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Journal of International Education and Practice
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ARTICLE

Association between Teacher Candidates' Competency and First-Year Employment in Physical Education: A Comparison Study

YuChun Chen* Brian Myers

Western Kentucky University, Bowling Green, Kentucky 42101, United States

ARTICLE INFO

Article history
Received: 01 December 2021
Accepted: 13 December 2021
Published: 22 December 2021

Keywords:
Teacher education
Physical education teacher education
Content knowledge
Pedagogical content knowledge
Competence
Job attainment

ABSTRACT

Physical education teacher education (PETE) programs prepare teacher candidates to be competent and employed in P-12 school settings. This study examined the relationship between competency and first-year job obtainment in physical education (PE). Participants included 111 teacher candidates from two schools. Participants' competency in content knowledge in Kinesiology and sub-disciplines (CKKH), content knowledge in sport and skill proficiency (CKSP), pedagogical content knowledge (PCK), and first-year job obtainment in PE were collected. Descriptive statistics, independent-samples *t* tests, and multiple logistic regressions were used to analyze the data. The overall sample showed participants were most competent in PCK, followed by CKSP and CKKH. Female participants were more competent in PCK than their male counterparts, and those at School A performed better in CKSP and PCK than their peers at School B. As a sample, more than half of the participants (55.9%) obtained PE jobs. There was a significance between the overall sample and female participants' competency in CKKH and their first-year employment in PE. This study was limited by sample size, variances in courses between the two schools, and by the defined timeline to clarify first-year PE employment. Implications regarding the importance of CKKH and first-year employment were discussed.

1. Introduction

Physical education teachers have the responsibility to help children and adolescents acquire the knowledge, skills, and dispositions necessary to develop and maintain a healthy and physically active lifestyle. At the elementary level, the focus is placed in building a strong foundation of movement concepts and motor skills. Through educational games, gymnastics and dance, children are to extend and deepen the roots of the movement elements. At the secondary level, the movement concepts advance to applied knowledge of tactical moves and team strategies while the motor skills become more specialized and complex as adolescents are introduced to a wide variety of indoor and outdoor sports and physical activities. This is also the time that adolescents learn about the value of being physically active and discover different ways to practice such healthy living throughout their lifetime. Regardless of the level at which they are teaching, physical education teachers are expected to help their students understand and apply the knowledge and skills to participate in physical activities regularly, motivate them to continue such lifestyle after high school, and empower them to become productive citizens in the community.

In the United States, individuals who want to become physical education teachers in public schools are required

**Corresponding Author:*
YuChun Chen, School of Kinesiology, Recreation & Sport, Western Kentucky University, Bowling Green, Kentucky 42101, United States; Email: yuchun.chen@wku.edu.

DOI: https://doi.org/10.30564/jiep.v4i3.4169

to possess at least a bachelor's degree, obtain a teacher certification, and pass all competency exams. The first two requirements can be attained simultaneously through the completion of a physical education teacher education (PETE) program, preferably accredited by the Council for the Accreditation of Educator Preparation (CAEP) [1]. The curriculum in a CAEP-accredited PETE program typically includes coursework in general education, Kinesiology content area, knowledge of diverse learners and learning environment, and methodology and teaching in (health and) physical education, early field experiences, and a student-teaching component. According to Teacher.org [2], "competency exams vary from state to state and should be taken in the state where [the individuals] wish to teach. The exact licensing requirements [also] vary depending on the state where [the individuals] live." In the state of Kentucky, for example, students who are pursuing a degree and a licensure in physical education (P-12) must take and pass the Praxis Core Academic Skills for Educators test, the Praxis II Physical Education: Content and Design test, and the Principles of Learning and Teaching test [3]. After a statewide teacher certification is processed and granted, the teacher candidate will be eligible to apply for a teaching job in physical education.

