The Impact of a University Wellness Requirement on Student Nutrition and Physical Activity Behavior

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THE IMPACT OF A UNIVERSITY WELLNESS REQUIREMENT ON
STUDENT NUTRITION AND PHYSICAL ACTIVITY BEHAVIOR

by
Lisa Malan Blaser

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

Department of Exercise Sciences
Brigham Young University
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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a thesis submitted by

Lisa Malan Blaser

This thesis has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

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As chair of the candidate’s graduate committee, I have read the thesis of Lisa Malan Blaser in its final form and have found that (1) its format, citations, and bibliographical style are consistent and acceptable and fulfill university and department style requirements; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the graduate committee and is ready for submission to the university library.

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Accepted for the College

Gordon B. Lindsay, Associate Dean
College of Health and Human Performance
ABSTRACT

THE IMPACT OF A UNIVERSITY WELLNESS REQUIREMENT ON
STUDENT NUTRITION AND PHYSICAL ACTIVITY BEHAVIOR

Lisa Malan Blaser
Department of Exercise Sciences
Master of Science

Purpose: The Brigham Young University General Education Wellness Program has three options available to students to fulfill the program's requirement. The purpose of this study was to assess the impact of these three wellness options. Specifically, we wanted to know: does the university wellness requirement affect student nutrition and physical activity behaviors and do the various options available differ in their abilities to impact student nutrition and physical activity behaviors?

Methods: A three-group pretest/posttest design was used and a survey was administered, at both the beginning and end of the semester, to all students enrolled in HEPE 129, live and online, and all 100 level Physical Education activity classes. The final study design included 303 student responses from HEPE live, 551 responses from HEPE online and 270 responses from the activity classes. Data analysis of between and within group differences was conducted for each nutrition and physical activity behavior.
**Results:** HEPE online students had small but significant improvements in estimated VO$_2$ max, and in the percentage of students who ate bran or whole grain cereal once/day or more. The activity classes increased significantly for almost all of the physical activity behaviors including estimated VO$_2$ max, days/week of moderate activity, and the percent of students getting 30 minutes/day of vigorous activity, but only one of the nutrition behaviors, whole wheat food intake. HEPE live students increased for every variable, some more significantly than others.

**Conclusion:** These findings suggest that of the three wellness options offered at Brigham Young University, the HEPE live class had the largest impact on improving nutrition and physical activity behaviors across a one semester time period, the activity classes had the next largest impact, and HEPE online had the least impact.
ACKNOWLEDGMENTS

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THE IMPACT OF A UNIVERSITY WELLNESS REQUIREMENT ON
STUDENT NUTRITION AND PHYSICAL ACTIVITY BEHAVIOR

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ABSTRACT

Purpose: The Brigham Young University General Education Wellness Program has three options available to students to fulfill the program's requirement. The purpose of this study was to assess the impact of these three wellness options. Specifically, we wanted to know: does the university wellness requirement affect student nutrition and physical activity behaviors, and do the various options available differ in their abilities to impact student nutrition and physical activity behaviors?

Methods: A three-group pretest/posttest design was used and a survey was administered, at both the beginning and end of the semester, to all students enrolled in HEPE 129, live and online, and all 100 level Physical Education activity classes. The final study design included 303 student responses from HEPE live, 551 responses from HEPE online, and 270 responses from the activity classes. Data analysis of between and within group differences was conducted for each nutrition and physical activity behavior.

Results: HEPE online students had small but significant improvements in estimated VO2 max, and in the percentage of students who ate bran or whole grain cereal once/day or more. The activity classes increased significantly for almost all of the physical activity behaviors including estimated VO2 max, days/week of moderate activity, and the percent of students getting 30 minutes/day of vigorous activity, but only one of the nutrition behaviors, whole wheat food intake. HEPE live students increased for every variable, some more significantly than others.
**Conclusion:** These findings suggest that of the three wellness options offered at Brigham Young University, the HEPE live class had the largest impact on improving nutrition and physical activity behaviors across a one semester time period, the activity classes had the next largest impact, and HEPE online had the least impact.
INTRODUCTION

There are four major influences on health status: environment, the healthcare system, human biology, and lifestyle. While all four areas affect people’s health, scientists have suggested that lifestyle (health-related behavior) probably accounts for more than 50% of the causes of mortality in the United States. Research has found that the most rapid reduction in physical activity levels for most individuals occurs between the ages of 18 and 24 years. A quarter of all individuals in that age group in the United States are currently enrolled in the nation’s colleges and universities.

For young adults the college years present a distinct decline in nutritional priorities, and poor eating habits often worsen during this time. A hallmark of most student diets is fast food that is high in fat and sodium content. In 1986 one study reported that 69% of college students did not eat any fruit once a day and 48% ate vegetables less than once daily. In addition, the U.S. Department of Health and Human Services found that within the typical university years the frequency of doing vigorous exercise three or more times a week declines 6.2 percentage points for men and 7.3 percentage points for women.

Healthy People 2000 specifically identified postsecondary educational institutions as settings where young adults (aged 18-24) should be targeted for exercise promotion. One aspect of promoting a healthy lifestyle within educational institutions is the presence of required health and physical education courses. Although many universities require their students to take and pass such courses, only a limited number of studies have assessed the efficacy of these courses. In general, studies suggest that university
sponsored physical activity and/or health classes have the potential to positively affect the attitudes and behaviors of the students who enroll in them; however the results of most studies are inconclusive.⁷

Brigham Young University (BYU) in Provo, Utah, offers a course entitled Fitness and Lifestyle Management (labeled as the HEPE 129 course in the class schedule), which can be used to fulfill the wellness requirement that is part of the required general education program.⁸ To fulfill the wellness requirement students have two options. Option A, HEPE 129, is the conceptually based wellness course entitled Fitness and Lifestyle Management. This course can be taken live (in class with an instructor) or online. Option B requires students to take 3 physical activity or dance classes offered by the university; however, there is no conceptual class that is required with this option. (This was the system in place prior to Fall 2004.)

This study evaluated all three options on various nutrition and physical activity behaviors to determine which, if any, has the highest impact, and to help us learn how all options might be improved to greater impact student health.

**METHODS**

**Participants**

The population used for this study consisted of students (mostly freshman and sophomores) currently attending BYU. The demographics of this particular population are university students, both males and females, mostly Caucasian, aged approximately 18-25, and religiously affiliated.
The sample of the population that we studied consisted of students at BYU currently enrolled during the winter 2004 semester for one of the three possible options for fulfilling the wellness requirement. This included everyone enrolled in all sections of HEPE 129, both the in-class students and the online students, as well as a sample of students enrolled in a beginning (100 level) activity class offered by the physical education department. (While students can take dance classes to fulfill the wellness requirement we chose not to include them in this study.)

During this particular semester approximately 500 students took the HEPE 129 live course and another 1024 took HEPE online. Due to the large number of students who were registered for physical activity classes (approximately 4000) we chose to take a random sample of all the 100 levels P.E. courses offered for the entire semester to obtain a similar sample size of the other two wellness options. The sample surveyed for the activity classes was approximately 1000 students.

After throwing out incomplete survey responses and matching baseline with follow-up the final study design included 303 student responses from HEPE live, 551 student responses from HEPE online, 270 students responses from the activity classes, and 103 student responses from those who had already completed the wellness requirement and were taking either HEPE (< 5 students) or an activity class as an elective (these responses were not used in the analysis). The response rates for each of the wellness options are as follows: the HEPE live response rate was 60.6%, the HEPE online response rate was 53.8% and the activity class response rate was 27%. One reason
for the low response rate in the activity classes was the low compliance from the instructors in properly administering the survey; therefore many had to be thrown out.

