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### **ABSTRACT**

The research examines the current state of technological, pedagogical, and content knowledge (TPCK) of pre-service physical educators at Cagayan State University. The study used a quantitative research design. Frequency and percentage were used to describe the demographic profile of the respondents, and the weighted mean was used to interpret the results. Furthermore, the independent sample t-test was used to determine the significant differences in TPCK levels when grouped according to their profile. According to the findings of the study, pre-service physical educators have a high level of competence in technological knowledge and are very high in the remaining six domains. Furthermore, findings indicate that the interrelationship between TPCK domains is significant. However, the result shows that there is no significant difference between the demographic profile of the respondents and their current perceived TPCK level. Thus, pre-service physical educators at Cagayan State University consider the relationships among all three areas and acknowledge that educators are acting within this complex space.

Keywords: TPCK level, six domains

### **INTRODUCTION**

Technology integration is being implemented at all levels of education and is frequently visible in the Strategic plans for various aspects of education. National Teacher Education Standards Sport and Physical Education Association [NASPE], 2009) state that the third standard, According to Physical Planning and Implementation, education candidates must "demonstrate knowledge." by planning and making use of current technology putting in place learning experiences that necessitate students to use technology appropriately to meet "The goal of the lesson" (NASPE 2008, p.2). according to Physical Education, the Teacher agrees with the statement. The PETE program seeks to find ways to assist teachers in incorporating technology into their teaching methods teaching and providing appropriate learning experiences for students through the use of technology.

This method of approach has proven to be very effective according to recent research because this approach elicits their particular interest, we are in the process of The advancement of technology. As a result, technology-assisted physical education not only breaks the traditional physical education barriers in classrooms, but also broadens the infinite horizon and space for physical education instruction and assistance Learners increase their motivation to learn, and encourage learners' learning effectiveness (Pasco, 2013). Physical education teachers now have more resources available the technology that can be incorporated into their operations classrooms and gymnasiums to improve teaching, improve assessment, and record-keeping efficiency as a result of school districts implementing more SMART Boards, iPads, and other technological resources available. Chromebooks are another option. Teachers' design beliefs have changed and are discovered to be a multidimensional concept concerning TPACK in teachers and teacher design Teachers' beliefs may predict TPACK (Chai & Koh, 2017).

However, there have been some complaints about the TPACK framework because it is complex and may not work to be beneficial to teachers in their daily work Dobozy and Campbell (2016). Moreover, Angeli, Valanides, and Christodoulou (2016) contend that The integrated method will not yield meaningful results. TPACK. With this in mind, the goal of this research is to evaluate the efficacy of TPACK integration in Physical Education is being taught.

Teachers' knowledge for students, Mark Hofer (2011) Technology integration is defined as knowledge of technological pedagogical content, or TPCK (Mishra & Koehler 2006) is difficult to implement. discern, let alone evaluate. Given the complication, the types of situatedness and interdependence. The TPCK construct represents knowledge, well-triangulated methods of evaluating demonstrated Knowledge of technology integration are required. The Researchers created a TPCK-based observation system. The rubric has been tested and proven to be reliable. The interrater reliability coefficient of the instrument was calculated by combining Intraclass Correlation and a procedure based on percent score agreement (90.8%). Cronbach's Alpha (internal consistency) was .914. The reliability of the test-retest (score agreement) was 93.9%.

As a result, the study determined teachers' TPCK as evidenced by observation and self-report data (Agyei, Douglas, 2011). Findings from the study confirmed Koehler and Mishra's contention (2008) demonstrated that

teachers' TPCK can be expressed in various ways for various students and various settings and contextual conditions. Lesson plan evaluation the documents demonstrated a well-presented theoretical framework, development of the teachers' TPCK. This appeared to be consistent with their self-reported beliefs which reported slightly higher levels of competence of TPCK. However, observational data revealed that Teachers had learned how to integrate technology but showed relatively low competence in TPCK components blended. The research there is no doubt that these educators stated their pedagogical beliefs did not correspond to their instructional practices (Nozaleda et.al, 2021).

The recent curricular changes in Philippine basic education brought about by K to 12Reform, ASEAN Integration, globalization, and the demand of 21st-century learners necessitate the hiring of competent, efficient, and effective teachers. Furthermore, despite being digital natives, today's young teachers face technological challenges (Urbani,Roshandel, Michaels, & Truesdell, 2017). According to the Philippine Professional Standards for Teachers (Department of Education Order No. 42, s. 2017), a beginning teacher should have a strong understanding of the subject in terms of content knowledge and pedagogy, as well as skills in the positive use of information and communication technology (ICT) to facilitate the teaching and learning process.