A typical search process in the public school setting requires teacher candidates to submit an application package, including but not limited to the application, resume, letters of reference, transcripts, competency exam results, and background checks. It appears that the initial screening is based on the qualifications, experiences, references, grade point average (GPA), and test scores presented on the required documents. This documentation-based screening is an objective method to rank the applicants from the most qualified to the least. Those who meet the minimal standards will then be invited to conduct an in-person or virtual interview with the administrative team. This interview is a great opportunity for the teacher candidates to sell themselves to the hiring committee and convince them why they are the best person for the job, especially for those who may not stand out in the candidate pool. As a result, the most competent candidate on paper may not get the job, which led the researchers to ponder the question: Was there a significant association between teacher candidates' competency on paper and their first-year employment in physical education?

2. Review of Literature

Competency is defined as "the positive combination of knowledge, ability and willingness in the availability of the individual to cope successfully and responsibly with changing situations" [4]. For the subject-matter competency, physical education teacher candidates are expected to demonstrate efficiency in the following six standards: *content and foundational knowledge*, *skillfulness and health-related fitness*, *planning and implementation*, *instructional delivery and management*, *assessment of student learning*, and *professional responsibility* [5]. To evaluate competency in the first standard, previous research has reported teacher candidates' knowledge in three major areas: Kinesiology subdisciplines, health-related fitness, and sports and physical activities.

Using the Assessment of Subdisciplinary Knowledge in Physical Education, Ayers found that the teacher candidates who took the seven-test assessment scored the best on the motor development and exercise physiology (76-87%) and the worst on the historical perspectives (59-68%) [6-7]. As for the knowledge of health-related fitness, a wide range of scores was reported (54.80-82.06%), which was very likely due to the different tests implemented in the research [8-14]. In a recent study, Chen and Jacques evaluated 53 teacher candidates' content knowledge in Kinesiology subdisciplines and health-related areas (CKKH) by calculating their GPAs in nine classes (e.g., biomechanics, exercise physiology, and preventive health and wellness) and revealed a 3.11 average on the 4.0 scale [15]. Compared to the knowledge in Kinesiology subdisciplines and health-related fitness, the teacher candidates scored the worst in the knowledge of sports and physical activities. Those in Santiago and colleagues' study failed the physical activity portion of the test (50.8%) and the others in Tsuda and colleagues' research also scored at 59% or below in the badminton, tennis and volleyball tests [13, 16].

To evaluate competency in the second standard, PETE programs have implemented skills and fitness tests in their activity classes. However, only 46% of the surveyed PETE programs reported having at least one type of skills tests in their activity courses, and 80% of these programs failed to identity clear criteria and standards in the skills tests [17]. The program that Chen and Jacques examined was among the 46% that did implement skills tests in three of their PETE classes, but in this study the evaluation of skillfulness was combined with the content knowledge in the sports they were skills-tested on [15]. A a result, the 53 teacher candidates earned a 3.53 GPA on the content knowledge in sports/physical activities and skill proficiency (CKSP). Compared to the skills tests, there were more records on teacher candidates' fitness levels in the literature; however, the results were inconclusive because the five health-related fitness components were measured by different testing protocols and each protocol had a different set of standards to identify the

 DOI: https://doi.org/10.30564/jiep.v4i3.4169

fitness levels [12, 18-21]. Two extreme results that illustrated this drawback could be found in the following studies. Pulling from Jackson-Pollock's three-site skinfold test, Cooper's 12-minute run/walk, ACSM's push-up and curl-up tests, and YMCA's sit and reach test, Blackshear and colleagues reported an overall passing rate of 36.8% for male and 50.8% for female exercise science majors and physical education teacher candidates [18]. Solely using Cooper's Fitnessgram, the teacher candidates in Petersen and colleagues research reported an 82% passing rate on all five testing items (i.e., 1-mile run, body mass index, sit and reach, curl-ups, and push-ups) [12].