**Design**

A three-group pretest/posttest design was used for this study. In order to determine the health behaviors of the students in the various wellness options a survey was administered to all students enrolled in HEPE 129, live and online, and a sample of students enrolled in the 100 level Physical Education activity classes. The Department of Physical Education HEPE committee approved this evaluation and required instructors for all Wellness related courses to administer the survey to their students at the beginning as well as the end of winter semester 2004. The study was also approved by the BYU IRB committee in the summer of 2003.

Before the start of the semester the instructors for all of the classes being surveyed were given a letter informing them of the purpose and importance of the survey. This letter also instructed them on how to administer the survey to their students. The correct number of surveys for each class was placed in the instructors’ university boxes before the first day of class, along with the informed consent letters, which were attached to the front of the surveys.

During the first or second day of class the students were given the informed consent instruction form and survey by their instructor, and were asked to complete the survey using the electronic bubble sheet. Students were required to code in their name and student identification number. This was necessary for baseline surveys to be successfully matched with follow-up surveys. The survey took the students
approximately 10 minutes to complete. Once the surveys had been administered they were returned to a central office where they were compiled and made ready for scanning.

Two weeks before the semester ended the instructors were given a follow-up letter informing them of the second phase of the study. A small incentive of $1 was attached to the letter given to instructors as an incentive to turn the completed surveys in as soon as possible. The correct numbers of surveys were again placed in the instructors’ university boxes and they were asked to administer the survey to their classes one last time. Once collected the surveys were checked through for errors, compiled and taken to the university’s testing center to be scanned and formatted onto a disk.

Online students were required to fill out the questionnaire online during the same time periods, for both pre- and posttests, as those using the paper/pencil version. This online version of the survey was created in Flashlight Online, which is a web based survey creation tool from Washington State University, and then linked to Blackboard at BYU. Blackboard is a program used by the university that allows instructors and students to relay information online. The online version consisted of the exact same questions as the paper/pencil version; with the exception of two questions that were omitted accidentally (those questions were thrown out altogether because of the omission). The data from the online surveys was downloaded and converted to Excel files.

All of the data, both baseline and follow-up, for all classes surveyed, were merged by subject ID number to prepare for analysis. There were no known risks associated with participation in this study. There were no benefits to students who completed this survey. In addition, students were not compensated in any way for completing this survey.
Measures

A questionnaire was designed using questions from the Centers for Disease Control and Prevention’s (CDC) Behavioral Risk Factor Surveillance System Survey Questionnaire and the non-exercise regression equations developed by Bradshaw et al., 2001. The purpose of this questionnaire was to determine the behavior of the students with regards to nutrition, physical activity, and general health and wellness both before and after participation in either the HEPE 129 (in class versus online) or an activity class. The study also contained questions regarding the students’ perception of the General Education Program. A pilot study was conducted where the questionnaire was given to approximately 100 students in four different activity classes. Feedback relative to the clarity and duration of the questionnaire was obtained. A committee of experts reviewed the final questionnaire.

The survey began with questions to determine demographics, such as age, height, weight, gender, GPA, and which wellness class they were in. The next section of questions concerned physical activity/exercise. These questions looked at moderate and vigorous physical activity. There were also questions about walking/jogging/running pace for 1 and 3 miles, and overall level of physical activity, which were used to estimate VO2 max.

The variables used to determine estimated VO2 max are gender, age in years, Body Mass Index (BMI) in numeric value, 1 mile and 3 miles pace (each are a whole number between 1 and 13 that are self selected from a written question), and overall level
of physical activity for the last 6 months (6 months is a whole number between 1 and 10 that is self selected from a written question). The actual equation\textsuperscript{9} is as follows:

\[
\text{Estimated VO}_2\text{ Max} = 48.073 + (6.179 \times \text{Gender}(1 = \text{male}, 0 = \text{female})) - (0.2464 \times \text{Age}) - (0.6186 \times \text{BMI}) + (0.7115 \times [1 \text{ mile } + 3 \text{ miles}]) + (0.6709 \times 6 \text{ months})
\]

Following the physical activity/exercise section were the nutrition questions. These questions asked how many servings of various healthy foods students ate. The number of serving options went from 0 to 5 times or more depending on the question. The healthy foods surveyed were fruits and vegetables, green salad, whole grain cold cereal, and whole wheat foods.

In order to determine the students’ perception of the wellness program within general education a series of questions were asked with response options for all the questions being: strongly disagree, disagree, not sure, agree, or strongly agree. These questions looked into how well the students felt the wellness program taught them about proper exercise and nutrition, and if the program helped them be healthier with regards to both nutrition and physical activity than they otherwise would have been.

**Data Analysis**

Merging of baseline and follow-up surveys was conducted in SAS using the proc merge procedure to match pre and follow-up surveys by student ID number. Once merging took place, all personal identifiers except the research assigned ID were deleted from the final data set.

Dependent \( t \) tests and chi-square analyses of changes between and within groups were used to compare nutrition and physical activity behaviors between wellness options.
RESULTS

At baseline there was no significant difference between the three groups for any of the variables surveyed except for estimated VO₂ max, gender, age, and GPA. Table 1 provides comparisons of the descriptor variables at baseline. Estimated VO₂ max was significantly different between the activity classes and both HEPE live, and HEPE online options (F = 3.79, \( p < .01 \)). Age was significantly different between the activity classes and both HEPE live and HEPE online options (\( \chi^2 = 117.83, p < .0001 \)). GPA was significantly different between HEPE live and HEPE online, as well as between HEPE online and the activity classes (\( \chi^2 = 85.15, p < .0001 \)). There were more males in the activity classes than in either HEPE course. (\( \chi^2 = 13.35, p < .0039 \))

From baseline to follow-up neither weight nor BMI changed significantly for any of the three wellness options. Table 2 provides change scores for all of the variables from baseline to follow-up with numerical responses. Estimated VO₂ max increased only marginally within groups for all three wellness options (\( p < .05 \)). However there was also significance between groups for estimated VO₂ max with the most significant increase occurring in the HEPE live class as compared to HEPE online and the activity classes (\( p < .05 \)).

The number of days per week of moderate activity performed increased significantly within groups for both HEPE live and the activity classes (\( p < .05 \)), but not for HEPE online. There was also significance between groups (\( p < .05 \)) with HEPE live and the activity classes increasing the exact same amount and the HEPE online class with
an almost negligible increase. However, this may be due to the fact that at baseline HEPE online had the highest value of all three groups.

The number of days per week of vigorous activity increased significantly within groups for the HEPE live option ($p < .05$), and not for either of the two other options. This resulted in between group significance ($p < .05$) because both HEPE online and the activity classes had close to zero change for days per week of vigorous activity.

Table 3 provides change scores for percent of respondents by group and by physical activity and nutrition variables. The percentage of students getting 30 minutes or more of moderate activity per day increased 6% for the HEPE live option, HEPE online increased 0.5% and the activity classes actually decreased just over 3%. The follow-up total for the HEPE live class was significantly greater than both other options ($p < .05$).

The percentage of students getting 30 minutes or more of vigorous activity per day at both baseline and follow-up was significantly higher for the activity classes than for either HEPE option ($p < .05$). Even still, at follow-up the activity class had actually decreased almost 2% while HEPE live and HEPE online increased 2.6%.

