The Effect of Three Different Lifetime Fitness Class Structures on Various Fitness Parameters of College Students

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Many college basic instruction programs and high school physical education programs require students to participate in a course designed to emphasize the concepts and principles of fitness and exercise. Common course titles include Lifetime Fitness, Fitness and Wellness for Life, Principles of Fitness, and Wellness and Fitness for Life. However, no matter what the title, the underlying assumption is that such a physical education experience will enhance the students' chances of achieving and maintaining certain levels of physical fitness over the course of their lifetime.

While this underlying assumption tends to be consistent, course objectives may vary from program to program. One program may expect an observable improvement in cardiovascular fitness, while another program may expect the student to understand the process used to establish a fitness program. Still another program may expect both an increase in selected fitness parameters and an understanding of fitness principles.

Course format or structure is another area that may vary from program to program. Most Lifetime Fitness Courses have a classroom or lecture portion and an activity or laboratory portion of the class. Time spent in the classroom or in the lab varies from program to program. Within this structure, students typically are expected to complete a series of fitness test items, listen to lectures on the principles of fitness, perform a series of labs that compliment lecture material and, finally, design an individual fitness program. The content of the course is guided, not only by the course objectives, but by the way in which the course is structured.

It is interesting to note that little, if any, research has been completed to determine type of class structure most appropriate for achieving specific objectives. Salva, Laurie, and Corbin (1984) studied long-term effects of a conceptual physical education program. The study evaluated attitudes, knowledge, and activity behaviors of 100 college graduates who completed a lecture-laboratory (concepts) course in physical education during their tenure as undergraduates. These students were compared to 100 students who received advanced credit for the concepts class (tested out) and to 100 transfer students with a traditional physical education activity based course. The results indicated that the attitude-knowledge-activity profile of the concepts groups differed from the profiles of the other two groups. The concepts profile was good attitude, knowledge and activity. The test-out profile was high knowledge, low activity and the transfer profile was low attitude, knowledge and activity. Male and female students possessed different profiles. A knowledge-attitude profile differentiated among males in the three groups (concepts subjects had high profiles and trans-

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fers had low profiles). A knowledge-activity profile differentiated females in different groups. High activity-good knowledge profiles characterized the concepts subjects while the quiz-out subjects had a high knowledge-good activity profile that differentiated them from transfer students. Results suggested that a conceptual physical education class can have a positive long term effect on knowledge, attitude and activity.

Griffin (1983) was interested in determining the effect of three different class structures on various fitness and psychological parameters. The students met two times per week for seven weeks. She randomly assigned volunteers to three experimental groups. Each group met three times a week for 45 minutes. The physical fitness group performed fitness activities the entire period. The physical fitness/stress management group performed 25 minutes of fitness activities and 20 minutes of stress management techniques each period. The fitness/stress management/wellness group performed 25 minutes of fitness activities and 20 minutes of stress management activities for two periods a week and at the third meeting had a 45 minute wellness discussion. All fitness activities were similar for the three groups. The activities included a warm-up, walk/jog, circuit training (for fitness only group) and cool-down. Data analyses indicated no significant differences among the groups based on various fitness and psychological measures.

Based on the lack of work in this area, the following questions served as a basis for this study. Is the lecture/lab structure effective? How often should labs be scheduled? Does class structure affect fitness parameters or students' attitudes toward fitness? Specifically, this study investigated the following hypotheses:

1. Subjects in the three groups (class structure) will significantly improve (from pretest to posttest) recovery heart rate, intent to exercise, and attitude toward exercise.
2. At the end of the semester (posttest), there will be no significant difference among the three groups (class structures) on the variables recovery heart rate, intent to exercise, and attitude toward exercise.

Method

Subjects in this study were college students (N = 51) enrolled in three different Lifetime Fitness classes that met two times per week for 14 weeks. All classes were taught by the same instructor, but the class structure was varied. Class 1 (MW 2:00) had one day of lecture and one day of activity each week. Class 2 (MW 3:00) had three lectures and then one activity day over a two week period. Class 3 (TTH 2:00) had 20 minutes of activity a 20 minutes of lecture every class meeting. Activity days in all three sections included only a warm-up, cardio-vascular activity, and a cool-down. All activity days included a minimum of twenty minutes of vigorous activity that was designated to elevate and maintain students' heart rate in the training zone. Heart rate checks were taken three times during the activity session; half-way through the cardio-vascular work out, at the end of the cardio-vascular work out and after the cool-down. Each class had approximately the same number of students (17, 19, and 15 respectively).