Teacher candidates' competency in standards 3-6 has been evaluated by their performance in the methods courses with the early field experience component and student-teaching semesters [15, 22-28]. It was evident that the teacher candidates were able to plan quality lessons but had much room to improve on the delivery and class management [22-23, 27]. In all three studies, Rovegno revealed the teacher candidates' poor performance during field experiences and emphasized the need for the development of pedagogical content knowledge (PCK) [24-26]. More recently, Chang and colleagues examined the effect of a content knowledge workshop on two elementary teachers' PCK evaluated by their students' throwing performance, and a significantly greater distance was recorded on the experimental classes post-workshop [29]. Building on a similar concept, the three middle school teachers who underwent a badminton-focused content knowledge workshop demonstrated more task progressions and adaptations based on student needs [30]. These two articles indicated the importance of content knowledge and how it could improve teachers' PCK, and consequently lead to greater student performance. To quantify PCK, Chen and Jacques calculated their teacher candidates' GPAs in seven methods courses and student-teaching, which revealed a 3.55 average [15]. Moreover, fellow scholars have developed performance-based assessment instruments such as Educational Teacher Performance Assessment (edTPA) and Preservice Teacher Competency Performance Scale [31-32]. The former has been the most commonly used assessment tool for teacher preparation programs across the country, and the latter is a recently developed instrument designed to complement edTPA for its summative and high-stakes measures. However, after a thorough search in the selected databases (i.e., ERIC, PsycINFO and SPORTDiscus), limited quantitative findings were reported on teacher candidates' PCK, although there were studies examining their experiences in using edTPA and other performance-based assessment tools.

With regard to the first-year employment, more than half (58.1-61.0%) of the surveyed teacher candidates secured a full-time, part-time or long-term substitute physical education position [15, 33]. Although the factors of academic performance, physical appearance, and the combination of the two were believed to have an impact on the job attainment in physical education, Chen and Jacques did not find any significant association between the two [15, 34-35]. Specifically, the teacher candidates' CKKH, CKSP, PCK and fitness level showed no statistical significance with their first-year employment in physical education. Chen and Jacques argued that the insignificant findings might be on account of the small sample size (N = 31) [15]. They suggested that having a larger sample size with more than one PETE programs may produce different yet more meaningful results. Therefore, the purpose of the study was to examine the competency of teacher candidates from two PETE programs, their first-year employment in physical education, and the association between the two.

3. Methods

Participants

The institutional review board approval was obtained at School B, which permitted the invitation to recruit participants from other universities. The inclusion criterion was physical education teacher candidates who took all of the identified classes that were used to evaluate competency in this research project. In other words, teacher candidates who had transfer hours or substitution credits were excluded. The sample included a total of 111 physical education teacher candidates who graduated between the spring of 2015 and the summer of 2021 academic years. Forty-six of the 111 teacher candidates (41.4%) were female and 65 (58.6%) were males. Forty-three of them (38.7%) were from School A located in the mid-south region of the United States, and the other 68 (61.3%) were from School B located in the southeastern region of the same country. School A consisted of 21 females (48.8%) and 22 males (51.2%), while School B comprised 25 females (36.8%) and 43 males (63.2%)

Data Collection

In accordance with Chen and Jacques, three distinct categories were identified to determine the participants' competency in CKKH, CKSP and PCK [15]. Between the two schools, the courses that were included to evaluate competency in CKKH consisted of safety and first aid, personal, public, community and preventative health, application of fitness and wellness, kinesiology, motor

DOI: https://doi.org/10.30564/jiep.v4i3.4169

development, and exercise physiology. Moreover, two teacher-education physical activity courses were selected from School A (i.e., net/wall and target sports, striking/fielding and invasion sports) to measure competency in CKSP. Although the courses taught in School B were categorized differently (i.e., individual sports and physical activities, team sports and group activities), the sports and physical activities introduced in these courses were almost identical with the two courses taught at School A. The participants in both courses at either school were tested cognitively and physically on a variety of concepts and skills, including but not limited to basketball, soccer, pickleball, volleyball, disc golf, bowling, softball, and cricket. Thirdly, the courses used to evaluate competency in PCK included fundamentals of movement and instruction, materials and methods in teaching elementary and secondary health and physical education, classroom management, diverse learner/learning environment and student teaching. Within these courses, students were required to produce artifacts that demonstrated professional preparation according to SHAPE America's beginning physical education teacher standards [5]. Examples of these artifacts were unit and lesson plans, skill and concept assessments and rubrics, and post-lesson reflections.