The first nutrition questions asked about behavior regarding fruits and vegetables. We found that the percent of students who ate 5 or more servings of fruits and/or vegetables/day increased substantially for the HEPE live class with an increase of 8.6%, while the HEPE online and the activity classes increased about 1.5% each. In addition, follow-up values for the fruit and vegetable variable for the activity classes were significantly lower than either HEPE option ($p < .05$). It was also found that the percentage of students who ate salad more than once per week also increased
significantly for the HEPE live class with an increase of 7% ($p < .05$). The HEPE online increased 2.5% and the activity classes increased 1.8%.

The next set of nutrition questions asked about behavior regarding whole grain cereal and other whole wheat foods. We found that the percentage of students who ate bran or whole grain cereal once per day or more at baseline was significantly lower for the HEPE online class ($p < .05$). At follow-up, however, HEPE online had an increase of 7.1%. This still did not make it as high as the HEPE live or activity classes, however it closed the gap between the three options for this variable. The percentage of students who ate whole wheat foods once per day or more increased substantially for both the HEPE live class, with a 9.6% increase, and the activity classes, with a 7.3% increase. In addition, HEPE online increased 0.5%; this resulted in a significant difference in the follow-up values between HEPE online and the other two options ($p < .05$).

For the questions regarding the students’ perceptions of the wellness program within general education we found that there was no significant difference between groups at follow-up for any of the questions. However, there were some differences within groups from baseline to follow-up. For the question regarding the students’ understanding of how a proper exercise and nutrition program can enhance the body’s health and fitness we found that all three options increased significantly within their respective groups ($p < .05$). The questions assessing the students perception of how participation in the General Education Wellness Program helped them, one, do more physical activity than they otherwise would have done, and two, eat a healthier diet than
they otherwise would have done, increased significantly within groups for the activity classes only \((p < .05)\).

**DISCUSSION**

A quarter of all 18-24-year-olds in the United States are currently among the more than 12 million students enrolled either full time or part time in the nation’s 3,600 colleges and universities.³ *Healthy People 2000* identified postsecondary educational institutions as settings where young adults (aged 18-24) should be targeted for exercise promotion.⁵ One aspect of promoting a healthy lifestyle within educational institutions has been the presence of required lifetime health and physical education classes.¹ Brigham Young University has such a requirement as part of its General Education Program, called the wellness requirement.

This wellness requirement can be fulfilled by one of three options. The first is to take HEPE in a normal class setting with a live instructor. The second is to take the same HEPE class online. The third is to take three activity classes offered by the university. Several of the objectives of the wellness requirement are to help students avoid chronic disease by learning about and participating in regular physical activity and a healthy diet. HEPE live is designed to teach students about nutrition and exercise through the use of class lectures, a text book, physical assessments at both the beginning and end of the semester, and a required physical activity/exercise log. HEPE online is done online with limited teacher-student interaction. They also have teaching assistants available through the telephone or email. The students read lessons, take quizzes and take tests online. They
also keep an activity log for six weeks. Due to the difficulty of monitoring physical assessments, the online class does not participate in those measures.

The physical activity classes are not required to cover fitness or nutrition information, but instead are focused on specific sport skill development and participation. However, some classes use text books with some nutrition information in them and some instructors take the time to teach additional fitness and nutrition information. Even still, the majority of the physical activity classes have very little fitness and nutrition information given outside the scope of their particular sport. Therefore, we would not expect much behavior change from this group.

We hypothesized that there would be no measurable difference in nutrition or physical activity behaviors between students who have recently completed the wellness requirement, no matter which option they chose. However, we found that HEPE online had the smallest impact on students’ nutrition and physical activity behaviors, the activity classes had a noticeable impact on improving the students’ physical activity behaviors but not much on improving nutrition, while the HEPE live class had the largest impact on both nutrition and physical activity behavioral improvements.

HEPE online had only two variables from the nutrition and physical activity behaviors with significant improvements, which were estimated VO$_2$ max, and whole grain cereal intake. The activity classes increased significantly for almost all of the physical activity behaviors including estimated VO$_2$ max, days/week of moderate activity, and the percent of students getting 30 minutes or more/day of vigorous activity. While the activity classes only increased significantly for one nutrition variable (whole
grain food intake) they increased just as much as the HEPE online class for all of the other nutrition variable except one (whole grain cereal intake). This is very interesting considering that the activity classes get very little to no information on nutrition, while the HEPE online is given quite a bit of information on nutrition, yet their results were similar.

HEPE live increased for every variable, both nutrition and physical activity, some more significantly than others, but increases none the less. Research in connection with health and physical activity courses indicates that over the course of a semester significant improvements in health-related knowledge, attitudes, and behaviors can be expected.\textsuperscript{1} The results from our study reinforce the previous statement.

Other studies have been done to assess the efficacy of health and wellness courses at various colleges and universities. One such study was done by Sorochan et al.\textsuperscript{10} to assess a basic required health education course at Eastern Kentucky University in 1971. This study was concerned with the general problem of whether significant changes were taking place in the health and attitudes of students, as a consequence of enrolling in the required undergraduate Personal and Community Health Course.

They found that students completing the course were able to apply health knowledge to everyday life situations with greater facility and capacity than those students who had not enrolled in the course. Students completing the course also had more positive attitudes toward well being than did students who had not enrolled in the course.
In addition, a number of pre/post studies have attempted to compare students who completed a required health and physical education class with students who did not participate in this type of a class. Results vary, but the findings suggest that students who are exposed to a required class improve with respect to their health knowledge, attitudes, and behaviors over the course of a semester.¹

Fitness levels of young Americans are declining or failing to improve, and the most rapid reduction in physical activity levels occurs between the ages of 18 and 24 years.² One study found that in the typical university ages of 18 to 21 years, frequency of doing vigorous exercise three or more times a week declines 6.2 percentage points for men and 7.3 percentage points for women.⁵ In the present study from baseline to follow-up neither the students’ weight nor their BMI changed significantly for any of the three wellness options. However, their estimated VO₂ max increased significantly for all three wellness options, indicating the possibility that while their weight did not change their ability to perform cardio respiratory exercise increased.

We also found that the number of days per week of moderate activity performed increased significantly for HEPE live and the activity classes, but not for HEPE online. However the number of days per week of vigorous activity only increased significantly for the HEPE live option and not for either of the two other options. It is somewhat surprising that the activity classes did not also increase in the amount of vigorous activity performed.

An alternate way of looking at the physical activity levels of the students is to look at the accumulated minutes of moderate and vigorous physical activity throughout
the day. The U.S. Centers for Disease Control and Prevention (CDC), the American College of Sports Medicine (ACSM), and the surgeon general have recommended that every American adult accumulate at least 30 minutes of moderate intensity activity each day. In the present study the percent of students getting 30 minutes or more of moderate activity per day increased for the HEPE live and the HEPE online options. The same trend occurred for students getting 30 minutes or more of vigorous activity per day. Surprisingly the activity classes decreased on both of those activity variables.

The college years present a distinct decline in nutritional priorities, and poor eating habits often worsen during this time. In 1986 one study reported that 69% of college students did not eat any fruit once a day and 48% ate vegetables less than once daily. Our study found that all three wellness options increased, to some degree, for all of the nutrition variables surveyed. However, not all of those increases were significant. HEPE live had the most substantial changes.

For example, the percent of students who ate 5 or more servings of fruits and/or vegetables per day almost tripled for the HEPE live class while both HEPE online and the activity classes only increased about 1%. It is important to note that HEPE online started with the highest percentage and was higher than the activity class for both measurements. A similar trend is true for the percent of students who ate salad more than once a week. HEPE live increased about 8% while both other options only increased about 2%. For the questions regarding the students’ intake of whole grain cereal and whole wheat foods HEPE online and the activity classes had large increases (HEPE online for whole grain
cereal and activity classes for whole wheat foods). However, these were the only large increases for nutrition variables for HEPE online and the activity classes.