Beginning teachers often perceive teaching as an overwhelming task in an ICT-rich classroom with a diverse group of 21st-century learners (Scherer, 2012). Several studies have also found that pre-service teachers do not have a balanced combination of technological, pedagogical, and content knowledge (Tanak, 2018; Ogan-Bekiroglu & Karabuz, 2017; Cacho, 2014; Papanikolaou, Gouli, & Makri, 2013; Hsu, 2012, Messina & Tabone 2012).

The success of these new teachers in the teaching profession is a reflection of the quality of teacher training provided by their respective teacher education institutions (TEIs). As a result, it is critical for TEIs to establish a scheme for monitoring and evaluating not only their outputs (graduates), but also the processes (learning experience and internship/practice) that have been included in the teacher training (Philips, Koehler, Rosenberg, & Zunica, 2017). The technological, pedagogical, and content knowledge (TPACK) framework is one such measure that assesses the effectiveness of processes.

As a result, the significance of this study is to describe Knowledge of Physical Educators is required for curriculum development, implementation, evaluation, and instruction with technology. This research also includes understanding when, where, and how to apply domain-specific expertise and strategies directing students' learning with appropriate tools technologies of information, and communication required in their Physical Education class.

This study served as a basis for the school administration, curriculum implementers, and other stakeholders on the enrichment of the curriculum of Physical Education, especially on the delivery of instruction or curriculum especially in employing the 21st-century approach. With the above premise, the pre-service physical educators' evaluation of their technological, pedagogical, and content knowledge is imperative as a basis for the academic enrichment of the curriculum.

### **Research Questions**

This study aims to determine the current state of the pre-service physical educator on the use of TPCK in their delivery of instructions. The specific questions are as follows:

1. What is the demographic profile of respondents based on:
  - 1.1. Sex; and
  - 1.2. Type of residence
2. What is the perception of the respondents towards TPCK framework based on the following domain:
  - 2.1. Technological Knowledge;
  - 2.2. Pedagogical knowledge;
  - 2.3. Content Knowledge;
  - 2.4. Technological Content Knowledge;
  - 2.5. Pedagogical Content Knowledge;
  - 2.6. Technological Pedagogical Knowledge; and
  - 2.7 Technological, Pedagogical, and Content Knowledge
3. Is there a significant difference in the perception of the respondents when grouped according to their profile?

### **METHODOLOGY**

#### **Research Design**

A quantitative research design was used in this study. The goal of this study is to evaluate the personal knowledge of the pre-service towards educational technology using the TPCK framework.

### Research Participants

The respondents of this study are the pre-service Physical Educators of the Cagayan State University- College of Human Kinetics during the 2<sup>nd</sup> Semester of the academic year 2021-2022 who are enrolled in Technology Application II.

### Research Instrument

An adapted research instrument was used to measure the perceived TPCK of the pre-service Physical Educators, which was developed by Zahra Hosseini and Anand Kamal (2022). The questionnaire was divided into two parts: Part 1 is about the respondents' demographic profile, and Part 2 is a 5-point Likert Scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree) and 53- item measuring the seven domains of physical educators TPCK level. The items for each domain were: 1) Technological Knowledge (11 items); 2) Pedagogical Knowledge (7 items); 3) Content Knowledge (6 items); 4) Technological Pedagogical Knowledge (10 items); 5) Pedagogical Content Knowledge (7 items); 6) Technological Content Knowledge (5 items), and 7) Technological Pedagogical Content Knowledge (7 items).

### Data Gathering Procedure

The researcher gathered information from the respondents through google forms. Consent to participate in the study was included in the electronic questionnaire sent to the participants thru an online messaging application.