Finally, the information regarding participants' first-year employment was obtained via alumni pages, emails and phone calls. With the assistance from the alumni centers at both schools, the researchers were able to identify whether or not the participants accepted a full-time physical education teaching position at a P-12 school as their first-year employment. For the participants whose employment status was unavailable on the alumni pages or through direct contacts, the researchers obtained their email addresses from the alumni centers and sent two separate emails with two weeks in between. Two weeks after the second email was sent, one follow-up phone call (also retrieved from the alumni centers) was made to those who did not respond to the emails.

Data Analysis

To quantify the participants' competency, GPAs in the scale of A = 4, B = 3, C = 2, and D = 1 were calculated for the CKKH, CKSP and PCK categories, respectively. As for their first-year employment as full-time physical education teachers, it was recorded as "yes" or "no", and later converted as "1" or "0" in SPSS, respectively. Descriptive statistics were conducted to calculate the means, standard deviations, maximums, and minimums of the GPAs in CKKH, CKSP and PCK as an overall sample, and by gender and school. Independent-samples *t* tests were run to detect any significant differences on the GPAs by gender and school. Frequencies and percentages were also calculated on the first-year employment in physical education as the overall sample, and by gender and school. Lastly, multiple logistic regressions, as an overall sample and by gender and school, were computed to determine if the participants' competency in CKKH, CKSP, and PCK had any significant influence on their first-year employment as full-time physical education teachers.

The data were determined to be both reliable and valid in terms of how they were collected and analyzed between the two schools. In this comparison study, the researchers attempted to establish a relationship between variables both independently at each school and among both schools combined. When measuring the relationship between variables, a correlation design is appropriate [36]. The process to extract participants' GPAs for each competency area at both schools was replicable and consistent, and therefore reliable. The current study was also determined to have criterion validity (also inclusive of predictive validity) because the researchers attempted to correlate criterion-based GPA standards for each of the competency areas with first-year job obtainment in physical education. This study measured what it proports to measure with consistency between the two schools, and the instruments used to collect and analyze the data measured exactly what was intended.

4. Results

As a group, the participants earned the highest GPA in PCK (m = 3.63), followed by CKSP (m = 3.61) and CKKH (m = 3.26). Separating the data by gender, the female participants also upheld the highest GPA in PCK (m = 3.76), followed by CKSP (m = 3.65) and CKKH (m = 3.37). The male participants, however, had the highest GPA in CKSP (m = 3.58), PCK in the middle (m = 3.54) and the lowest in CKKH (m = 3.19). By comparison, the female participants earned higher GPAs in all three competency areas than their male counterparts, but independent-samples t tests only detected a significant difference in PCK ($t(109) = -3.983$, $p = .003$). Moreover, the participants at School A reported the highest GPA in CKSP (m = 3.79), followed by PCK (m = 3.73) and CKKH (m =3.53), while those at School B averaged the highest in PCK (m = 3.57), the second in CKSP (m = 3.49) and the lowest in CKKH (m = 3.09). The participants at School A performed better than their peers at School B in all three competency areas, but statistical significances were only shown in CKSP ($t(109) = 3.203$, $p = .008$) and PCK ($t(109) = 2.710$, $p = .022$). The standard deviations and ranges of the GPAs as a sample and by gender and school are illustrated in Table 1.

