Marketable Features of Adapted Physical Education and Therapeutic Recreation Careers in the Public Schools

Jiabei Zhang
Department of Helath, Physical Education, and Recreation
Western Michigan University, USA

Shihui chen
Department of Physical Education and Sport Science
The Hong Kong Institute of Education

Abstract
The purpose of this study was to examine the marketable features of adapted physical education (APE) and therapeutic recreation (TR) careers in the public schools within the USA. Eight types of data sets were used: APE teachers employed, TR specialists employed, students with disabilities enrolled, APE teachers needed, TR specialists needed, federal funds for APE programs, federal funds for TR programs, and APE and TR degrees awarded. These data were analyzed in the best-fitted trends, descriptive statistics, and correlation coefficients. The results revealed that school APE career has been a growing market while the school TR career has been a decreasing market between 1984-85 and 1996-97, wherein the shortage of APE and TR personnel exited. The associations between APE and TR personnel employed and federal dollars funded for APE and TR programs existed between 1984-85 and 1995-96.

INTRODUCTION

Since the Education for All Handicapped Children Act of 1975 (PL 94-142) was signed into legislation, adapted physical education (APE) and therapeutic recreation (TR) careers in the public schools have attracted the attentions of researchers on several issues. These issues addressed included needs for APE teachers and TR specialists (e.g., Curton, 1986; O'Morrow & Stewart, 1989), competencies for APE teachers and TR specialists (e.g., Kelly, 1995; Stumbo, 1990), models of APE and TR service delivery (e.g., Davis & Dummer, 1987; Peterson & Stumbo, 2000), and demographics of APE teachers and TR specialists (Kelly & Gansneder, 1998; O'Morrow & Stewart, 1989). The results of these studies were certainly helpful for understanding APE and TR careers better; however, marketable trends of these careers based on longitudinal data sets have been ignored.

Using longitudinal data sets, however, the marketable trend of APE career in higher education has been examined. Zhang, Joseph, and Horvat (1999) investigated the marketable trend of APE career in higher education. The results of this study showed that the total APE position openings in higher education have linearly increased between 1975-76 and 1997-98 ($Y = 1.03X - 2024.45$, $R^2 = .65$, $p < .01$). This linearly increasing trend at the university level implied that APE teachers needed in the public schools would be also increased continuously between 1975-76 and 1997-98 since APE professors in higher education were generally responsible for training school APE teachers (Berkey & Zhang, 1999). However, data-based studies on the marketable trend of APE career in the public schools in the United States have not been found in the review of literature.

Stewart and Anderson (1990) recommended that the marketable trend of TR career in the public schools should be studied because the decrease of TR students might be in response to TR employment market. They reported that the enrollments of students concentrating in TR have decreased substantially since 1979. The decline of enrollments in TR was first noticed in 1982 (Gitelson & Henkel, 1983). This decline continued in 1984 (Gitelson, 1985), in 1986 (Gitelson, 1987), and in 1988 (Stewart & Anderson, 1990), showing that the enrollments of students in TR programs have continuously decreased over these years. Since the employment market was a basic reason for students to select TR as their concentration, the decrease of TR enrollments might be in response to the decrease of TR employment market. Unfortunately, no longitudinal data-based studies have been found to support this decreasing trend.

Although the marketable trends of APE and TR careers have not been examined yet, additional APE teachers needed in the public schools in the United States were estimated based on the number of students with disabilities enrolled in 1994-95 school year (Zhang, Kelly, Berkey, Joseph, & Chen, 2000). The results of this estimation noted that a total of 22,116 more APE teachers were needed in the United States. This number, however, was estimated based on the

number of students with disabilities enrolled rather than the number of APE teacher positions funded in the employment market, indicating that this number might not reflect the actual APE teachers needed in this employment market. A market-based study is therefore needed to reveal the actual APE teachers needed in its employment market. Similarly, additional TR specialists needed in the TR employment market are also needed to be examined based on longitudinal data.