### Data Analysis

The data were statistically analyzed using Statistical Package for Social Sciences (SPSS) version 20.0 free software. Frequency and percentage were used to determine the demographic variables of the respondents, details of the demographic were presented in Table II (Demographic Profile of the Respondents). In addition, mean and standard deviation were used to measure the perceived TPCK level of physical educators. Weighted means will be computed for all scaled statements. To determine the level of the physical education teachers in TPCK, the data is interpreted as follows:

1.00 – 1.80 Very Low

1.81 – 2.60 Low

2.61 – 3.40 Moderate

3.41 – 4.20 High

4.21 – 5.00 Very High

While independent sample t-test was used to determine the difference between the TPCK and demographic profile according to sex, type of school, location of the school, and school provincial address. Lastly, Pearson- r Correlation Coefficient was used to analyzing the interrelationship of physical educators' TPCK levels.

## RESULTS

**Table 1: Distribution of the sex of the respondents.**

Sex	Frequency	Percentage
Male	41	38%
Female	67	62%
Total	108	100%

**Table 2: Distribution of the type of residence of the respondents.**

Type of Residence	Frequency	Percentage
Rural	80	74.1
Urban	28	25.9
Total	108	100%

**Table 3: Respondents' level of evaluation towards TPCK.**

DOMAIN	MEAN	INTERPRETATION
Technological Knowledge	4.09	High
Pedagogical knowledge	4.43	Very High
Content Knowledge	4.25	Very High
Technological Content Knowledge	4.30	Very High
Pedagogical Content Knowledge	4.33	Very High

Technological Pedagogical Knowledge	4.39	Very High
Technological, Pedagogical, and Content Knowledge	4.31	Very High
OVERALL MEAN	4.30	Very High

**Table 4: Test of significant difference on the self-evaluation of the respondents towards TPCK when grouped according to their profile.**

Profile	P-Value	Interpretation
Sex	0.176	Not Significant
Residence	0.493	Not Significant

## DISCUSSION

Table 1 shows that 108 pre-service PE teachers answered the online survey, forty-one (41), or 38% of the respondents are male while sixty-seven (67), or 62% of respondents are female. This means that this research is female-dominated. On the other hand, table 2 shows the type of residence where the respondents live. Eighty (80) or 74.1% of the respondents live in a rural setup while twenty-eight (28) or 25.9% of the respondents live in an urbanized place. This implies that most of the respondents live in a rural community.

In table 3, the researchers examined the perceived level of physical education teachers in terms of their awareness of the 7 domains of the TPCK which is the technological knowledge, pedagogical knowledge, technological knowledge, content technological knowledge, pedagogical content knowledge, technological pedagogical knowledge, and technological, pedagogical, and content knowledge. As presented in Table 3, the perceived level of the pre-service physical education teachers in all the domains of knowledge is very high except for the Technological Knowledge which is only high. This Technological Knowledge (TK) describes teachers' knowledge of, and ability to use, various technologies, technological tools, and associated resources. TK concerns understanding edtech, considering its possibilities for a specific subject area or classroom, learning to recognize when it will assist or impede learning, and continually learning and adapting to new technology offerings. This can be possible because most of the respondents live in a rural type of community where most of the time educational technologies or advance technologies are not available in their community. This is synonymous to the findings of the study of Ramos, Babasa, & Vergara et. Al (2020), that "Pre-service teachers were also particularly confident in their pedagogical knowledge (M = 4.03, n = 187), pedagogical content knowledge (M = 4.02, n = 187), and technological pedagogical knowledge (M = 4.01, n = 187), according to the findings. However, these learning experiences did not translate well into practice. It should be noted that content knowledge (M = 4.00, n = 187) and technological content knowledge (M = 4.06, n = 187) were practiced more frequently than the other TPACK dimensions."

However, based on the result of the study the Pedagogical Knowledge of the respondents earned the highest mean score. This domain describes teachers' knowledge of the practices, processes, and methods regarding teaching and learning. As a generic form of knowledge, PK encompasses the purposes, values, and aims of education, and may apply to more specific areas including the understanding of student learning styles, classroom management skills, lesson planning, and assessments. This implies that the pre-service Physical Educators are knowledgeable about the right type of technology to be used to deliver their instructions.

Moreover, the result shows that there is no significant difference in the self-evaluation of the respondents when grouped according to their profiles. This means that male and female respondents have the same evaluation of their Technological, Pedagogical, and Content Knowledge. In the same manner, respondents have the same evaluation when grouped according to the type of residence where the respondent lives. The findings confirmed that pre-service teachers in their final year of teacher education institutions demonstrated significant improvements and preparedness as a result of experiences gained in various education courses and during their internship or fieldwork (Khalid, Karim, & Husnin, 2018).

