Self-confidence using technology, understanding of TPACK and teaching quality of physical education's teacher candidate while online learning

Gita Febria Friskawati

Prodi Pendidikan Jasmani, Kesehatan, dan Rekreasi, Sekolah Tinggi Keguruan dan Ilmu Pendidikan (STKIP) Pasundan, Jl. Permana No.32 B, Citeureup, Cimahi Utara, Cimahi City, West Java, 40512, Indonesia

Abstract

This study aims to reveal the relationship between self-confidence, understanding of TPACK and the teaching quality of prospective physical education teachers when conducting online learning. The correlational research method was used in a population of 132 students practicing STKIP Pasundan who were following the PPL program. A total of 96 samples were involved in this study by means of convenience sampling. The instrument used to measure teaching confidence is a questionnaire with a Likert scale questionnaire (1-5 scale) which has been tested for validity and reliability with the results of $r = 0.791$. Meanwhile, to measure the quality of teaching, the Teaching Quality Scale (TQS) and TPACK Questioners. The results showed that the contribution of all independent variables (confidence and understanding of TPACK) to the dependent variable (quality of teaching physical education) simultaneously was 72.1%. Research shows that the psychological factor of self-confidence can determine the goals to be achieved (quality of teaching physical education) even though it is weak by being influenced by experience, knowledge and other skills, including understanding of TPACK. Therefore, further research is recommended to discuss forms of intervention for prospective physical education teachers to increase confidence in using technology when teaching online and increase understanding of TPACK in order to make students interested in learning when online learning so as to maintain teaching quality.

Keywords: Self-confidence while using technology, Understanding TPACK, Teaching quality, Physical education's teacher candidate, Online learning.

INTRODUCTION

Teaching activities are the main activities carried out by a teacher, through these activities the teacher will deal with many students in teaching and learning interactions. Teachers will also become human figures who are authoritative and respected by students. Therefore, teachers must show

---

their best performance, minimize all shortcomings and take advantage of all their strengths to be able to mingle with students in order to create an effective learning process, (Eirín-nemiña et al., 2020). This teaching activity will shape the personality or identity of a real teacher, (Balázs, Susan, & Henriette, 2019). One of the university's efforts in producing quality teachers is through direct teaching practice activities to schools.

Practical teaching experience is widely regarded as one of the most important components of teacher education programs, especially physical education teachers and an important part of the teaching and learning process. This view is the most important basis for higher education to produce quality teachers (Lawson & Lawson, 2013; Tsuda et al., 2019). The teaching and learning process carried out by practical students is a reflection of the absorption of various physical education teaching sciences when they receive education in lectures, (Fletcher & Kosnik, 2016). The quality of a physical education teacher will be formed during lectures and during teaching practice in schools, (Ward & Cho, 2020; Wickens et al., 2020). The practice of teaching physical education directly will provide real experience for students to carry out learning starting from planning, implementing various strategies and teaching methods to evaluating students, (Tsuda et al., 2019).

The teaching and learning process of physical education is a process carried out to create learning conditions for students by utilizing the environment as a supporting factor in student learning conditions, (Ju & Wan, 2016). In the teaching and learning process, it is related to the psychological conditions in it, such as the teacher's confidence in teaching (Sullivan & Sullivan, 2020), the belief in the teacher's teaching competence, (Fischetti, 2019), and the readiness of students to accept the material provided by the teacher (Starck et al., 2018). Some of these personal factors are closely related in influencing the quality of physical education programs in schools. Research shows that there is a positive correlation between self-confidence and expectations of the effectiveness of quality learning. When teachers perceive that their content and pedagogical knowledge is high,

they tend to have high self-confidence or self-efficacy, (Trainin et al., 2017). Confidence is also associated with teaching quality after a training intervention to improve the pedagogical ability of prospective teachers, (Ledger et al., 2019).

In contrast to the quality of teaching that can be displayed by practical teachers face-to-face in class, the quality of teaching practical teachers when conducting online learning during the Covid-19 pandemic has not been revealed, (Dhawan, 2020). Research reveals that in online physical education learning during the Covid 19 pandemic, physical education teachers reported that students submit assignments (51% yes), use video instructions (37% yes), are less effective when teaching remotely (20% yes). It is important for teachers to identify alternative strategies in online physical education learning to support learning and create quality physical education teaching, (Mercier et al., 2021).