Moreover, the APE career in the public schools assumed to be partially driven by federal personnel training programs since the Education for All Children Act enacted in 1975 (Arnhold, 1997). This assumption implied that the amount of federal dollars available for APE teacher preparation programs has been associated with the number of qualified APE teachers employed in the public schools over years. However, the amount of federal dollars for APE and TR programs was changeable (Bokee, 1995) because the situations of national economy over years were different (Krannich, 1993), suggesting that the employment market of APE career in the public schools would be associated with the changeable amount of federal dollars funded for APE teacher training programs over years. A longitudinal data-based study is therefore needed to document the association between the APE and TR careers in the public schools and federal funds for APE and TR programs.

The overall purpose of this study was to examine the marketable features of APE and TR careers in the public schools. Specifically, this study was to examine (a) the marketable trends of APE and TR careers in the public schools, (b) the marketable shortages of APE and TR personnel in the public schools, and (c) the marketable associations of APE and TR careers in the public schools with federal dollars funded for APE and TR personnel preparation programs based on longitudinal data sets.

METHOD

Data Sources

Three data sources were used for this study. The first data source was *Annual Reports to Congress* by the Office of Special Education Programs since 1979 (e.g., OSEP, 1998). This data source presents information about APE teachers employed, TR specialists employed, and students with disabilities enrolled in the public schools by state in the United States. In this data source, annual APE teacher and TR specialist positions filled by partially certified individuals and left vacant are also included.

The second data source was *1982-95 Federally Funded Adapted Physical Education and Therapeutic Recreation Program Analysis* by Bokee (1995, 2000). This source consists of information about the annual number of federal funds for APE and TR personnel training programs between 1984 and 1995. The third data source was *APE and TR Degree Completions 1995-96 and 1996-97* by National Clearinghouse for Profession in Special Education (OSEP, 2000a, 2000b). This data source presents the 1995-96 and 1996-97 data only.

Data Categories

Five types of longitudinal data sets from 1984-85 to 1996-97 were used for this study. These data sets were (a) APE teachers employed--the annual number of APE teachers hired to deliver physical education to students with disabilities, (b) TR specialists employed--the annual number of TR specialists hired to deliver recreational education to students with disabilities, (c) students with disabilities enrolled--the annual number of students with disabilities enrolled in public schools, (d) APE teachers needed--the annual number of APE teacher positions filled by partly certified teachers and left vacant, and (e) TR specialists needed--the annual number of TR specialists positions filled by partly certified teachers and left vacant.

The above longitudinal data were obtained from *Annual Reports to Congress* by the OSEP (e.g., 1999). In each data set obtained, the 1984-85 was selected as the base year because this year was the first time that partly certified APE teachers and vacant positions were required to report to the OSEP (Boe, Cook, Bobbitt, & Terbanian, 1998; OSEP, 1987), while the 1996-97 was used as the last year since this year was the latest year with which the above data were available (OSEP, 2000c).

The data of APE teachers employed and TR specialists employed included school APE teachers and TR specialists who were fully certified and who were not fully certified (e.g., OSEP, 1999). The data of APE teachers needed and TR specialists needed included school APE teacher positions and TR specialist positions that were left vacant and filled by partially certified individuals (e.g., OSEP, 1999). These data were reported by state to the OSEP in the annual number of full-time equivalent employees (Boe, et al., 1998).

The data of APE teachers employed and TR specialists employed were used as an estimate of the employment market of APE and TR careers in the public schools. This estimation might underestimate the actual job market since these data did not include the number of vacant APE teacher and TR specialist positions as mentioned above. However, this underestimation was very small since vacant APE and TR personnel positions were only a small part in the total APE and TR personnel positions in their employment markets.

Based on *Annual Reports to Congress* available for the latest four years from 1993-94 to 1996-97 (OSEP, 1996, 1997, 1998, 1999), vacant APE and TR personnel positions were reported separately from partially certified APE and TR personnel. The percentages of vacant APE positions in the total APE and TR personnel positions funded was 1.1%, 1.1%, 0.8%, and 1.0% in 1993-94, 1994-95, 1995-96, and 1996-1997, respectively. Since the vacant APE and TR positions were reported with the partially certified APE and TR personnel in a category before 1993-94, the vacant APE and TR positions could not be separated from this category to put into the APE and TR personnel employed data sets.