While the data from baseline to follow-up indicate positive changes in the students’ nutrition behaviors there is still a lot of room for improvement in this area. Despite the increase in the total number of students engaging in these positive nutrition behaviors the actual percentages for each class are very low. For example, at baseline, the percentage of students who ate 5 or more servings of fruits and/or vegetables per day was 5.3% (HEPE live), 7.44% (HEPE online), and 4.1% (activity classes). While each of the options increased for this behavior only one option, HEPE live, increased to above ten percent (13.91%). Another example is the percentage of students who ate whole grain foods once per day or more. At baseline all three groups were around 30%. At follow-up both HEPE live and the activity classes had increased almost 10%, but even with that increase over half the students in all classes are not eating whole grain foods even once per day.

In order to assess the students’ attitudes and perceptions of how effective the classes were, they answered a series of questions regarding the general education objectives. When the students were surveyed about their understanding of how a proper exercise and nutrition program can enhance the body’s health and fitness, all three wellness options increased significantly. When surveyed regarding their perception of how participation in the general education wellness program helped them to both, do more physical activity and eat healthier than they otherwise would have done, only the activity classes increased significantly. It is interesting that the HEPE live class had the
most improvements for nutrition and physical activity behaviors, yet the students do not perceive the class to have helped them at follow-up any more than it did at baseline before they had the class.

In general, the results of the present study indicate that of the three wellness options HEPE live had the most significant impact on nutrition and physical activity behaviors, the activity classes had the next largest impact and HEPE online had the least impact.

For some colleges and universities, the general education program represents the only contribution physical education makes to the total curricula. For the majority of students, enrollment in classes within the general education program represents their only exposure to physical education during their college career. It is extremely important that students are taught how to live a healthy lifestyle, and it appears that the university is one of the best places in which to do just that.

**Limitations**

The most significant limitation of this study is that the behaviors were self-reported by the students, in survey form, rather than directly measured. Students may perceive their behaviors to be more or less than they actually are. Having to rely on the teachers of the various classes being surveyed to accurately explain and administer the survey and its purpose, as opposed to the researchers administering it to all of the many classes surveyed resulted in data needing to be thrown out due to improper filled in or blank answers. This also led to lower response rates, especially for the activity classes than we would have liked.
Seasonal changes and/or preference in eating habits may have factored into the outcome for the nutrition related questions. Fresh fruits and vegetable can be expensive and available in a limited variety; especially for college students living on campus (much of our sample consisted of freshmen who usually live on campus).

The generalizability of this study may be limited, because the demographics of the group are not representative of the entire U.S. population. However, the results are generalizable to other similar college and university populations. The study was only done for one semester’s time, therefore, the long term effects of the classes on nutrition and physical activity behaviors are still not known.

**CONCLUSION**

This study suggests that of the three wellness options offered at BYU, the HEPE live class was the most effective in improving nutrition and physical activity behaviors across a one semester time period. The activity classes also had significant improvements for physical activity behaviors, which is to be expected, however, the improvements were still less than that of the HEPE live class. The HEPE online class had the least amount of improvement overall. While all classes improved to some degree in most of the nutrition behaviors, the numbers of students participating in these positive behaviors is still alarmingly small. This study provides preliminary data for more long term studies into the efficacy of a university wellness program.
REFERENCES


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Table 1. Baseline Comparisons Between the Three Groups

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<td>HEPE online</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>33.00</td>
<td>Activity Classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33.50</td>
<td>30.65</td>
</tr>
<tr>
<td><strong>Estimated VO₂ max (ml·kg⁻¹·min⁻¹)</strong></td>
<td>Mean</td>
<td>52.10</td>
<td>HEPE online</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>5.33</td>
<td>Activity Classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.84</td>
<td>6.12</td>
</tr>
<tr>
<td><strong>Gender (% male)</strong></td>
<td>%</td>
<td>42.38</td>
<td>HEPE online</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>128</td>
<td>Activity Classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>286</td>
<td>153</td>
</tr>
<tr>
<td><strong>Age (% less than 20 years of age)</strong></td>
<td>%</td>
<td>40.73</td>
<td>HEPE online</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>123</td>
<td>Activity Classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>274</td>
<td>89</td>
</tr>
<tr>
<td><strong>GPA (% with GPA below 3.0)</strong></td>
<td>%</td>
<td>15.90</td>
<td>HEPE online</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>48</td>
<td>Activity Classes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>104</td>
<td>20</td>
</tr>
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</table>

* Significant difference in baseline values between groups as tested by ANOVA (*p* < .05)
** Significant difference between groups as tested by chi-square (*p* < .05)
Table 2. Change Scores from Baseline to Follow-up

<table>
<thead>
<tr>
<th></th>
<th>HEPE Live Class</th>
<th>HEPE Online</th>
<th>Activity Classes</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow-up</td>
<td>Change</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>Mean</td>
<td>158.76</td>
<td>159.32</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>33.01</td>
<td>33.34</td>
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<tr>
<td>BMI</td>
<td>Mean</td>
<td>23.43</td>
<td>23.34</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.91</td>
<td>3.96</td>
</tr>
<tr>
<td>Est. VO₂ max (ml·kg⁻¹·min⁻¹)</td>
<td>Mean</td>
<td>52.10</td>
<td>53.20</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>5.33</td>
<td>5.46</td>
</tr>
<tr>
<td>Days/week of moderate activity</td>
<td>Mean</td>
<td>5.07</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.37</td>
<td>1.45</td>
</tr>
<tr>
<td>Days/week of vigorous activity</td>
<td>Mean</td>
<td>3.34</td>
<td>3.70</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.49</td>
<td>1.59</td>
</tr>
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</table>

* Significant within group change as tested with dependent t tests (p < .05)
Table 3. Percentage of Respondents by Group, by Physical Activity and Nutrition

Variables

<table>
<thead>
<tr>
<th></th>
<th>HEPE live</th>
<th>HEPE online</th>
<th>Activity Classes</th>
<th>chi-square</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage getting 30 minutes or more of moderate activity/day</td>
<td>Baseline 63.88 60.74 64.41</td>
<td>Baseline 70.28 61.27 61.04</td>
<td>Baseline 71.29 73.55 83.33</td>
<td>Baseline 5.30 7.44 4.10</td>
<td>Baseline 40.94 44.42 35.45</td>
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Table 4. Change Scores from Baseline to Follow-up for General Education Objectives

<table>
<thead>
<tr>
<th>Participation in the GE Wellness Program has helped me to…</th>
<th>HEPE live</th>
<th>HEPE online</th>
<th>Activity Classes</th>
<th>F</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>…understand how a proper exercise and nutrition program can enhance the body’s health and fitness</td>
<td>.27*</td>
<td>.27*</td>
<td>.24*</td>
<td>1.5</td>
<td>.2143</td>
</tr>
<tr>
<td>…do more physical activity than I would have done otherwise</td>
<td>.10</td>
<td>.13</td>
<td>.24*</td>
<td>.65</td>
<td>.5814</td>
</tr>
<tr>
<td>…eat a healthier diet than I would have done otherwise</td>
<td>.09</td>
<td>.04</td>
<td>.19*</td>
<td>.87</td>
<td>.4537</td>
</tr>
</tbody>
</table>

* Significant within group change from baseline (p < .05)
Appendix A

Prospectus
Chapter 1

Introduction

It has been suggested that there are four major influences on health status: environment, the healthcare system, human biology, and lifestyle. While all four areas affect people’s health, scientists have suggested that lifestyle (health-related behavior) probably accounts for more than 50% of the causes of mortality in the United States (Pearman et al., 1997).

