Quantitative Analysis of the Adapted Physical Education Employment Market in Higher Education

by Jiabei Zhang, Western Michigan University

Abstract

The purpose of this study was to analyze the employment market of adapted physical education (APE) careers in higher education since 1975 to see if the increase of this market has continued since 1998. Based on the data collected from the *Chronicle of Higher Education*, a total of 887 APE job openings have been posted since 1975, including about 45% of the openings that were APE first priority (i.e., APE as a major responsibility) and 55% were listed as APE second priority (i.e., APE as a minor responsibility). The yearly frequencies of APE job openings, the yearly proportions of APE first priority, and the yearly proportions of APE second priority over the years were analyzed by regression analysis and descriptive statistics. The results revealed that the employment market of APE professionals is a growing one in higher education; however, the proportion of APE first priority contribution to the market has been decreasing over the years, while the proportion of APE second priority contribution to the market has been increasing over the years. This growing employment market is therefore primarily attributed to APE second priority openings.

Key words: teacher preparation

The enactment of the Education for All Handicapped Children Act (now the Individuals with Disabilities Education Act) requires that physical education services, specially designed if necessary must be made available to all students with disabilities receiving a free and appropriate public education (Federal Register, 1977; Sherrill 2004). This enactment has resulted in the fact that more students have been prepared by more professors at colleges and universities to teach adapted physical education (APE) in public schools over the years. When more APE professors have been needed for training more APE students, it has been assumed that the employment market of APE careers in higher education has grown over the past 34 years since 1975. This assumption has been documented in three studies (Dunn & McCubbin, 1991; McCubbin & Dunn, 2000; Zhang, Joseph, & Horvat, 1999).

Dunn and McCubbin (1991) published an article including an analysis of the employment market of APE careers in higher education. They collected the data for documenting the need for more APE leadership personnel. A systematic analysis of the data from the *Chronicle of Higher Education, Dissertation Abstracts International*, and the *Physical Education Gold Book* revealed that the number of available APE leadership personnel was not enough to fill those job positions available in a growing employment market of APE careers in higher education. They revealed that the number of APE position openings at colleges and universities had linearly increased between years 1981-1989, which partially supported the assumption that the employment market of APE careers in higher education has grown since 1975.

Zhang, Joseph, and Horvat (1999) investigated the marketable features of APE careers in higher education. They identified 560 APE job openings, including 297 APE first priority (i.e., APE as a major responsibility) and 263 APE second priority (i.e., APE as a minor responsibility) from the *Chronicle of Higher Education* between 1975-1976 and 1997-1998. These data were analyzed by regression analysis, chi-square, and descriptive statistics. The results indicated that the employment market of APE careers in high education was a growing one that demanded more candidates specializing in APE to prepare in other areas and encouraged candidates specializing in other areas to minor in APE. In this growing market, APE second priority openings increased more quickly than APE first priority openings. This study further confirmed the assumption that the employment market of APE careers in higher education had grown from 1975-76 to 1997-98.

In reanalyzing the need for the preparation of APE leadership personnel (i.e., doctoral APE students), McCubbin and Dunn (2000) also depicted the employment market of APE careers in higher education. Data were collected on those advertised APE positions in the *Chronicle of Higher Education* from 1991 to 1998 that were used to compare to the numbers of APE personnel prepared. They revealed that during this time period, the available doctoral APE students completing dissertations was too small to fill the APE job positions in higher education advertised in the growing employment market of APE careers at colleges and universities between 1991 and 1998. This result was clearly similar to that found in the study by Zhang, et al (1999), partially documenting the assumption that the employment market of APE career in higher education has grown since 1975.

As a total of 34 years have been passed since 1975, however, the results obtained from the above three studies could not be employed in completely documenting this assumption that the employment market of APE careers in higher education has continued to grow since 1998. The above studies just documents that the employment market of APE careers in higher education has grown over years 1981-1989 (Dunn & McCubbin, 1991), 1991-1998 (McCubbin & Dunn, 2000), and 1975-1998 (Zhang, et al., 1999). Has the employment market of APE careers in higher education continuously grown after 1998? Research evidence has not been found in a review of relevant literature. A need does exist for initiating an investigation analyzing the employment market of APE careers in higher education since 1975 to see if the increase of this market has continued since 1998.