The term of fully certified referred to school staff who had met state certifications plus individuals in personnel categories that did not require licensures if they met existing state requirements for their positions and staff in the positions for which no requirements existed in their states (Westat, 1998). The term of not fully certified referred to personnel contracted who were employed on emergency and provisional basis and who did not hold state certifications or meet state requirements for their positions (Westat, 1998).

Based on the *data dictionary* for *annual reports* (Westat, 1998), the term of school APE teachers used in this study referred to school staffs who were certified to provide special physical education, movement education, or motor development to children and youth with disabilities. The term of school TR specialists used in this study referred to qualified professionals who provided assessment of leisure function, therapeutic recreation services, recreation programs, and leisure education to students with disabilities.

Additional three types of data sets were also used for this study. One was federal funds for APE programs from 1984-85 to 1995-96 and the second was federal funds for TR preparation program from 1984-85 to 1995-96. These data sets were obtained from *1982-95 Federally Funded APE and TR Program Analysis* by Bokee (2000). The 1984-85 was selected as the base year in this data set because the data sets described before (e.g., APE teachers employed) used this year as the base year. The 1995-96 was used as the last year since this year was the latest year with which the above data were available (Bokee, 2000). The third type of data was *APE and TR Degree Completions 1995-96 and 1996-97* by National Clearinghouse for Profession in Special Education (OSEP, 2000a, 2000b).

Data Validation

Because a 4% of missing values that might jeopardize the trend of a data set was found in the total raw data obtained, each of the missing values was replaced before the data analyses were conducted. A missing value was a yearly value that was not reported by a state or outlying area. A missing value was estimated using the mean of two adjacent values if this missing value was within this data set, or using the predicted value by an mathematical equation fitted based on a related data set if this missing value was the first or last value of this data set (Tabachnick & Fidell, 1996). The yearly values of all states and outlying areas for a data set were then summed for each year between 1984-85 and 1996-97. This resulted in seven types of longitudinal data sets as defined before.

Data Analysis

The marketable trends of three longitudinal data sets (APE teachers employed, TR specialists employed, and students with disabilities enrolled) were fitted in three trend-fitting equations using SPSS (1993). The first equation was a linear model ($Y = a + bX$). This equation describes a linear trend in which the criterion variable is proportionally changed following the predictor variable. The use of this equation was based on the assumption that the APE and TR employment markets in the public schools might be linearly increased because a linearly growing population of students with disabilities has been observed (OSEP, 1999).

The second equation was an inverse model ($Y = a + b/X$). This model describes a curvilinear trend in which the criterion variable is increase or decreased rapidly during initial years and followed by a gradual decrease of the increasing or decreasing rate over rest years until a level off occurs. The use of this equation was based on the assumption that the APE and TR employment markets in the public schools would not be changed in a linearly increased or decreased trend forever because an employment market would be level off finally (Krannich, 1993).

The third equation was a cubic model ($Y = a + bX - cX^2 + dX^3$). This equation describes a wavelike increasing trend in which the criterion variable is increased in an up-down-up fashion following the predictor variable. The use of this

equation was based on the assumption that APE and TR employment markets in the public schools would be in relation to the change of federal funds for APE and TR preparation programs over years because APE and TR careers might be primarily driven by federally funded APE and TR training programs (Arnhold, 1997).

Using the SPSS software package (SPSS, 1993), the above three equations were first used to fit each of the three data sets as mentioned above. The best-fitted equations based on the maximum R^2s were then selected to functionally describe the marketable trends of these data sets. The marketable trend of each data set was finally graphed based on the related best-fitted equation. Each trend was graphed in conjunction of another related trend for visual comparison of relationship between these two trends.