Regular physical activity has long been regarded as an important component of a healthy lifestyle (Pate et al., 1995). However, despite efforts by health professionals to promote the benefits of regular physical activity, a substantial proportion of the American population is characterized by a sedentary lifestyle. (U.S. Dept. of Health and Human Services, 1996). Research has found that the most rapid reduction in physical activity levels for most individuals occurs between the ages of 18 and 24 years (Stephens, Jacobs & White, 1985). The question can then be asked, what is typically occurring during that time frame to cause such a rapid reduction in physical activity?

Approximately 7.1 million 18-24-year-olds – a quarter of all individuals in that age group in the United States - are currently among the more than 12 million students enrolled either full or part time in the nation’s 3,600 colleges and universities (Douglas et al., 1997). College students risk some of the highest numbers of person years of life lost from illnesses and injuries that are largely preventable through alterations of their risky health behaviors (Grace, 1997). For example, a hallmark of most student diets is fast
food that is high in fat and sodium content. For young adults the college years present a distinct decline in nutritional priorities, and poor eating habits often worsen during this time. For example, one study reported that 69% of college students did not eat any fruit once a day and 48% ate vegetables less than once daily (Melby, Femea & Sciacca, 1986). In addition, the U.S. department of Health and Human Services (1996) found that within the typical university years the frequency of doing vigorous exercises three or more times a week declines 6.2 percentage points for men and 7.3 percentage points for women.

Given the number of students within the 18-24 year age group, relating to the entire population, and the overwhelming evidence of that particular groups poor eating and exercise habits it appears that institutions of higher education can provide an important setting for reaching young people and reducing health risk behaviors among them. In fact, Healthy People 2000 specifically identified postsecondary educational institutions as settings where young adults (aged 18-24) should be targeted for exercise promotion (U.S. Department of Health & Human Services, 1990). One aspect of promoting a healthy lifestyle within educational institutions is the presence of required health and physical education courses (Pearman et al., 1997).

The lifetime health and physical education courses vary from school to school. Some of these courses are primarily conceptually based, others are mainly activity-based, and some are a combination of the two (Hensley, 2000). Conceptually based courses focus on teaching the students about physical activity, health, and wellness through lectures and readings. Activity-based courses do not have a strong conceptual focus.
Rather, students engage in various physical activities during the allotted class time (Cardinal, Jacques & Levy, 2002).

Although many universities require their students to take and pass such courses, only a limited number of studies have assessed the efficacy of these courses. In general, studies suggest that university sponsored physical activity and/or health classes have the potential to positively affect the attitudes and behaviors of the students who enroll in them, however the results of most studies are inconclusive (Cardinal, Jacques & Levy, 2002). Therefore, an area of physical education that needs more research is that of the effectiveness of the current health and wellness courses required at higher institutions.

Brigham Young University (BYU) offers a course entitled Fitness and Lifestyle Management (labeled as the HEPE 129 course in the class schedule), which can be used to fulfill the wellness requirement that is now part of the general education program. However, the students have a few options as to how they fulfill this wellness requirement other than the health and wellness course that is offered. To fulfill the wellness requirement students have two options. Option A, HEPE 129, is a conceptually based wellness course entitled Fitness and Lifestyle Management, this course can be taken live (in class with an instructor) or online. Option B requires students to take 3 physical activity or dance classes offered by the university; however, there is no conceptual class that is required with this option.

Several of the objectives of the wellness requirement are to help students avoid chronic disease by learning about and participating in regular physical activity and a healthy diet. To date, there is no evidence that any of the three wellness course options
do this. The evaluations from this study will help us determine which option, if any, is best, and help us learn how all options might be improved to greater impact student nutrition and physical activity.

Statement of the Problem

The purpose of this study is to assess the effectiveness of the three wellness options currently being used at Brigham Young University to fulfill the general education wellness requirement. Specifically we want to know; does the university wellness requirement affect student nutrition and physical activity behaviors? Do the various options available to fulfill this requirement differ in their abilities to impact student nutrition and physical activity behaviors?

Hypothesis

There is no measurable difference in nutrition or physical activity behaviors between students who have recently completed the HEPE 129 live course, the HEPE 129 online course, or any of the three activity classes required to fulfill this general education requirement.

Assumptions

1. The subjects will respond honestly to questionnaires used to report their behavior and feelings about health and wellness.

2. All sections of the classes being surveyed are being taught the same information.

3. The subjects will be capable of reading and comprehending the survey questions.
Delimitations

1. The population being surveyed consists only of students at Brigham Young University.

2. The study is only using data collected during one semester.

Limitations

1. Physical activity behaviors will be self-reported answers in survey form, rather than directly measured.

2. Seasonal changes and/or preferences in eating habits may be a factor. This study will be conducted during the winter months when fruits and vegetables are not readily available.

3. The generalizability of the study may be limited, because the demographics of the group may not be representative of the US population.

Significance of the Study

There are three formal components to the baccalaureate at Brigham Young University: general education, religious education, and education in a major. General education is intended to provide students with intellectual breadth and the capacity to make connections among fields of knowledge. Most graduates, five years after completing their degrees, are not employed in the areas of their majors and studies show that those who do best in the long term are usually those whose breadth of education, rather than specialized training, have given them versatility (BYU, 2003).

The general education requirements contain, among others, a wellness requirement. This wellness requirement can be fulfilled using one of two options: Option
A, to take Health and Physical Education (HEPE) 129; or Option B, to take 3 physical activity or dance classes. Option A, HEPE 129, is a conceptually based wellness course entitled Fitness and Lifestyle Management. The course syllabus for this class covers information including: cardiovascular health, cardiorespiratory fitness, muscular fitness, nutrition, consumer health, substance abuse, human sexuality, immunity and infectious diseases, cancer, stress management, rape prevention, first aid and emergency care, physical fitness portfolio, and body-mind-spirit. The course can be taken either in a classroom setting with a live instructor, or as an online course. As mentioned above, Option B requires students to take 3 physical activity or dance classes offered by the university; however, there is no conceptual class that is required with this option.

Several of the objectives of the wellness requirement are to help students avoid chronic disease by learning about and participating in regular physical activity and a healthy diet. To date, there is no evidence that any of the three wellness course options do this. The evaluations from this study will help to determine which option, if any, is best, and help to learn how all options might be improved to promote a greater impact on student nutrition and physical activity.
Chapter 2

Review of Literature

It is well known that regular physical activity has long been regarded as an important component of a healthy lifestyle (Pate et al., 1995). However, despite efforts of physical education professionals to promote the benefits of regular physical activity, The U.S. Department of Health and Human Services (1996) found that a sedentary lifestyle characterizes a substantial proportion of the American population. The US Centers for Disease Control and Prevention (CDC), the American College of Sports Medicine (ACSM), and the surgeon general have recommended that every American adult accumulate at least 30 minutes of moderate intensity activity each day (Pinto et al., 1998). If Americans who lead sedentary lives would adopt a more active lifestyle, there would be enormous benefit to the public’s health and to individual well being (Pate et al., 1995).

Unfortunately, fitness levels of young Americans are declining or failing to improve, and the most rapid reduction in physical activity levels occurs between the ages of 18 and 24 years (Stephens, Jacobs, & White, 1985). Recent data indicates that a sedentary lifestyle characterizes a substantial proportion of young adults on a college campus (Pinto & Marcus, 1995). In the typical university ages of 18 through 21 years, frequency of doing vigorous exercise three or more times a week declines 6.2 percentage points for men and 7.3 percentage points for women (U.S. Department of Health & Human Services, 1996). In a survey of recent graduates, 47% reported a decrease in their physical activity, compared to their student days. These data indicate a need for physical
activity interventions targeting early adult age groups (Calfas et al., 1994), specifically within the college and university systems.