If a trend of the employment market of APE careers in higher education over past 34 years can be fitted, moreover, the major contribution made to this market by APE first priority or APE second priority has not been made clear yet. A trend of the employment market of APE careers in higher education is generally fitted based on the yearly frequencies of APE job openings (Zhang, et al., 1999). Each of the yearly frequencies of APE job openings (e.g., 45 in 1997) include two proportions, the proportion of APE first priority openings in the total APE job market (e.g., 16/45 = 0.36) and the

proportion of APE second priority openings in the total APE job market (e.g., 29/45 = 0.64). A frequency signifies the total number of APE job openings in a given year, while a proportion shows the contribution of APE first priority openings or APE second priority openings to the total number of APE job openings.

It is believed that yearly frequencies are useful for describing an absolute trend of the employment market of APE careers in higher education using APE job openings. It may mislead readers, however, if they are used to seeing a developmental trend using APE first priority opening or APE second priority openings. For example, let us suppose that yearly frequencies of APE first priority openings over the three years have grown (11, 12, 13) and APE second priority openings over the same years have grown as well (1, 7, 9), implying that total APE job openings have also grown over the same years (12, 19, 22). However, the contribution of APE first priority openings to the total APE job openings has actually decreased based on the proportion (11/12 = 0.92, 12/19 = 0.63, 13/22 = 0.59). The yearly proportions of APE first and second priority openings should therefore be used to depict market trends. However, no study has been found using yearly proportions of APE first and second priority to analyze their contributions to the employment market of APE careers in higher education.

The primary purpose of this study was to quantitatively analyze the employment market of APE careers in higher education since 1975, to see if the increase of this market has continued since 1998, based on the data of yearly frequencies of APE job openings. Secondarily, this study analyzed the contributions of those APE job openings requiring APE as a major and minor responsibility to this employment market based on yearly proportions of APE first and second priority. It has been assumed that the employment market of APE careers in higher education has been a growing market primarily contributed by either APE first priority or APE second priority openings.

Method

Data Collection

The *Chronicle of Higher Education* was used as the primary data source in this study. All the advertised announcements in kinesiology, physical education, exercise science, sport science, health, recreation, and dance from all issues of this primary source since academic years 1975-76 were searched manually and electronically. Each APE job opening announced was identified for analyses if a responsibility for teaching an APE course, conducting APE research, or equivalents was included in this opening. The equivalents were such similar APE terms as adapted physical activity, adapted kinesiology, special physical education, and physical education for individuals with disabilities or similar terms such as handicapped children.

It should be noted that if an APE job opening was repeatedly advertised for two or more times during an academic year, this job opening was identified once announced in this year only. For checking the reliability of data collection conducted by a researcher, another researcher also sampled 10 academic years of announcements randomly from the total 34-year period between academic year 1975-76 and academic year 2008-09. The *Chronicle of Higher Education* is the best data source for advertising most job openings in higher education, including most APE job openings. It has extensively been used as the primary data source in conducting career studies in special education (e.g., Sindelar, Buck, Carpenter, & Watanabe, 1993) and APE (e.g., Dunn & McCubbin, 1991) in higher education.

Data Categories

Three data sets were used in this study, (a) APE job openings, (b) APE first priority, and (c) APE second priority openings. APE job openings included the yearly frequencies of openings requiring APE as a part of the job duty. APE first priority was the yearly proportion of openings requiring an APE specialization with or without the responsibility in one or more other areas. APE second priority constituted a specialization in another area or a general background across several areas with a responsibility for teaching and researching in APE. Announcements coded as APE first or second priority were independently completed by two researchers to check reliability.

In the data set of APE job openings, a yearly frequency is simply the number of APE job openings identified in the corresponding academic year. In academic year 2005-06, for example, the yearly frequency of APE job opening was 34, since a total of 34 APE job openings were identified. In either data set of APE first priority or APE second priority, a yearly proportion was calculated through dividing the yearly frequency of one such data set by the yearly frequency of APE job openings. In academic year 2005-06, for example, the yearly proportion of APE first priority was 0.35 because the yearly frequency of APE first priority is 12 and the yearly frequency of APE job openings was 34 (12/34 = 0.35).