In addition to the use of trend-fitting method, descriptive statistics was also used in this study. The data of the yearly numbers of APE teachers needed and TR specialists needed by state from 1984-85 to 1996-97 and the mean across these years and the fields were presented in a table. The data of APE and TR degrees awarded and the data of APE and TR personnel needed in 1995-96 and 1996-97 were also presented in a table so that their differences would be determined.

Moreover, Pearson product movement coefficient of correlation method was used to calculate two correlation coefficients. One was for relationship between APE teachers employed and federal dollars funded for APE programs, and another was for relationship between TR specialists employed and federal dollars funded for TR programs. Since the latest year for available data of the federal dollars funded for APE and TR programs was 1995-96 (Bokee, 2000), the data of this year were also used as the data of last year in APE and TR personnel employed data sets.

RESULTS

Best-Fitted Equations

As shown in Table 1, the best-fitted equation based on the maximum R^2 was the cubic equation for the data set of APE teachers employed ($Y = 3967.37 + 1018.09X - 163.63X^2 + 7.66X^3$, $R^2 = .66$), and the inverse equation for the data set of TR specialists employed ($Y = 345.84 + 289.37/X$, $R^2 = .62$). For the data set of students with disabilities enrolled, both the linear equation and cubic equation had the same level of goodness of fit ($R^2 = .99$). The visual inspection of this data set graphed in Figure 1, however, shows that the trend of this data set is much closer to a linearly increasing line over years. The linear equation was therefore selected as the best-fitting model for this data set ($Y = 3827156.69 + 145479.92X$, $R^2 = .99$).

Table 1: Fitted Equation Comparisons of the Three Data Sets in the APE and TR Careers in the Public Schools Based on R^2

| | Equation | | |
Data Sets	Linear	Inverse	Cubic
The number of APE teachers employed	.15	.40	.66
The number of TR specialists employed	.40	.62	.60
The number of students with disabilities enrolled	.99	.50	.99

Marketable Trends

Based on the best-fitted equations, the marketable trends of three defined data sets are graphed in Figures 1 and 2. There are two types of lines for each data set. The dash lines show the raw data sets, while the solid lines show the fitted data sets based on the best-fitted equations. A solid line is used to describe a functional trend of a data set since this line is graphed based on the best-fitted equation. As shown in Figures 1 and 2, each of these fitted data sets demonstrates the unique fitted trend: The best-fitted line of student with disability enrolled data set shows a linearly increasing trend; The best-fitted line of APE teachers employed data set shows a wavelike increasing trend; The best-fitted line of TR teachers employed data set shows a decreasing trend in a fast rate over initial years and a slow rate over rest years.

Descriptive Data

The data of the yearly numbers of APE teachers needed and TR specialists needed by state from 1984-85 to 1996-97 are presented in Table 2. As shown in Table 2, a mean of 482 APE and TR personnel needed across the 13 years and the two fields is found. The data of APE and TR degrees completed and the data of APE and TR personnel needed in

1995-96 and 1996-97 are presented in Table 3. As indicated in Table 3, the differences between these two fields are –407 and – 457 over these two years respectively.