Approximately 7.1 million 18-24-year-olds – a quarter of all 18-24-year-olds in the United States - are currently among the more than 12 million students enrolled either full time or part time in the nation’s 3,600 colleges and universities (Douglas et al., 1997). Institutions of higher education can provide an important setting for reaching young people and reducing health risk behaviors among them. In fact, Healthy People 2000 specifically identified postsecondary educational institutions as settings where young adults (aged 18-24) should be targeted for exercise promotion (U.S. Department of Health & Human Services, 1990). One aspect of promoting a healthy lifestyle within educational institutions has been the presence of required lifetime health and physical education classes (Pearman et al., 1997).

Status of Physical Education Programs

Institutions of higher education are in a unique position to promote healthy behaviors by providing health education programs to students (Brener & Gowda, 2001). Schools should deliver comprehensive health and physical education programs that provide and promote physical activity at every opportunity (Pate et al., 1995). Despite the knowledge we have of the value of health and physical education programs, they are still not being utilized to their full capacity. In fact, not only do some schools not require any form of physical education classes, others don’t even offer them.

Physical education programs in American colleges and universities have a long history. From the inception of such programs over 100 years ago, physical education
courses for college students have been an enduring part of higher education. In the past century, we have seen the emergence of physical education, and more recently kinesiology and exercise science, as major fields of study. Yet the constant element in physical education programs throughout their history has been those courses offered for the general college student. These courses generally focus on the physical development and health needs of students, and they compose what have been called “activities programs,” “general education programs,” or “basic instruction programs,” among others (Hensley, 2000).

In a survey done by Larry D. Hensley (2000) it was found that of 600 randomly chosen colleges and universities in the United States 63% of the responding institutions indicated that physical education was required for all undergraduate students. The nature of the requirement varied among institutions, but 52% reported a requirement mandate that students enroll in a specific physical education course, typically along the lines of a “Fitness for Life” class.

In 1991 a survey was conducted by Kittleson & DeBarr to determine the status of the general health education courses in U.S. colleges and universities. They found that of 248 institutions surveyed 213 (85.8%) offered a general health education course. Of the 213 institutions offering a general health education course only 35 (16.5%) reported that all undergraduate students were required to complete the course for graduation.

In addition, one study reported that only 13 colleges and universities (out of 125 state institutions that were surveyed) required a health course for graduation. Another study found that 60% of all universities required some form of physical education for
graduation. Many of these requirements, however, have no emphasis on health-related issues other than developing lifetime proficiency in a particular sport (Kittleson & Ragon, 1984).

As previously mentioned, the required courses for health and wellness vary from school to school. Some of these courses are primarily conceptually based, others are mainly activity-based, and some are a combination of the two (Hensley, 2000). Conceptually based courses focus on teaching the students about physical activity, health, and wellness through lectures and readings. Activity-based courses do not have a strong conceptual basis. Rather, students engage in physical activity during the allotted class time (Cardinal, Jacques & Levy, 2002).

Although many universities require their students to take and pass such courses, only a limited number of studies have assessed the efficacy of these courses. In general, studies suggest that university sponsored physical activity and/or health classes have the potential to positively affect the attitudes and behaviors of the students who enroll in them, however the results of most studies are inconclusive (Cardinal, Jacques & Levy, 2002).

The status of the general education program in physical education is of significant importance to most physical educators in higher education. For some colleges and universities, the general education program represents the only contribution physical education makes to the total curricula. For the majority of students, enrollment in classes within the general instruction program represents their only exposure to physical education during their college career (Trimble & Hensley, 1984). Unfortunately, it has
been shown that, to a large degree, school physical education programs do not effectively prepare students for the transition to self-directed physical activity (Sallis et al., 1999).

**Health Issues of Colleges Students**

The fact that most school physical education programs do not effectively prepare students for the transition to self-directed physical activity may be, in part, to the lack of research done to assess the prevalence of exercise behavior and factors influencing exercise adoption and maintenance among college students (Wallace & Buckworth, 2003).

College students risk some of the highest numbers of person years of life lost from illnesses and injuries that are largely preventable through alterations of their risky health behaviors (Grace, 1997). For example, a hallmark of most student diets is fast food that is high in fat and sodium content. The college years present a distinct decline in nutritional priorities, and poor eating habits often worsen during this time. One study reported that 69% of college students did not eat any fruit once a day and 48% ate vegetables less than once daily (Melby, Femea & Sciacca, 1986). In addition, the U.S. department of Health and Human Services (1996) found that within the typical university years the frequency of doing vigorous exercises three or more times a week declines 6.2 percentage points for men and 7.3 percentage points for women. These data indicate a need for physical activity and nutritional interventions targeting early adult age groups.

**Research on the Effectiveness of Wellness Courses**

Research in connection with health and physical activity courses indicates that over the course of a semester significant improvements in health-related knowledge,
attitudes, and behaviors can be expected (Pearman et al, 1997). One such study was done by Sorochan, Ulrich and Coleman (1971) to assess a basic required health education course at Eastern Kentucky University in 1971. This study was concerned with the general problem of whether significant changes were taking place in the health and attitudes of students, as a consequence of enrolling in the required undergraduate Personal and Community health course.

The study design had an experimental group of students enrolled in the health class and a control group of students not enrolled in the health class who had also never taken the class. All subjects were registered as full-time students at the university and were comprised of mostly freshmen and sophomores. Three instruments were used to assess changes in the health behaviors: a) a standardized College Health Behavior Inventory, b) a health attitudinal scale, and c) a demographic inventory.

They found that students completing the course were able to apply health knowledge to everyday life situations with greater facility and capacity than those students who had not enrolled in the course. Students completing the course had more positive attitudes toward well being than did students who had not enrolled in the course. Finally, students completing the health course appeared to practice desirable personal, family, community and socially acceptable health behaviors more positively that those students who had not enrolled in the course.

Another study done by Corbin and Chevrette (1974) looked to ascertain whether changes in attitude toward physical education resulted from a required lecture-laboratory physical education course designed to present information concerning exercise and
physical activity. The subjects used were freshman students enrolled in lecture-laboratory physical education. The researchers found that both skill instruction and lecture-laboratory physical education play a role in positive attitude development. They also suggest that more research be conducted to determine the magnitude of attitudinal changes necessary to effect changes in behavior.

In addition, a number of pre-post studies have attempted to compare students who completed a required health and physical education class with students who did not participate in this type of a class. Results vary but the findings suggest that students who are exposed to a required class improve with respect to their health knowledge, attitudes, and behaviors over the course of a semester (Pearman et al, 1997).

Other studies have attempted to compare health knowledge, attitudes and behaviors based on whether the student completed a cognitive-affective or an activity-based health and physical education class. The collective results of these studies suggest that cognitive health information is more valuable if coupled with physical activity (Pearman et al, 1997). As early as the 1970s, educators advocated teaching skills students could use to stay active for a lifetime, as opposed to only teaching specific activities (Corbin & Laurie, 1978).

Summary

Fitness levels of young Americans are declining or failing to improve, and the most rapid reduction in physical activity levels occurs between the ages of 18 and 24 years (Stephens, Jacobs & White, 1985). Approximately 7.1 million 18-24 year-olds are enrolled as either part time or full time students in the nation’s colleges and universities.
(Douglas et al., 1997). It seems reasonable that institutions of higher education that influence so many of our nation’s young people should play a role in development of healthy lifestyle behaviors. One way colleges and universities have found to promote a healthy lifestyle is through a required lifetime health and physical education course (Pearman et al., 1997).