Data Analyses

Four types of data analyses were conducted in this study. The first type of analysis was a reliability analysis in the inter-observer agreement method. To check the reliability of identifying APE job openings, coding APE first priority openings, or coding APE second priority openings, the number of agreements found between two persons was divided by this same number plus the number of disagreements, and the quotient was then multiplied by 100 (Thomas & Nelson, 1996; Zhang, et al., 1999).

The second type of analysis was a calculation of regression equations. All data sets were fitted in linear regression equations. Each of these equations was calculated with academic years as the predictor variable and the yearly frequencies for APE job openings or proportions for APE first or APE secondary priority as the criterion variable (Sindelar, et al., 1993; Zhang, deLISLE, Chen, 2006). The effect of the predictor variable on the criterion variable was checked in an analysis of variance (F test) and a coefficient of determination (R^2).

The third type of analysis was a computation of the related data pertaining to APE job openings found over the academic years from 1998-99 to 2008-09 - including the mean of APE job openings, the standard deviation of APE job openings, and information about fitted regression equations. These data were used to compare to the corresponding data found over the academic years from 1975-76 to 1997-98, which were reported in a previous investigation (Zhang, et al., 1999).

The fourth type of analysis was a description of other specialization areas in combination with APE responsibility.

The total number of these areas and their frequencies was first counted. The distribution of the combined frequencies with APE over areas was then analyzed with a chi-square test for goodness of fit (x^2; Thomas & Nelson, 1996) to verify if actual frequencies were proportional to averaged ones. Ranks of these areas were also listed according to the percentages in combination with APE responsibility.

Table 1. ***Frequencies and Proportions of APE Job Openings, APE First Priority, and APE Second Priority In Employment Market in Higher Education from Academic Year 1975-76 to 2008-09***

Academic Years	APE job opening *Frequency*	APE first priority *Frequency*	*Proportion*	APE second priority *Frequency*	*Proportion*
1975-1976	6	2	0.33	4	0.67
1976-1977	15	6	0.40	9	0.60
1977-1978	22	12	0.55	10	0.45
7198-1979	25	20	0.80	5	0.20
1979-1980	12	11	0.92	1	0.08
1980-1981	20	13	0.65	7	0.35
1981-1982	22	13	0.59	9	0.41
1982-1983	15	10	0.67	5	0.33
1983-1984	22	14	0.64	8	0.36
1984-1985	20	9	0.45	11	0.55
1985-1986	22	18	0.82	4	0.18
1986-1987	19	8	0.42	11	0.58
1987-1988	30	19	0.63	11	0.37
1988-1989	32	23	0.72	9	0.28
1989-1990	25	13	0.52	12	0.48
1990-1991	21	11	0.52	10	0.48
1991-1992	36	18	0.50	18	0.50
1992-1993	25	13	0.52	12	0.48
1993-1994	29	12	0.41	17	0.59
1994-1995	28	12	0.43	16	0.57
1995-1996	36	10	0.28	26	0.72
1996-1997	34	14	0.41	20	0.59
1997-1998	45	16	0.36	29	0.64
1998-1999	37	11	0.30	26	0.70
1999-2000	36	12	0.33	24	0.67
2000-2001	31	8	0.26	23	0.74
2001-2002	30	10	0.33	20	0.67
2002-2003	26	9	0.35	17	0.65
2003-2004	30	11	0.37	19	0.63
2004-2005	29	8	0.28	21	0.72
2005-2006	34	12	0.35	22	0.65
2006-2007	30	5	0.17	25	0.83
2007-2008	30	10	0.33	20	0.67
2008-2009	13	7	0.54	6	0.46
Total/Proportion	887	400	0.45	487	0.55

Results

The estimate of reliability for identifying APE job openings from the *Chronicle of Higher Education* was 96%, while the estimate of reliability for coding APE first and second priority was 91%. Table 1 presents the yearly frequencies of APE Job openings and the yearly proportions of APE first priority and second priority. As presented in Table 1, a total of 887 APE job openings were identified in the *Chronicle of Higher Education* from academic year 1975-76 to academic year 2008-09. In the total openings, the proportion of APE first priority was 0.45, while that of APE second priority was 0.55.