Figure 1: The Marketable Trends of Annual APE Teachers Employed and Annual Students with Disabilities Enrolled in the Public Schools from 1984-85 to 1996-97.
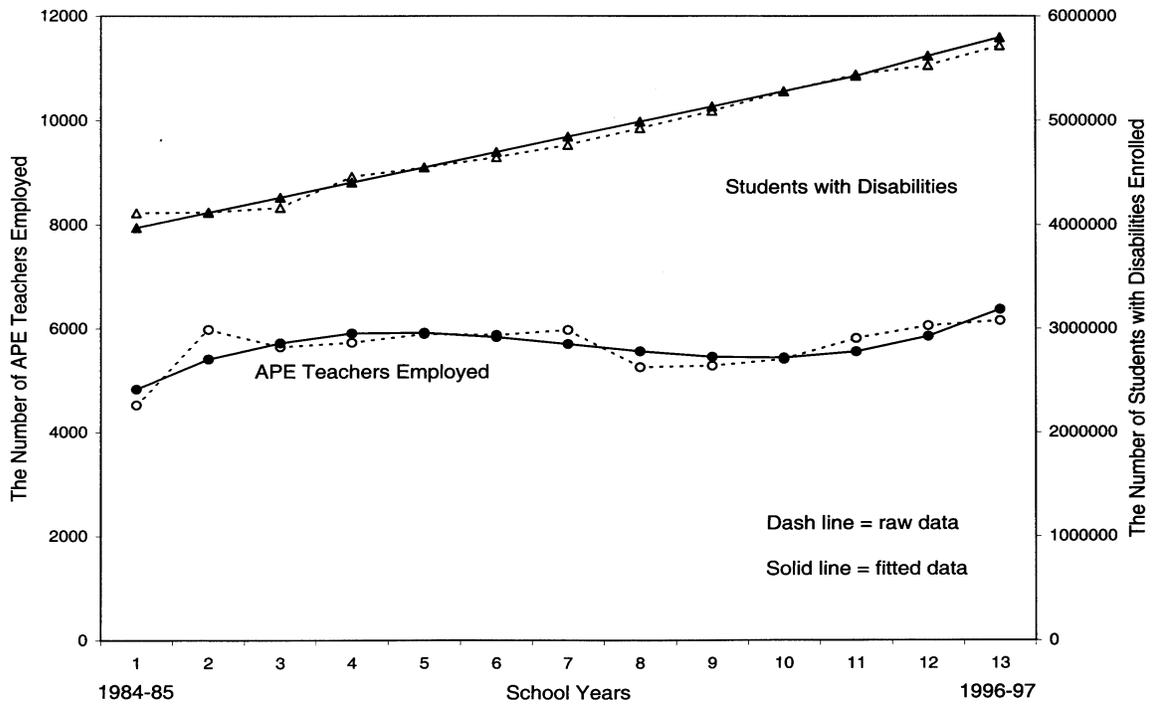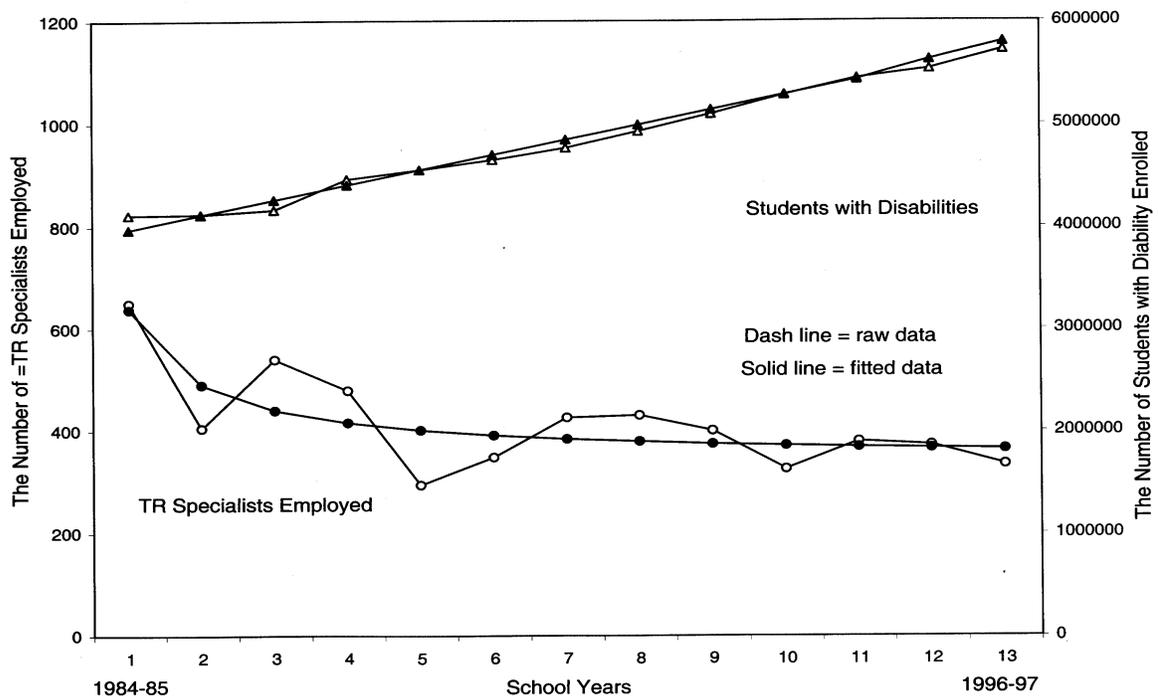