The status of these lifetime health and physical education courses within the general education programs of schools is very important to most physical educators. For the majority of students, enrollment in classes within the general instruction program represents their only exposure to physical education during their entire college career (Trimble & Hensley, 1984). Unfortunately, it has been shown that, to a large degree, school physical education programs do not effectively prepare students for the transition to self-directed physical activity (Sallis et al., 1999). However, research has been done on health and physical activity courses which indicate that over the course of a semester significant improvements in health-related knowledge, attitudes and behaviors can be expected (Pearman et al, 1997).

The study we are proposing hopes to find whether there is any difference in nutrition or physical activity behaviors between students who have recently completed a lifetime health and physical education type course live versus online, or those who take only activity classes.
Chapter 3

Methods

This chapter describes the methods used to test the hypothesis that there is no difference in nutrition or physical activity behaviors between students who have recently completed the HEPE 129 live course, the HEPE 129 online course, or any of the three activity classes required to fulfill this general education requirement. This chapter contains the specific details regarding subjects, procedures, design, instruments, and analysis.

Subjects

The population being used for this study consists of students (mostly freshman and sophomores) currently attending Brigham Young University (BYU) in Provo, Utah. The demographics of this particular population are university students, both males and females, mostly Caucasian, aged approximately 18-25, and religiously affiliated.

The sample of the population that we will study consists of students at BYU currently enrolled during the winter 2004 semester for one of the three possible options for fulfilling the wellness requirement. This includes everyone enrolled in all sections of HEPE 129, both the in class students and the online students, as well as everyone enrolled in an activity class with the physical education department. Each semester approximately 1200 students take the HEPE 129 live course, another 800 take HEPE online, and roughly 2,500 students will take Physical Education 100 level physical activity courses that will meet the wellness requirement.
Procedures and Design

A three-group pretest/posttest design will be used for this study. In order to determine the health behaviors of the students in the various wellness options a survey will be administered to all students enrolled in HEPE 129, live and online, and all 100 level Physical Education activity classes. The College of Physical Education HEPE committee has approved this evaluation and will require instructors for all Wellness related courses to administer the survey to their students at the beginning as well as the end of winter semester 2004. Before the semester begins, all course instructors will be informed of the survey and given enough copies to evaluate each of the students in their classes.

During the first or second day of class the students will be given the informed consent instruction form and asked to complete the survey using the electronic bubble sheet. Online students will be required to fill out the questionnaire online during the same time period. Pilot testing of the survey to over 100 students revealed that the survey takes approximately 5-8 minutes to complete. There are no known risks associated with participation in this study. There are no benefits to students who complete this survey. In addition, students will not be compensated in any way for completing this survey.

Students will be required to code in their name and student identification number. This is necessary if baseline surveys are to be successfully matched with end of semester (follow-up) surveys. Scanning of the data sheets will be conducted at the testing center. After the surveys have been scanned, they will be destroyed. The results from the initial
survey will be used as baseline data that we will compare with the results collected at the end of the semester.

*Instrument*

A questionnaire will be designed using questions from the Centers for Disease Control and Prevention’s (CDC) Behavioral Risk Factor Surveillance System Survey Questionnaire and the non-exercise regression equations developed by George et al., 2003. The purpose of this questionnaire will be to determine the behavior of the students with regards to nutrition, physical activity, and general health and wellness both before and after participation in either the HEPE 129 (in class versus online) or an activity class.

A pilot study was conducted where the questionnaire was given to approximately 100 students in four different activity classes. Feedback relative to the clarity and duration of the questionnaire was obtained. A committee of experts reviewed the final questionnaire.

*Analysis*

Merging of pre and follow-up surveys will be conducted in SAS using the proc merge procedure to match pre and follow-up surveys by student ID number. Once merging has taken place, all personal identifiers except the research assigned ID will be deleted from the final data set.

Chi-Square analysis of changes between and within groups and polytomous logistic regression will be used to compare nutrition and physical activity behaviors between wellness options after control for any baseline differences in gender, age, and year in school.
References


Brigham Young University Undergraduate Catalog (2003-2004). Provo, UT, BYU.


Appendix B

Questionnaire
Brigham Young University
Consent to be a Research Subject

Introduction
This research study is being conducted by the Department of Physical Education at Brigham Young University to determine the effectiveness of the University General Education Wellness Program. You were selected to participate because you are a student who is required to complete the Wellness program prior to graduation.

Procedures
You will be asked to complete a questionnaire consisting of 27 questions about your exercise and dietary habits. It should take you about 10 minutes to complete the questionnaire. You will be asked to complete this questionnaire again at the end of the semester. For this reason, we need your name and ID so that we can make comparisons between your responses today and in the future.

Benefits
There are no direct benefits to you as a student. However, future students will benefit when the Wellness program is evaluated and improved based on the results of this questionnaire.

Confidentiality
All information provided will remain confidential and will only be reported as group data with no identifying information. All data will be kept in the confidential files of the Department of Physical Education and only those directly involved with the research will have access to them. After the research is completed, the answer sheets will be destroyed.

Participation
Your participation in this research study is voluntary. You have the right to withdraw at anytime or refuse to participate entirely without jeopardy to your class status, grade or standing with the University.

Questions about the Research
If you have questions regarding this study, you may contact Lisa Malan by phone at 801-422-1845 or by email at lmm35@email.byu.edu.

Questions about your Rights as Research Participants
If you have questions you do not feel comfortable asking the researcher, you may contact Dr. Shane Schulthies, IRB Chair, Phone: 801-422-5490, Office: 120B RB, email: shane_schulthies@byu.edu.

I have read and understood this consent form and desire of my own free will and volition to participate in this study. The return of the blue answer (bubble) sheet represents my informed consent to participate in this study.
General Education Wellness Questionnaire

*Answer all questions on the blue answer sheet. Do not write on the questionnaire.*

**STEP 1.**

*Answer the following questions in the lower left hand corner of the blue answer sheet where it says “INSTRUCTIONS.”*

A. What is your weight in pounds? In this section on the bubble sheet that reads: FACULTY USE ONLY, write your weight in pounds in the white spaces, and then bubble in your weight. Use the **two columns on the right (right justify the numbers)** if you are under 100 pounds; use all three columns if your weight is 100 pounds or more.

B. What is your height in inches? In this section on the bubble sheet that reads: OFFICE USE ONLY, write your height in inches (for example, 5'0" = 60 inches, 5'5" = 65 inches, 5'10" = 70 inches, etc.) in the white spaces, then bubble in your height in inches. **Use the two columns on the right side of this section (right justify the numbers).**

**STEP 2.**

*Bubble in your name and university identification number on the upper left hand side of the blue answer sheet. If you do not know your university ID number, bubble in your net ID (used for email).*

**STEP 3**

*Answer the following questions on the main section of the blue answer sheet.*

1. How are you completing the BYU General Education Wellness requirement?
   1. I am currently enrolled in HEPE 129 – in class with a live instructor.
   2. I am currently enrolled in HEPE 129 – online by computer.
   3. I am currently enrolled in an activity class.
   4. I have already completed my GE Wellness requirement

2. What is your gender?
   1. Female
   2. Male

3. How old are you?
   1. 17-19 years
   2. 20-22 years
   3. 23-25 years
   4. 26-28 years
   5. 29-31 years
   6. 32-34 years
   7. 35-37 years
   8. 38-40 years
   9. 41-43 years
   10. 44 years or older
4. What is your current GPA or your final GPA at graduation?