Table 2 presents the regression line fitted for APE job openings. The rate of each trend is estimated based on coefficient of a variable X with a positive coefficient showing an increasing trend and a negative one showing a decreasing trend. As shown in Table 2, regression equations fitted based on the yearly frequencies for APE job openings and the yearly proportions for APE second priority showed a significantly increasing trend, but regression equation fitted based on the yearly proportions for APE first priority showed a significantly decreasing trend.

Table 2. ***Regression Equations Fitted based on the Yearly Frequencies of APE Job Openings and the Yearly Proportions of APE First Priority and APE Second Priority from Academic Years 1975-76 to 2008-09***

	APE Job Openings	APE First Priority	APE Second Priority
Data	Yearly frequencies	Yearly proportions	Yearly proportions
Equation	Y=0.48X - 935.74	Y=-0.01X + 22.95	Y=0.12X–22.89
Trend	Increase	Decrease	Increase
Rate of trend	0.48	1% (0.01 x 100)	12% (0.12 x 100)
R^2	.33	.40	.42
$F(1, 32)$ value	15.97	21.47	23.19
P value	.00	.00	.00

Table 3 presents the related data computed for two phases, including phase 1 over the academic years 1975-76 to 1997-98 and phase 2 over the academic years 1997-98 to 2008-09. The averaged APE job openings obtained in phase 2 (M = 29.63) was higher than the averaged APE job openings found in phase 1 (M = 24.39). The marketable trend fitted over phase 2, however, did not increase as compared to the marketable trend fitted over phase 1. The marketable trend fitted over phase 1 increases at a rate of 1.03 position opening per year, while the marketable trend fitted over phase 2 decreases at a rate of 1.24 position opening per year.

Table 4 presents other specialization areas included in all APE job openings and their frequencies, percentages, and ranks. As shown in Table4, a total of 15 other specialization areas were identified in combination with APE responsibility. The result of chi-square test indicated a significant difference in the distribution of the frequencies over these areas, x^2 (14, N = 1490) = 4645.55, p < .001. As presented in corresponding ranks based on percentages in Table 3, the 15 other areas included in APE job openings were ranked from physical education methods (the top one) to special education and others (the last one)

Table 3. ***Mean, Standard Deviation, and Information about Fitted Regression Equations based on the Yearly Frequencies of APE Job Openings over Phase 1 from 1975-76 to 1997-98 and Phase 2 from 1998-99 to 2008-09***

	Phase 1	Phase 2
	1975-76 to 1997-98	1998-99 to 2008-09
Mean of the APE Openings	24.39	29.63
SD of the APE Openings	8.74	6.38
Regression Equation Fitted	Y = 1.03X - 2024	Y = -1.24X + 2506
Trend of the Fitted Equation	Increase	Decrease
Rate of the Fitted Equation	1.03	1.24
R^2 of the Fitted Equation	.65	.41
F value of the Fitted Equation	38.84	6.36
P value of the Fitted Equation	.00	.03

Table 4. ***Frequencies, Percentages, and Ranks of Other Areas in Combination with APE Job Openings from Academic Years 1975-76 - 2008-09***

Other area	Frequency	Percentage	Rank
Physical education methods	497	33.33	1
motor behavior and control	261	17.51	2
Health and wellness education	136	9.12	3
Tests, measurement, and evaluation	106	7.11	4
Biomechanics and kinesiology	104	6.98	5
Exercise physiology and fitness	100	6.71	6
Physical and recreational therapy	49	3.29	7
Sports management & administration	48	3.22	8
Sport medicine and athlete training	44	2.95	9
First aid, CPR, and safety education	39	2.62	10
Research methods	34	2.28	11
Sport psychology	28	1.88	12
Sport history, philosophy, sociology	22	1.48	13
Statistics and computer application	12	0.80	14
Special education and others	11	0.74	15
Total	1491	100	--

Discussion

The results of this investigation document the assumption that the employment market of APE careers in higher education has grown since 1975. As shown in Table 2, the fitted equation of APE job openings shows an increasing trend, which is increased by 0.48 APE job opening an academic year as indicated in the fitted regression equation based on the yearly frequencies of APE job

openings ($Y = 0.48X - 935.74$, $R^2 = .33$, $F[1, 32] = 15.97$, and $p = .00$). Since the F test for this regression reveals a significant linear relationship between the predictor variable (years) and the criterion variable (job openings), we can conclude that the job market of APE careers in higher education is growing over the past 34 years. This finding clearly supports the prediction of a continued increase in the APE job market in higher education since 1975 made by Zhang, et al., 1999.