Figure 2: The Marketable Trends of Annual TR Specialists Employed and Annual Students   with Disabilities Enrolled in the Public Schools from 1984-85 to 1996-97.

Table 2: The Number of Annual APE Teachers Needed and the Number of TR Specialists Needed Between 1984-85 and 1996-97.

School Year	The Number of APE Teachers Needed	The Number of TR Specialists Needed	Total
1984-85	181	44	225
1985-86	353	145	498
1986-87	306	57	363
1987-88	428	71	499
1988-89	425	110	535
1989-90	488	96	584
1990-91	367	91	458
1991-92	403	72	475
1992-93	366	108	474
1993-94	400	72	472
1994-95	489	73	562
1995-96	484	71	555
1996-97	548	52	600
Mean	403	82	485

Table 3: Differences between the Number of APE and TR Degrees Completed and the Number of APE and TR Personnel Needed During 1995-96 and 1996-97

School Year	The Number of APE/TR Degree Completed	The Number of APE/TR Personnel Needed	Difference
1995-96	148	555	- 407
1996-97	143	600	- 457

Correlation Data

Figure 3 presents correlation between APE teachers employed and federal dollars funded for APE programs. Figure 4 presents correlation between TR specialists employed and federal dollars funded for TR programs. As indicated in Figure 3, the number of APE teachers employed is associated with the number of federal dollars funded for APE programs ($r = .57$, $df = 10$, $p < .10$). The similar association between the number of TR specialists employed and the number of federal dollars funded for TR programs ($r = .53$, $df = 10$, $p < .10$) is shown in Figure 4.

DISCUSSION

There are three implications based on the results of this study. First, the APE and TR employment markets in the public schools showed different trends. The APE career in the public schools has been a wavelike increasing employment market. As presented in Figure 1, the best-fitted line of APE teachers employed data is increasing in an up-down-up trend from 1984-85 to 1996-97. Although this trend has a down wave in the middle of the fitting period, its direction as a whole is increasing. This wavelike increasing pattern of the growing employment market is different from the linearly growing pattern of APE employment market in higher education reported by Zhang, et al. (1999), although both trends of these two employment markets are in direction of growing.

However, the TR career in the public schools has been a decreasing employment market with a fast rate over initiate years and a slow rate over rest years. As presented in Figure 2, the best-fitted line of TR specialists employed data is decreasing rapidly in beginning years and then slowly over remaining years. It appears that this employment market is going to reach its plateau of decrease very soon since the rate of decrease in this employment market in last few years becomes very small. This decreasing trend supports the assumption that the demand of TR employment market might decrease in response to that the enrollments of students who concentrated in TR have been decreased (Stewart & Anderson, 1990).