Course objectives and requirements were identical for all three sections. The objectives are listed in Table 1. While there are six course objectives, this study was only interested in the effect class structure had on changes in fitness parameters and attitudes of students toward fitness, because the majority of the time in the course was spent on fitness activities and principles. Only a small portion of the class dealt with

Table 1

Course Objectives for Lifetime Fitness Course

1. To assess and evaluate various physiological parameters.
2. To develop and improve basic level of personal fitness.
3. To understand the basic principles involved in exercise prescription.
4. To develop an awareness of potential stressors and the possible stress management techniques to reduce stressors.
5. To develop an awareness of proper nutrition and an understanding of basic principles in weight management.
6. To examine various psychological techniques that could assist in the initiation and adherence to an exercise and weight management program.

the topics of stress and nutrition; objectives four, five and six. All students were required to keep a fitness log, complete a dietary study, perform all pre/post fitness test items, complete attitude inventories and pass two written exams.

Physiological and psychological data were collected on subjects. The main physiologic objective of this Lifetime Fitness course was to improve the fitness parameter of cardio-respiratory endurance. This parameter was assessed pre/post to determine improvement over the 14 week period. All fitness testing was preceded by a five minute warm-up consisting of light jogging and walking followed by stretching of the upper and lower extremities and the lower back. Improvement in cardio-vascular endurance was assessed through the LSU Step Test (Nelson, 1976) which provided a measure of recovery heart rate. Subjects were provided with an explanation of testing and pulse-counting procedures. The step test was performed in groups of five with a 16 inch step height. All subjects were alllowed a short practice period to become comfortable with the stepping cadence. The stepping cadence for all subjects was 24 beats/minute. Subjects performed the step test for three minutes. At the end of the test, subjects were told to sit down on the bench and find their pulse. Pulse counts were collected at three different times (5 seconds after test, 1 minute after test and 2 minutes after the test). All pulse counts were taken for ten seconds and multiplied by 6 to determine beats/minute. The 1 minute after exercise pulse count was used to compare cardio-vascular fitness levels among the three classes used in this study.

Test-retest reliability coefficient for 1 minute recovery heart rate was .88. Nelson (1976) indicated that the step test had construct validity.

Flexibility testing was included because, in general, stretching exercises were part of warm-up and cool-down activities. The flexibility test that was used was the sit and reach (AAHPERD, 1980). Subjects were asked to remove their shoes and sit in front of the sit and reach box. The subject sat with knees fully extended and feet flat against the end board of the box. Students were asked to extend arms, place one hand on top of the other and reach forward as far as possible. The mean of three trials was used as the student's flexibility score. The reliability coefficients for the sit and reach test are .70 and above. The test has been validated against other flexibility tests. Validity coefficients range from .80 to .90.

Psychological measures taken included an intent to exercise scale and an attitude toward physical activity scale. Intent to exercise was measured by "Exercise Motivation Questionnaire" (Dzewaltowski, 1988). This scale measured a subject's confidence in his/her ability to exercise in various situations; e.g., when on vacation, when bored, or on a rainy day. The scale assessed subject's confidence level on a scale from 0 to 100. Coefficients for test-retest reliability were .80-.97. Validity coefficients were not reported. Attitude toward physical activity was measured by modified "Scale for Measuring Attitude Toward Physical Education in the Elementary School" (Martens, 1979). The scale was modified by the investigators to fit college students in an exercise setting. Modification consisted of changing the term children to students and movement to fitness. The original scale reported that reliability varied from .63 to .81 with the instrument being more reliable with older children. Test-retest reliability coefficient on revised scale was .82. Content validity was ensured by having children participate in selection of statements for the scale. Also, a high correlation (.82) was found between scores on the scale and self-rating of subjects' attitude toward physical education.

The subjects were pretested during the first two weeks of the semester and posttested during the last two weeks of the semester.

Statistical analyses included a repeated measures multivariate analyses of variance to determine if subjects in all groups improved on the four dependent variables from pretest to posttest (Hypothesis one) and a one-way MANOVA on posttest scores to determine if at the end of the semester, groups were significantly different

based on the four dependent variables (Hypothesis two).

Results

Table 2 presents the pre/post fitness data for all three groups. For pretest data, a one-way multivariate analysis of variance was found not to be significant ($F_{8,86}=.96$, $p<.469$) by the Wilks' Lambda criterion; therefore, the three groups were essentially equal on all dependent variables (recovery heart rate, intent to exercise, attitude toward exercise, and sit and reach) at the beginning of the semester.

