and four of the female teachers enjoyed teaching single-sex classes more than mixed-sex classes and felt that in these compositions they taught most effectively. One female teacher remarked that “single sex classes are certainly easier to teach . . . behavior-wise.” Another advantage of single-sex classes, according to a male teacher, was the “incompatibility if you’ve got boys and girls together for a lot of sports . . . mostly because of the boys’ skill and fitness levels exceeding the girls’.”

Five of the male teachers and all six female teachers believed that girls benefitted from single-sex classes because the teachers had the opportunity to cater to the girls’ skill levels and foster their increased participation. All teachers perceived the problem of some girls “holding back” in mixed-sex physical education, based on the girls’ belief that success would bring teasing from the boys, and the associated need for the teachers to coerce the girls into participation. One male teacher commented, “What I hate about the girls is that you’ve got to prod them in terms of the practical . . . they hang back and I’m always saying, ‘Have a go!’” A physical education teacher who had reintroduced single-sex physical education in her school attributed the girls’ participation problem to their poor body image. She pointed out that “the girls don’t like to sweat and are conscious of their body image . . . they’ll wear anything to cover the body. Now, that’s the most difficult thing to cope with in a mixed-sex class. You don’t have time to cope with it as well as you do in an all-girls class.”

The majority of teachers believed it was appropriate to alter teaching approaches to maximize pupils’ participation in the single-sex classes. For boys this entailed being “stricter,” “harder,” and “more definite.” For instance, a female teacher said that with the boys she would “tend to give direct orders more, whereas a lot of girls do not respond to that sort of thing. They tend to need mothering . . . no, that’s not the word . . . a little bit of encouragement . . .
a friendlier approach. You really have to keep reinforcing their self-esteem as
the girls tend to be worrying they'll make a fool of themselves if they can't do
something.” A male teacher echoed this point: “Probably with the girls you tend
to use a bit more psychology to get them round to your side... not so much
strict discipline.” However, the teachers did not support a suggestion that they
should use any overcompensatory positive interaction patterns. Their percent-
ages of positive interaction were consistent with this standpoint.

Nevertheless, the advantages of mixed-sex classes were recognized by the
teachers in terms of pupils’ social interaction and the standards of participation
demonstrated by the boys. A female teacher commented that “in practical classes
for all girls the standards of performance can sometimes be lower because with
the boys there [in mixed-sex classes] they can see what they can achieve and the
boys also add a different level of competition and enjoyment.”

Discussion

In mixed-sex physical education classes there were examples of teacher/pupil
interactions that were consistent with the perpetuation of sex role stereotyping.
Boys had a greater proportion of verbal interactions with the teacher than girls
did, and a higher proportion of positive interactions were either directed to or
initiated by boys. During interviews the teachers predicted that boys may receive
a higher proportion of interactions because of the management component directed
to boys in mixed-sex classes, but the higher proportion of positive interactions
with boys was not hypothesized.

For boys and girls in single-sex physical education classes, the hypothesized
differences in teacher/pupil interactions were not supported to the same extent
as those differences in mixed-sex classes. Boys in all-boys classes did not receive
proportionally more management interactions than the girls in all-girls classes;
to the contrary, they received a lesser proportion of negative management inter-
actions than did the girls.

Male and female teachers were found to have differing patterns of inter-
action. Female teachers had a higher frequency of interactions per minute than
male teachers. Their interactions were predominantly skill based while those of
male teachers were based more upon class organization. These differential inter-
actions were not only a function of individual differences of teaching style and
expectations but also seemed to reflect the behavior of the pupils in the classes
they taught. However, skill based interactions are crucial to the development of
girls’ self-confidence in physical education, since without competency in skills
their satisfaction may diminish.

Disregarding the class composition, the pupils surveyed in this study held
positive attitudes toward physical education. In general boys were more consist-
tent with the stereotype and held more positive attitudes than did the girls. The
boys’ enthusiasm for physical education did not appear to positively influence
the girls, as the girls in single-sex classes had a more pronounced positive attitude
than did the girls in mixed-sex classes.