Figure 3: The relationship between annual APE teachers employed and annual federal dollars funded for APE teacher training programs from 1984-85 to 1995-96.
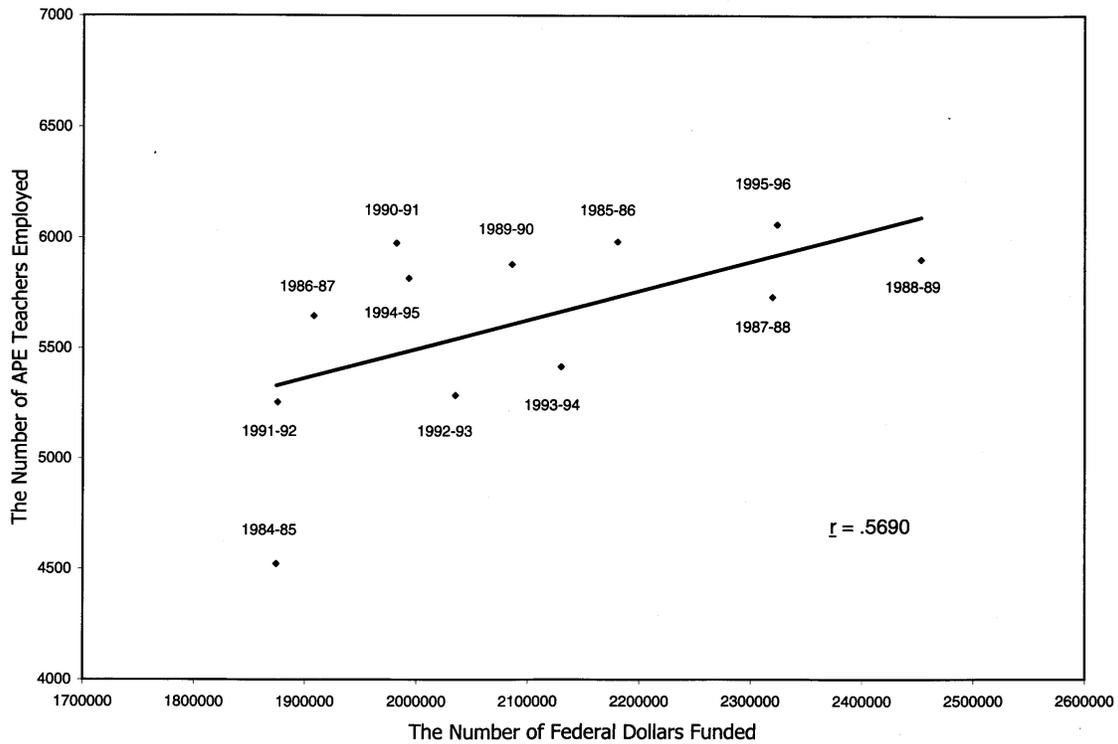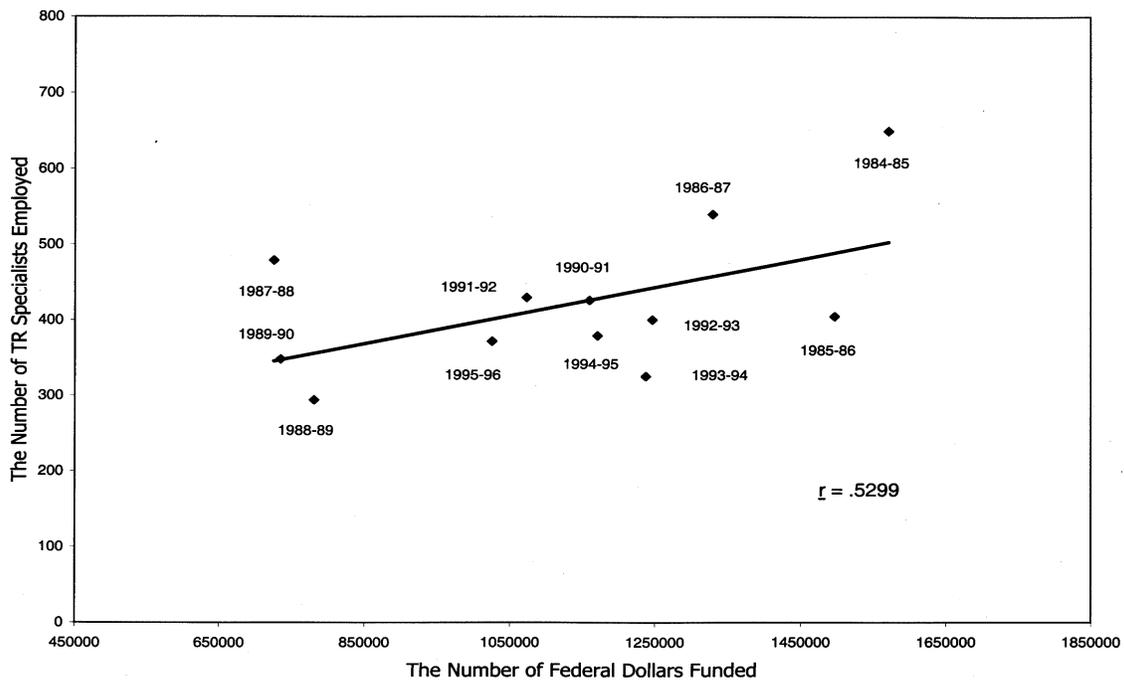