The biggest challenge for practicing teachers, especially physical education, when teaching online during the covid 19 pandemic is how they can convey information and movement tasks that must be done by students through the online media they use, (D et al., 2020). In addition, difficulties and problems associated with the use of this modern technology from download errors, installation problems, login problems, problems with audio and video, and so on, (Baloran, 2020).

Sometimes students find online teaching boring and uninteresting. Online learning has so much time and flexibility that students never find the right time to do it, (Vayre & Vonthron, 2016). Teachers should be confident in packaging learning media using technology when teaching online in physical education classes so that the delivery of motion assignments is not mistaken for students to understand, (Gawrisch et al., 2019). Media can be the use of video analysis, social media, interactive game applications, etc. (Hilvoorde et al., 2019).

In addition to being confident when teaching physical education online, teachers should have the knowledge and understanding of integrating technology into the teaching and learning process. Regarding

teacher knowledge to integrate technology into learning, (Koehler, 2006) introduces technology pedagogical content knowledge, namely Technology (Technological Knowledge), Pedagogy knowledge (Pedagogy Knowledge), and Content Knowledge in a learning context or commonly referred to as (TPACK) as a framework for conceptualizing teacher knowledge required for proper teaching with ICT. While PCK integrates domain knowledge and pedagogical knowledge into the understanding of how certain aspects of subject matter can be organized, adapted and represented for teaching, the TPACK conception adds technological knowledge as a new component that must blend with domain and pedagogical knowledge in order to integrate ICT effectively. Effective in learning practices, (Voogt & McKenney, 2017).

TPACK as a conceptual framework that is useful for explaining the type of knowledge that teachers need to integrate technology in their teaching practice in order to create quality teaching, (Hsu et al., 2020). Empowering teachers for effective technology integration does not mean that they need to know such a TPACK framework, but implies that teachers need to understand how to shape learning practices in which technology, content and pedagogical knowledge are embedded.

Factors such as self-confidence and understanding of TPACK in prospective physical education teachers are needed to create learning patterns using technology-based learning media to be able to organize quality and memorable physical education learning for students, (Batane & Ngwako, 2017). Physical education online learning should not be an obstacle but a challenge for practicing teachers to conduct quality learning, (Zheng et al., 2020) when they understand various supporting factors such as confidence and understanding of TPACK. Moreover, in physical education learning during the COVID-19 pandemic, the shift in the pedagogical approach shifted from direct didactic towards using technology to conduct online learning, (González-calvo et al., 2021). Therefore, this study will reveal the relationship between confidence in using technology, understanding of TPACK and the teaching quality of prospective physical education teachers during online learning.

METHOD

Correlation research was conducted on 96 PJKR students from a population of 132 semester VIII STKIP Pasundan students who were following the Teaching Practice Program at Junior High Schools (SMP) and Senior High Schools (SMA) spread across Cimahi and Bandung. The entire sample has never been taught online teaching method courses in physical education learning, it's just that they get teaching experience during online lectures during the covid 19 pandemic. This research method is used to see the relationship factor between students' confidence levels as prospective physical education teachers when using technology TPACK's understanding of their level of teaching quality.

Convenience sampling was used in this study with the reason that the highest distribution of student practitioners was in the nearest area. Convenience sampling is sampling with the availability and ability of students to provide information, (Jack R. Freankel, 2017). The data collection procedure is carried out by distributing the instrument via google form. The instrument used to measure teaching confidence using technology when online learning is a questionnaire with a Likert scale questionnaire from a scale of 1-5, (Louis Cohen & Morrison, 2018) which has been tested for validity and reliability again with the results of r = 0.791 meaning that the questionnaire is feasible. to use. Meanwhile, to measure teaching quality, the Teaching Quality Scale (TQS) from (Ledger et al., 2019) was used in this study. This TQS is a questionnaire to measure the perception of teaching quality using 5 Likert scales that have a value of r = 0.760. TPACK measurement using TPACK Questioners from (Schmidt et al., 2009). Data analysis through the Pearson correlation test was used to reveal the problem in this study.