Hypothesis 1 states that subjects in all three class structures (groups) would significantly improve (from pretest to posttest) on all dependent measures. Four one-way repeated-measures analyses of variance (using MANOVA procedures) indicated that from pretest to posttest there were significant differences for the groups in recovery heart rate ($F_{2,45}=4.55$, $p<.04$), intent to exercise ($F_{2,49}=67.46$, $p<.000$), and sit and reach scores ($F_{2,49}=5.21$, $p<.027$) but not significant differences in attitude toward exercise ($_{2,49}=2.77$, $p<.10$). Inspection of group means (see table 2) indicated that all three groups had similar improvement in their intent to exercise scores and sit and reach scores from pretest to posttest. Although significant differences were found in groups on the variable recovery heart rate from pretest to posttest, that difference does not always reflect a "good" difference. Groups 2 and 3 improved their recovery heart rate (lower score from pretest to posttest), but group 1 had higher scores from pretest to posttest for the variable recovery heart rate (see table 2). Over the semester, groups 2 and 3 improved their cardio-respiratory endurance while group 3 decreased in endurance.

Hypothesis 2 states that at the end of the semester, there will be no significant difference among the three groups (classes) on the dependent variables (recovery heart rate, intent to exercise, attitude toward exercise and sit and reach). A one-way multivariate analysis of variance (on posttest scores) was found to be significant ($F_{8,90}=2.44$, $p<.019$) by the Wilks' Lambda criterion. Univariate F tests indicated varying significance levels for the four dependent measures, for recovery heart rate ($F_{2,48}=10.39$, $p<.000$), for intent to exercise ($F_{2,48}=.03$, $p<.97$), for attitude toward exercise ($F_{2,48}=.05$, $p<.95$), and for sit and reach ($F_{2,48}=.29$, $p<.75$). Since univariate statistics are not adjusted for the fact that several comprisons were made, discriminate function coefficients were examined (see table 3). The coefficients support the finding that only the variable recovery heart rate discriminates among the groups. For the variable-heart rate, Tukey's (HSD) technique for making multiple comparisons among means indicated that group 3 was significantly different from group 1 and group 2. Group 3 class structure improved recovery heart rate significantly better than the class structures used for groups 1 and 2.

Implications

In examining the results of this study, it appears that class structure was the major differ-

Table 2

Mean Scores for Groups 1, 2 and 3 on Recovery Heart Rate, Intent to Exercise, Attitude Toward Exercise and Sit and Reach Test.

GROUP		RHR	ATTITUDE	INTENT	SIT/REACH
1	Pre	126.86	58.06	49.12	20.12
	Post	133.76	56.12	70.52	21.18
2	Pre	118.89	53.94	49.04	18.79
	Post	117.63	55.42	70.35	20.68
3	Pre	127.08	51.33	46.87	21.33
	Post	103.33	56.90	69.42	22.07

Note: Group 1 had one day of lecture and one day of activity each week.
Group 2 had three lecture days and one activity day over a period of two weeks.
Group 3 had 20 minutes of lecture and 20 minutes of activity each day (two times a week).

Table 3

Multivariate Analysis of Variance

Source of Variation	Variable	MS Between Groups	Univariate F[a]	p<	SDFC
Groups	Recovery Heart Rate	3710.613	10.393	.000	-1.031
	Attitude	3.590	.052	.949	.055
	Intent	5.535	.031	.969	-.262
	Sit and Reach	8.089	.291	.749	-.084

Note: Abbreviated: SDFC: Standardized discriminate function coefficient.
Multivariate F = 2.44, df = 8/90, p < .019. [a]df = 2/48

ence among these three classes. The teacher was the same for all three sections, requirements and course objectives were the same for all students, and activities used in the three sections were identical. Classes were not significantly different from each other on any pretest measurement. Time of day the classes met were similar; 2:00 and 3:00 in the afternoon. In addition, each class had similar attendance records and based on the observation of the students' exercise logs, it appears that there was no difference in exercise patterns outside of class. Based on the results of this study it appears that the way in which a class is structured could significantly affect the development of cardio-vascular fitness in Lifetime Fitness Courses.

Since most college and high school programs are offering a Lifetime Fitness course, the programs should look carefully at the objectives of this class and the way the class is structured to meet these objectives. Based on this study, all three class structures were equally effective in improving intent to exercise and flexibility. The class structure most effective in improving cardio-vascular fitness was activity and a mini-lecture each day the class met.

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