Figure 4: The relationship between annual TR specialists employed and annual federal dollars funded for TR specialist training programs from 1984-85 to 1995-96.

Second, the shortages of APE and TR personnel have existed in their employment markets chronically. As indicated in Table 2, additional APE and TR personnel have been needed to fill school APE and TR personnel positions that were filled by partially certified individuals and left vacant at each year between 1984-85 and 1996-97. These shortages might be due to that the supply of APE and TR graduates could not meet the demand of school APE and TR personnel. As noted in Table 3, for example, individuals who received APE and TR degrees were 407 and 457 less than APE and TR personnel needed in 1995-96 and 1996-97, respectively. The need for additional APE and TR personnel did exist not only based on the student population who require special service (Zhang et al., 2000), but also based on the employment market.

It should be noted that the shortages of APE and TR personnel would be more substantial based on student with disabilities. As presented in Figure 1, APE teachers employed data show a wavelike increasing trend, while student with disabilities enrolled data a linearly one, indicating that the growing market of APE teachers employed have not kept pace of the increasing population of students with disabilities enrolled over years. As shown in Figure 2, TR specialists employed data show an inversely decreasing trend while student with disabilities enrolled data a linearly increasing trend, showing that less TR specialists have been employed when more students with disabilities were enrolled over years. These findings indicate that the need for APE and TR personnel would be more significant based on student body than based on employment market.

Based on the 1995-96 APE employment market, for example, a total of 468 APE teacher positions was filled by partially certified individuals and left vacant in the public schools (OSEP, 1998). This implied that only 468 additional APE teachers were needed in this year. Based on the 1995-96 students with disabilities who required APE service, however, a total of 22,116 additional APE teachers were needed in the public schools in the United States (Zhang, et al., 2000). This example indicated that the funded positions in APE employment market could not ensure that all APE students received APE service because the number of APE teachers needed based on the employment market (468) was significantly less than that based on the student body (22,116).

Third, the employment market of APE and TR personnel seemed to be associated with federal funds for APE and TR programs. As presented in Figures 3 and 4, both APE teachers employed and TR specialists employed are increased in relation to more federal dollars are funded for APE and TR programs within the period from 1984-85 and 1995-96. Correlation coefficient between APE teachers employed and federal dollars funded is .57 (df = 10, p < .10) and correlation coefficient between TR specialists employed and federal dollars funded is .53 (df = 10, p < .10), showing that that relationships between personnel employed and federal dollars funded existed in the APE and TR employment markets. These relationships support the assumption that the APE career has been driven by federal personnel preparation programs (Arnhold, 1997).

CONCLUSION

In conclusion, the APE career in the public schools showed a growing employment market in a up-down-up fashion, while the TR career in the public schools a decreasing employment market in a fast rate over initial years and a slow rate over remaining years between 1984-85 and 1996-97. The shortages of APE and TR personnel did exit in these APE and TR employment markets. These shortages would be more substantial based on the number of students with disabilities requiring APE and TR services. It seemed that associations between the number of APE and TR personnel employed and the number of federal dollars funded for APE and TR programs existed within the period from 1984-85 to 1995-96.

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