RESULT

This study will reveal data on the confidence of prospective physical education teacher students when teaching using online media associated with perceptions of the quality of physical education teaching. The data that has been obtained were analyzed descriptively and Pearson correlation

test. The description of the data on the results of the students' confidence in teaching practical students according to the technology used to teach online is presented in table 1

Table 1. Description of confidence teaching online with the use of technology

Teknologi yang digunakan untuk mengajar secara online	Mean	Sd. Deviation	%
Online Video	57.22	5.53	15.5
Software Presentasi	49.72	12.10	20.8
Media social	51.22	10.72	37.9
Pencarian materi melalui google	44.49	67.72	25.1
Email	33.06	1.54	0.7

In table 1 it can be seen that the students' self-confidence scores when ranked from the highest when teaching online using social media by 37.9%, searching for material through Google by 25.1%, presentation software by 20.8%, online video by 15.5% and the lowest using email. by 0.7%. In table 1, it can be seen that the level of self-confidence of practicing students when teaching physical education online using technology is highest when using social media and the lowest when using email as an online learning medium.

Furthermore, a description of the data from the calculation of the quality of teaching is presented in table 2.

Table 2. Description of teaching quality scale (TQS)

Indikator	Mean	Sd. Deviation	%
Penentuan media pembelajaran	60.4	9.10	32.3
Implementasi perencanaan pembelajaran	45.4	12.91	20.0
Berinovasi dalam pembelajaran	51.9	8.40	10.8
Tujuan pembelajaran tercapai	37.7	17.60	29.8

Table 2 presents a description of the data from the TQS calculation, the results show that the indicators for determining learning media are 32.3%, the implementation of learning plans is 20.0%, innovating in learning is 10.8% and finally, the learning objectives are achieved by 29.8%.

Table 3. Description of TPACK calculation results

Variabel	Mean	Sd. Deviation	%
TPACK	15.6	7.12	79.4

Table 3 describes the overall TPACK calculation data obtained by an average of 15.6, a standard deviation of 7.12 and a percentage of 79.45.

In accordance with the research objectives, the overall data on the results of the calculation of online teaching confidence with the use of technology, understanding of TPACK and teaching quality were correlated to see the relationship that occurred.

Table 4. Coefficient of determination results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.775[a]	.721	.698	64.154

a. Predictors: (Constant), X1,X2

The multiple correlation coefficient (R) in table 4 is 0.775. In addition, information can also be obtained how the coefficient of determination is equal to $(0.721)2 \times 100\% = 72.1\%$. This value indicates that the contribution of all independent variables to the dependent variable simultaneously is 72.1%. Meanwhile the remaining 27.9% is a contribution from factors other than the factors represented by the independent variables caused by technical and non-technical factors such as experience in operating technology in physical education learning, students' readiness to receive material online, how to assess teaching quality. online training, etc.

To see the effect, the calculation of the regression analysis presented in table 5.

Table 5. Results of multivariate regression analysis

Model	Variabel	Koefisien Korelasi	T	P
1	Percaya Diri	0,783	6,962	0,003< 0,05
	Pemahaman TPACK	0,630	4,011	0.028< 0,05
	Konstanta			0,000

The results of the Anova test (F test) showed that simultaneously the independent variables had a significant effect on the physical education teaching quality variable as indicated by the sig. 0.000 < Alpha 5%. In addition, the self-confidence variable (X1) and the TPACK understanding variable (X2) also have a statistically significant effect on the physical education teaching quality variable (X3) which is indicated by the value of sig. are smaller than Alpha 5%, namely 0.003 and 0.028, respectively.

DISCUSSION

Teaching practice is the first experience where many prospective physical education teachers can put the skills they have acquired during their studies into practice. This is where prospective teachers first establish their own teaching philosophy and practice, (Tutyandari, 2020). The teaching practice program obtained by students as prospective teachers with the term student apprentices in high schools is held with the Field Practice Program (PPL), (Rindrayani, 2016). This study aims to reveal the relationship between self-confidence, understanding of TPACK and the teaching quality of prospective physical education teachers when conducting online learning.