## CONCLUSION

The TPCK level of the pre-service Physical Educators of Cagayan State University-College of Human Kinetics shows great competence in the teaching-learning process regardless of their demographic profile when grouped to identify if there is a significant difference. However, the researcher still believes that the technology knowledge of the respondents should be given much attention. It appears that although teacher education programs are making strides to prepare teachers for using technology in their teaching, their progress still seems slow in equipping teachers with the special knowledge of how to effectively use technology in their teaching.

## REFERENCES

1. Baert, H. (2011). The Integration of Technology within Physical Education Teacher Education: Perceptions of the Faculty (p. 203). <https://scholarworks.uark.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1202&context=etd>
2. Cengiz, C. (2014). The Development of TPACK, Technology Integrated SelfEfficacy and Instructional Technology Outcome Expectation of Pre-service Physical Education Teachers. *Asia-Pacific Journal of Teachers Education*, Pages 411- 422.
3. Hungying LEE, C. C. (2021). Research on Design Thinking and TPACK of Physical Education Pre-service Teachers. 29th International Conference on Computers in Education. Asia-Pacific Society for Computers in Education
4. Jem Cloyd M. Tanucan, Ma. Rosita A. Hernani, and Felix Diano Jr.: Filipino Physical Education Teachers' Technological Pedagogical Content Knowledge on Remote Digital Teaching *International Journal of Information and Education Technology*, Vol. 11, No. 9, September 2021
5. Jones, E.M., Bulger, S.M., & Wyant, J.D. (2012). Moving beyond the stopwatch and whistle: Examining technology use in teacher training. *The Global Journal of Health and Physical Education Pedagogy*, 1, 210-222 Phillips, A., Rodenbeck, M., & Clegg, B. (2014). Apps for physical education: Teacher tested, kid approved! *Strategies*, 27, 28-31. doi:10.1080/08924562.2014.901047
6. Juniu, S. S.-F. (2015). Relationship between pre-service teachers' level of Technology Integration and technological pedagogical content knowledge (TPACK) in Physical Education Teacher Education Programs. *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, pp. 807-813.
7. Juniu, S., Shonfeld, M., & Ganot, A. (2013). Technology integration in physical education teacher education programs: A comparative analysis. *Actualidades Investigativas Enducacio´n*, 13, 218-240 Chai, C. S., & Koh, J. H. L. (2017). Changing teachers' TPACK and design beliefs through the Scaffolded TPACK Lesson Design Model (STLDM). *Learning: Research and Practice*, 3(2), 114-129. <https://doi.org/10.1080/23735082.2017.1360506>
8. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teachers' knowledge. *Teachers College Record*, 108 (6), 1017- 1054
9. Mouza, C. (2016). *Developing and Assessing TPACK Among Pre-Servic Teachers*. Taylor and Francis Group, 2nd Edition,22.
10. Niess, M. L. (2011). Investigating TPACK: Knowledge Growth in Teaching with Technology . *Sage Journal*, Volume: 44 issue: 3, page(s): 299-317.
11. Nozaleda, B. M., Dayag-Tungpalan, M., Arao, H. F., Ramos, C. C., & Maborang, M. H. (2021). Linking College Learners' Competence in Information and Communication Technology and Learning Styles during the COVID-19 Pandemic. *Turkish Journal of Computer and Mathematics Education*, 12(11), 3256-3262.
12. Scrabis-Fletcher, K., Juniu, S., & Zullo, E. (2016). Preservice physical education teachers' technological pedagogical content knowledge. *The Physical Educator*, 73(4), 704+. <https://link.gale.com/apps/doc/A480028772/AONE?u=anon~31748a11&sid=googleScholar&xid=4a134cad>
13. Schmidt, D., Baran, E., Thompson, A., Mishra, P., Koehler, M., & Shin, T. (2009). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers. *JRTE*, 42(2), 123-149. <https://files.eric.ed.gov/fulltext/EJ868626.pdf>
14. Voogt, D. A. (2011). Determining Teachers' TPACK Through Observations and Self-report Data. *Society for Information Technology & Teacher Education International Conference*, pp. 2314-2319.
13. Zahra Hosseini , Anand Kamal : Developing an Instrument to Measure Perceived Technology Integration Knowledge of Teachers: *IJITCS Journal : Issue : January / February 2012 : Advanced in Information System, EEducation & Development 2012*, Published by : IISRC Journals