The majority of boys and girls correctly perceived girls as not being favored
in interactions with the teacher. Girls did acknowledge that they felt they were
talked to less than the boys. One female teacher explained that attending to the
boys “was a normal reaction to the boys’ demanding attention. Boys jump up
and put their hands up and are noisier. Girls are more mature and are quieter.' The more typical teacher reaction was the statement, "I probably talk to the boys and girls evenly . . . and I wouldn't even consciously try to compensate for the girls." According to the model of the self-fulfilling prophecy, the teacher's expectations for a pupil's standard of achievement and effort, and the subsequent positive feedback that a pupil receives, is a determinant in that student's self-confidence (Martinek & Johnson, 1979).

The interdependence of teacher expectations and pupil self-esteem has been documented in the physical education literature. It is manifested in that those girls with lower self-esteem have less self-confidence, feel less valued by the teacher, and place limitations on their performances (Commonwealth Schools Commission, 1984; 1985; Sarah, 1980; Woods, 1980).

A common theme throughout the teacher interviews conducted in this study was the satisfaction the teachers noted in teaching boys. This was based on the teachers' expectations that boys made a greater effort than girls, and consequently their perceived evidence of this effort. "Boys tend to play up a bit, but I enjoy having them to joke with and they try really hard," commented a female teacher. If this pattern of interaction is considered in terms of the cycle of teacher expectations dictating pupils' behavior, the girls may continue to withdraw from verbal interactions in mixed-sex classes due to the teachers' expectations of girls as submissive.

Girls in single-sex classes, when compared with those in mixed-sex classes, were more satisfied with their effort in physical education. Correspondingly, when teachers' expectations of pupils' skills were considered, girls in single-sex classes perceived their teachers as having higher expectations for them than did the girls in the mixed-sex classes. This was consistent with the majority of teachers' support for single-sex classes, and more specifically, the expectations that teachers held for the higher levels of participation and effort by girls in single-sex classes. Nonetheless, the majority of girls believed that mixed-sex physical education classes were more fun. Similarly, despite the teachers' support for single-sex classes, the girls' "reluctance" and the boys' "sense of fun" were commonly held teacher attitudes and these also have implications for teachers' behavior and classroom environment.

No clear-cut answer emerged to assist in the organization and implementation of more effective strategies for the teaching of physical education in schools. Teacher/pupil interactions and teachers' and pupils' perceptions suggested that both single-sex and mixed-sex classes have a positive function in the effective teaching of physical education. However, if attention to skill and exposure to positive interaction are the means by which girls develop greater self-esteem in physical education, the evidence from this study may be cautiously interpreted as suggesting that girls are most effectively taught in all-girls classes with a female teacher. It was encouraging, for the future lifestyle of women, that the majority of girls in this study held positive attitudes toward physical education and were confident in their physical skills, perhaps reflecting the increasing acceptance of the socialization of girls into physical activity through physical education.

Recommendations for further research include the expansion of the subject populations and the collection and analysis of empirical data in order to clarify the assertions made concerning the above issues. Nonverbal interactions and the duration of interactions are important sources of differential teacher/pupil interactions and deserve close investigation.
References


Acknowledgment

I wish to acknowledge the assistance of Mr. John Saunders in the design of the original work upon which this paper is based, and Drs. Abernethy, Kirk, and Neal for their subsequent assistance.
Notes

Although the desirable pupil ratio for testing teacher/pupil interactions in mixed-sex classes is 50% boys and 50% girls in the naturalistic setting, it was not always possible to observe classes with equal numbers. The greatest variation from equal numbers was a class with 14 boys and 10 girls.

For convenience, the distribution of interactions for male and female teachers are expressed as percentages (rather than frequencies) for the remainder of the paper.

Due to the flexibility of class grouping in schools, all the pupils in this study had been taught physical education in both mixed-sex and single-sex groups within 12 months of this questionnaire being administered. Therefore, in order to compare experiences in mixed-sex and single-sex classes, pupils were also asked to recall experiences in the alternative class condition.

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For further information, write Margaret A. Jones, Congress Director, HPRD Dept., Georgia State University, University Plaza, Atlanta GA 30303-3083.

Erratum:

The October 1989 issue of JTPM, Vol. 9(1), contained a mistake in the title of the article by Keith W. Radford. The title, "Movement Education in Physical Education—A Definitional Effort," should have read, "Movement Observation in Physical Education—A Definitional Effort."