It should be noted that even though the averaged APE job openings increased from phase 1 (academic years from 1976-76 to 1997-98) to phase 2 (academic years from 1998-99 to 2008-09) - as presented in Table 3, the trend of the APE job market over the phase 2 period decreased at a rate of 1.24 position openings per year. The reasons why this happened are potentially complicated but two are presented here as possibilities. One reason refers to the inclusion movement over the past 10 years, which places students with disabilities in general PE classes, perhaps resulting in APE being de-emphasized in programs. Another reason refers to economic difficulties over recent years, which has resulted in budget cuts for higher education overall, and therefore maybe resulting in APE professor positions being frozen in universities. The decrease of the APE job market trend over phase 2, however, does not change the overall APE job market increasing from academic years 1975-76 to 2008-09 at a rate of 0.48 job positions (see Table 2) because APE job openings in phase 2 are more than that in phase 1 (see Table 3).

We can therefore say that the APE job market in higher education has grown over the past 34 years. However, this growing job market was not primarily contributed by APE first priority job openings in which APE was required as the primary responsibility. In fact, it was primarily contributed by APE second priority job openings in which APE was required as a secondary responsibility. This finding can be clearly seen in Table 2. The fitted regression line based on the yearly proportions of APE first priority job openings shows a decreasing trend, which was decreased by 1% (0.01 x 100) of APE job openings per year based on the fitted regression equation ($Y = - 0.01X + 22.95$, $R^2 = .40$, $F[1, 32] = 21.47$, and $p = .00$); however, the fitted regression equation based on the yearly proportions of APE second priority job openings shows an increasing trend, which was increased by 12% (0.12 x 100) of the APE job openings a year based on the fitted regression equation ($Y = 0.12X – 22.89$, $R^2 = .42$, $F[1, 32] = 23.19$, and $p = .00$).

This finding indicates that APE job openings have required candidates specializing in one of the other areas but capable of taking APE as a secondary duty has gradually increased more than candidates specializing in APE over the years. Why has this situation happened? No one knows at this point! One of the possible reasons is that there is a shortage of qualified candidates specializing in APE available in this market. When colleges and universities could not find qualified APE candidates in a year, they would have had to change their requirements by finding candidates specializing in related areas to take on an APE duty. As a matter of fact, some studies (e.g., Jansma & Surburge, 1995; Kelly & Gansneder, 1998; McCubbin & Dunn, 200; Sherrill, 2004; Wenos, Koslow & Wenos, 1996; Woods & Karp, 1997) have found that the supply of qualified APE candidates has been too small to meet the demand of APE openings in higher education, resulting in more candidates specializing in related areas being employed in this market.

It should also be noted that in the employment market of APE careers in higher education, not only candidates specializing in other areas should be ready to take APE as a part of their job duty, but also candidates specializing in APE should be prepared to take one or more other areas as their responsibility. As presented in Table 4, there are a total of 15 other related areas that were included in APE job openings. Among these related areas, candidates for taking APE positions would be most likely to take their responsibility in physical education methods (33.33%), motor behavior and control (17.52%), health and wellness (9.12%), test, measurement and evaluation (7.4%), biomechanics and kinesiology (6.98%), and exercise physiology and fitness (6.71%). This finding supports the results obtained by Zhang et al (1999) in which these related areas were the top five areas announced in APE job openings.

In conclusion, the employment market for APE careers in higher education has continually grown since 1975. APE job openings have increased by 0.48 APE job opening per academic year. The increase of the employment market has been primarily contributed by APE second priority job openings that perhaps resulted from the supply of candidates specializing in APE being too small to meet the demand of the APE market in higher education. A total of 15 other related areas have been included in the APE job openings. A candidate for an APE position is expected to teach one or more other area(s) such as physical education methods, motor behavior and control, health wellness education, test, measurement and evaluation, biomechanics and kinesiology, and/or exercise physiology and fitness.

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