 DOI: https://doi.org/10.30564/jiep.v4i3.4169

Table 1 Summary of Means, Standard Deviations, Maximums, and Minimums for GPAs in CKKH, CKSP, and PCK

	Sample (N = 111)			All Females (n = 46)			All Males (n = 65)			School A (n = 43)			School B (n = 68)		
Variable	m	s.d.	range	m	s.d.	range	m	s.d.	range	m	s.d.	range	m	s.d.	range
GPA in CKKH	3.26	0.45	2.00-4.00	3.37	0.41	2.59-4.00	3.19	0.47	2.00-4.00	3.53	0.34	2.69-4.00	3.09	0.43	2.00-4.00
GPA in CKSP	3.61	0.50	2.00-4.00	3.65	0.46	2.50-4.00	3.58	0.52	2.00-4.00	3.79	0.37	2.50-4.00	3.49	0.54	2.00-4.00
GPA in PCK	3.63	0.31	2.69-4.00	3.76	0.23	2.89-4.00	3.54	0.32	2.69-4.00	3.73	0.26	2.89-4.00	3.57	0.32	2.69-4.00

Note. m = mean; *s.d.* = standard deviation.

The overall sample regarding the first-year employment revealed that a little more than half of the participants (55.9%) secured a full-time teaching job in physical education. Sorting the data by gender, two-thirds of the female participants (67.4%) obtained a physical education employment while the job attainment in physical education appeared to be more even amongst the male participants (47.7%). Additionally, there was an overwhelming amount of the participants at School A who obtained a physical education position, and on the contrary, only one-third of the participants at school B secured a teaching job in physical education. The frequencies and percentages of the participants' job attainment as a sample and by gender and school are illustrated in Table 2.

Table 2 Summary of Job Attainment in Physical Education

	Yes	No
Sample (N = 111)	62 (55.9%)	49 (44.1%)
Gender		
Female (n = 46)	31 (67.4%)	15 (32.6%)
Male (n = 65)	31 (47.7%)	34 (52.3%)
School		
School A (n = 43)	36 (83.7%)	7 (16.3%)
School B (n = 68)	26 (38.2%)	42 (61.8%)

A multiple logistic regression calculating the relationship between the participants' competency and first-year employment indicated statistical significance in CKKH (Wald = 7.964, p = .005), but not in CKSP (Wald = .424, p = .515) or in PCK (Wald = .890, p = .346). Two more multiple logistic regressions were also performed to discover if any significant association existed between competency and job attainment by gender and school. None of the variables showed statistical significance except for the female participants' CKKH (Wald = 7.299, p = .007).

5. Discussion

As a group, the ranking in the three competency areas was consistent with what Chen and Jacques found in their study, and as a matter of fact, the participants in the present study earned higher scores in all three GPAs than those in the previous study [15]. Furthermore, the male participants appeared to be most competent in the sport-related knowledge and skills while the female participants excelled in their pedagogical knowledge and skills. The same trend was observed as the participants at School A earned the highest GPA in CKSP and those at School B had the highest GPA in PCK. The participants' Kinesiology-related content and foundational knowledge stayed as the least competent area regardless of the grouping mechanism. Per Chen and Jacques's argument, applicable comparisons between current findings and previous research remained unknown [15]. Specifically, fellow scholars used written tests to evaluate their participants' CKKH while this study calculated the GPA from a collection of Kinesiology subdisciplinary courses [6-14]. In terms of the competency in CKSP, there was limited evidence in the literature except for the 46% of the PETE programs that reported having some sort of skills tests in their activity courses; however, without clear criteria and standards in the skills tests, it was difficult to produce credible results [17]. Lastly, it is clear that no comparison could be made in the participants' competency in PCK between this study and previous research because the latter was all qualitative studies [22-28].

By comparison, the sample's job attainment in physical education was a little lower than the previous research; however, when the data were split by gender and school, the female participants and those at School A reported much higher successful rates of getting a full-time teaching position in physical education [15, 33]. Two surprising findings from the multiple logistic regressions indicated that the samples and the female participants' competency in CKKH had a significant influence on their first-year employment as full-time physical education teachers, which was contrary to what Chen and Jacques found in their study [15]. This interesting result could be a result of the bigger sample size in the present study;

DOI: https://doi.org/10.30564/jiep.v4i3.4169

however, a conclusion should not be drawn without follow-up studies containing much bigger sample sizes.