1. Less than 2.0  
2. 2.00 – 2.29  
3. 2.30 – 2.59  
4. 2.60 – 2.89  
5. 2.90 – 3.19  
6. 3.20 – 3.49  
7. 3.50 – 3.79  
8. 3.80 – 4.00  
9. I am a first semester freshman with no official University GPA

**PHYSICAL ACTIVITY/ EXERCISE QUESTIONS**

*We are interested in how much moderate and vigorous activity you do on a regular basis. Moderate activities are those which cause you to breathe slightly faster and increase your heart rate slightly. Vigorous activities are those which make you breathe fast and elevate your heart rate significantly.*

5. Think about the moderate activities you do in a usual week. Do you do moderate activities for at least 10 minutes at a time, such as a brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate?

1. Yes  
2. No: Go to question # 8  
3. Don’t know or not sure: Go to question # 8

6. How many days in a usual week do you do these moderate activities for at least 10 minutes at a time?

1. 1 day  
2. 2 days  
3. 3 days  
4. 4 days  
5. 5 days  
6. 6 days  
7. 7 days

7. On days when you do moderate activities for at least 10 minutes at a time, how many total minutes a day do you usually spend doing these activities?

1. About 10 minutes a day  
2. About 20 minutes a day  
3. About 30 minutes a day  
4. More than 30 minutes a day  
5. Don’t know or not sure
8. Now, think about the vigorous activity you do, in a usual week. Do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?
   1. Yes
   2. No: Go to question # 11
   3. Don’t know or not sure: Go to question # 11

9. How many days in a usual week do you do these vigorous activities for at least 10 minutes at a time?
   1. 1 day
   2. 2 days
   3. 3 days
   4. 4 days
   5. 5 days
   6. 6 days
   7. 7 days

10. On days when you do vigorous activities for at least 10 minutes at a time, how much total time per day do you usually spend on these activities?
    1. About 10 minutes a day
    2. About 20 minutes a day
    3. About 30 minutes a day
    4. More than 30 minutes a day
    5. Don’t know or not sure

11. Suppose you were going to exercise continuously on an indoor track for 1 mile. Which exercise pace is just right for you? (Not too easy and not too hard)
    1. Walking at a slow pace (16 minutes per mile or more)
    2. Walking at a fast pace between 13 and 16 minutes per mile
    3. Jogging at a slow pace (12 minutes per mile)
    4. Jogging between 12 and 11 minutes per mile
    5. Jogging at a medium pace (10 minutes per mile)
    6. Jogging between 10 and 9 minutes per mile
    7. Jogging at a fast pace (8 minutes per mile)
    8. Running between 8 and 7 minutes per mile
    9. Running at a fast pace (7 minutes per mile or less)

12. How fast could you cover a distance of three miles and NOT become breathless or overly fatigued? Be realistic.
    1. Walking at a slow pace (16 minutes per mile or more)
    2. Walking at a fast pace between 13 and 16 minutes per mile
    3. Jogging at a slow pace (12 minutes per mile)
4. Jogging between 12 and 11 minutes per mile
5. Jogging at a medium pace (10 minutes per mile)
6. Jogging between 10 and 9 minutes per mile
7. Jogging at a fast pace (8 minutes per mile)
8. Running between 8 and 7 minutes per mile
9. Running at a fast pace (7 minutes per mile or less)

13. Select from the following list the option that most closely describes your overall level of physical activity for the previous SIX MONTHS.
   1. **Minimal activity**: avoid walking or exertion; i.e. always use an elevator, drive when possible instead of walking.
   2. **Light activity**: walk for pleasure, routinely use stairs, occasionally exercise sufficiently to cause heavy breathing or perspiration.
   3. **Moderate activity**: 10 to 60 minutes per week of moderate activity such as golf, horseback riding, calisthenics, table tennis, bowling, weight lifting, yard work, cleaning house, walking for exercise.
   4. **Moderate activity**: over 1 hour per week of moderate activity as described above.
   5. **Vigorous activity**: run less than 1 mile per week and/or spend less than 30 minutes per week in comparable activity such as running or jogging, lap swimming, cycling, rowing, aerobics, skipping rope, running in place, or engaging in vigorous activity such as soccer, basketball, tennis, racquetball, or handball.
   6. **Vigorous activity**: run 1 mile to less than 5 miles per week and/or spend 30 minutes to less than 60 minutes per week in comparable physical activity as described above.
   7. **Vigorous activity**: run 5 miles to less than 10 miles per week and/or spend 1 hour to less than 3 hours per week in comparable physical activity as described above.
   8. **Vigorous activity**: run 10 miles to less than 15 miles per week and/or spend 3 hours to less than 6 hours per week in comparable physical activity as described above.
   9. **Vigorous activity**: run 15 miles to less than 20 miles per week and/or spend 6 hours to less than 7 hours per week in comparable physical activity as described above.
   10. **Vigorous activity**: run 20 to 25 miles per week and/or spend 7 to 8 hours per week in comparable physical activity as described above.
Nutrition Questions

For questions #14 – 18 bubble in your answer with the one letter that most closely represents your current eating habits.

14. A serving of vegetables is about one cup. A serving of fruit is one piece of fruit or a cup of fruit juice. How many total servings of fruits and/or vegetables do you eat?
   1. 0 – 3 a month
   2. 1 a week
   3. 1 a day
   4. 2 a day
   5. 3 a day
   6. 4 a day
   7. 5 a day
   8. 6 – 8 a day
   9. More than 8 a day

15. How often do you eat green salad?
   1. About once a month
   2. 2 or 3 times a month
   3. About once a week
   4. Several times a week
   5. About once a day
   6. 2 or 3 times a day
   7. 4 or 5 times a day
   8. More than 5 times a day
   9. I never eat green salad
   10. Don’t know or not sure

16. How often do you eat bran or whole grain cold cereal such as Cheerios, Shredded Wheat, Raisin Bran, Bran Flakes, Grape-Nuts, Granola, Wheaties, Healthy Choice, etc.?
   1. About once a month
   2. 2 or 3 times a month
   3. About once a week
   4. Several times a week
   5. About once a day
   6. 2 or 3 times a day
   7. 4 or 5 times a day
   8. More than 5 times a day
   9. I only eat non bran or non whole grain cold cereal.
   10. I never eat cold cereal or I don’t know or I am not sure.
17. How often do you eat brown rice, whole wheat bread or rolls that are made from whole wheat flour?
1. About once a month
2. 2 or 3 times a month
3. About once a week
4. Several times a week
5. About once a day
6. 2 or 3 times a day
7. 4 or 5 times a day
8. More than 5 times a day
9. I never eat brown rice, whole wheat bread or rolls.
10. Don’t know or not sure.

General Questions

18. My participation in the General Education Wellness program has taught me how a proper exercise and nutrition program can enhance the body’s health and physical fitness.
   
   | 1 | 2 | 3 | 4 | 5 |
   | Strongly Disagree | Not sure | Agree | Strongly Agree |

19. My participation in the General Education Wellness program has helped me to do more physical activity than I would have done without the Wellness program.

   | 1 | 2 | 3 | 4 | 5 |
   | Strongly Disagree | Not sure | Agree | Strongly Agree |

20. My participation in the General Education Wellness program has helped me to eat a healthier diet than I would have without the Wellness program.

   | 1 | 2 | 3 | 4 | 5 |
   | Strongly Disagree | Not sure | Agree | Strongly Agree |

21. My participation in the General Education Wellness Program has helped me to better understand the divine and eternal nature of the human body and its sacred role during mortality.

   | 1 | 2 | 3 | 4 | 5 |
   | Strongly Disagree | Not sure | Agree | Strongly Agree |