Three implications could be drawn from this study. First, it was concerning to learn that the participants were the least competent in the content and foundational knowledge of Kinesiology. The CKKH is the first and foremost expectation in SHAPE America's national standards for initial PETE programs [5]. Without the competency to "demonstrate an understanding of common and specialized content, and scientific and theoretical foundations" [5], teacher candidates would have a very difficult time planning and delivering effective physical education lessons. Besides, recent research has claimed that undergoing a content knowledge workshop led to a greater level of PCK and had a consequential effect on improved student performance [29-30]. These findings echoed the importance of content knowledge and how it is the essential component of planning and delivering quality lessons regardless of a teacher's experience in the profession (i.e., teacher candidates, beginning teachers, seasoned teachers).

Secondly, this study demonstrated further evidence of the importance of content knowledge by confirming a statistical significance between CKKH competency and the (female) participants' ability to secure a physical education teaching position. Given the participants' lack of competency in CKKH and that it was an influencing factor to obtain a full-time teaching job, it seems reasonable to encourage PETE faculty and their colleagues to help their teacher candidates develop better foundations of content knowledge in Kinesiology-related courses using evidence-based teaching strategies.

Lastly, it was noticeable that the female participants and the participants at School A had really good chance getting a physical education teaching job. The researchers could not help wondering what happened during the same time period that made such a clear difference between gender and location of the institution. Further examination on the reasons why these two groups of participants produced a higher percentage of job attainment in physical education could help PETE program better equip their students while they are still completing their degrees, and also help them be more marketable during the job hunt.

6. Conclusions

This study has a few limitations. The first was the small sample size. Collecting data from two PETE programs indeed helped increase the sample size, but with curriculum changes and courses with a pass/fail grade, a considerable amount of teacher candidates' data had to be excluded from the dataset. Secondly, the courses that were included and later calculated for the GPA may not be the best representation of Kinesiology subdisciplines. In order to keep the consistency between the two schools, some courses were dropped from the dataset because one of the schools did not offer them. Biomechanics and sport psychology, for instance, were excluded because one of the schools did not offer them, but they were considered two of the major subdisciplines in Kinesiology. Additionally, the researchers had no control over how the participants earned their grades in the courses. Although the course objectives in the same course offered at both schools were checked to ensure comparability, different instructors used different grading items and assessment tools to evaluate student learning, which presented a threat to the internal validity. The researchers attempted to eliminate this threat by excluding the teacher candidates who had transfer hours from another institution or substitution credits from another class, but it could still be an influencing factor in terms of quantifying the participants' competency in the three areas at either school. A third concern regarding the courses was that some participants might have taken the same course more than once because they failed it or did not make a C or better grade for the core courses on the first attempt. In this case, the final grade on the transcript did not demonstrate the participants' true performance.

The third limitation was related to the first-year employment. Following Chen and Jacques' recommendation, the researcher intentionally asked the participants if they took a full-time physical education position during the year after they completed their undergraduate degree in PETE [15]. Those who reported teaching physical education classes and another subject at the school or teaching in the classroom while obtaining a coaching position were not considered the same as full-time physical education teachers although they may be labeled as physical educators. Moreover, some participants were offered a full-time physical education position but had to turn down for reasons that were not disclosed in this research. For these participants, they obviously were competent enough to secure a physical education teaching position at a P-12 school, but they were considered one of the participants who did not obtain a job in that regard. Additional discussion about this limitation was how the definition of "first-year" after graduation was determined. For typical teacher candidates who received their diplomas in the spring or summer commencement, the next academic year was their "first-year", starting in August and ending in May. However, for teacher candidates who completed their degrees and walked in the fall or winter, they may consider the rest of the academic year as their first year or they may disregard the

 DOI: https://doi.org/10.30564/jiep.v4i3.4169

remaining academic year and consider the next academic year as their first year. Either way, it might create a mixed interpretation when asked whether or not they obtained a teaching position as their "first-year" employment. Fellow-researchers who are interested in carrying out a follow-up study may want to define a concrete timeline to define this term.

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 DOI: https://doi.org/10.30564/jiep.v4i3.4169