Given the changing pattern of learning to become more technology-oriented, it's a good idea for them to find out if technology is an important part of things for teachers from the start. In the past, several studies have shown that the reason why most teachers are reluctant to use technology in their teaching is that it was not part of their original training, (Barr-anderson et al., 2014) or part of their teaching when they started teaching. Along with time and also the problems that teachers are currently facing during the Covid 19 pandemic, they are required to be able to teach physical education online, (Brien et al., 2020). Of course, this has an impact on the psychology of teachers when teaching, especially the self-confidence of practicing teachers when teaching physical education, (Eirín-nemiña et al., 2020). Especially for practical teachers who were initially not specifically equipped with lectures to integrate technology into physical education learning exclusively.

The results of this study indicate that the level of confidence of prospective physical education teachers when using technology varies depending on the online learning media platform they use. This is due to the habits or experiences of practicing teachers when using online platforms in their daily lives, (Batane & Ngwako, 2017). In addition, the perception of prospective physical education teachers using social media as an online learning medium feels that it is easier compared to other complicated e-

learning sites, social media can be said to be quite user-friendly, so that it can lead to easy self-efficacy teaching also for practicing teachers, (Balakrishnan, 2017). The selection of online learning media will affect the confidence of a prospective physical education teacher when teaching. The attitude and firmness of prospective teachers in choosing online media has an impact on students' mastery of the material (Vayre & Vonthron, 2016) and also the quality of teaching, (Erwin & Erwin, 2016).

This study shows the highest confidence in physical education teacher candidates who use social media in integrating technology into physical education learning. Harmonious research also mentions that internet users regularly visit thousands of social websites to stay connected with their friends, share thoughts, photos, videos, and even discuss about their daily life will increase self-confidence, (Sharma & Sahu, 2018). Likewise with the use of social media in the learning process, previous studies explored patterns of social media use by pre-service teachers and statistically analyzed the effect of social media on the level of self-confidence carried out on 65 teachers. As a result, it was revealed that the positive impact of social media on the level of self-confidence of the pre-service teacher generation, (Wagh, 2020).

Another study found that there were several cases where individuals had a negative influence on students due to the use of social media, (Run, 2017). For example, students tend to access their gadgets regardless of their surroundings (Raut & Patil, 2016), tend to be alone and even have a low sense of empathy (Devi et al., 2019). However, when learning media is packaged wisely for a physical education learning scene by teachers who are confident and have high self-efficacy, the negative impact on students can be minimized (Stoicescu & Stănescu, 2018).

Social media is an effective way to share information with a wide audience in a very efficient way. Usually free or very undisclosed, allowing for more audience and interaction than a typical conference or student skills development workshop, (Erwin & Erwin, 2016). This fast way of sharing information can be a foundation for practicing teachers' confidence because

they are able to disseminate the most appropriate and quality information in very easy steps (Kinchin & Bryant, 2016). Differences in the level of confidence in prospective physical education teachers also vary in different age groups of different sexes. The study states that Facebook, WhatsApp, Instagram, and YouTube are used every day by students, so that prospective physical education teachers can easily provide materials and provide illustrations to them, (Cavanagh, 2018).

Content knowledge and teaching skills are related to feelings of self-confidence, with experience being a key factor in teachers' perceptions of their knowledge and skills as well as a determinant of teaching quality, (Sadler, 2018). When prospective teachers have the experience and ability to operate technology as an online learning medium, their teaching confidence will increase (Mccullagh & Doherty, 2020). This causes the learning atmosphere to be conducive because the teacher is able to control student activity in a learning scene, (Trainin et al., 2017).

Confidence and self-confidence about one's abilities tend to influence the success of teacher candidates as they begin their careers as educators. The TPACK framework provides a valuable structure for teacher preparation and the way technology creates new dynamics in the teaching and learning process, (Abbitt, 2011). Teacher candidates' confidence and confidence in their ability to use this knowledge in the classroom environment provide a measure that can help in assessing the success of teacher candidates' preparation for technology integration for the creation of quality teaching, (Altun & Akyıldız, 2017).

New self-confidence emerged as the main influence in the use of teaching strategies that actively involve students through learning media, (Abbitt, 2011). Content knowledge and teaching skills are related to feelings of self-confidence, with experience being a key factor in teachers' perceptions of their knowledge and skills as well as a determinant of teaching quality, (Sadler, 2018). When prospective teachers have the experience and ability to operate technology as an online learning medium, their teaching confidence will increase (Mccullagh & Doherty, 2020). This

Gita Febria Friskawati
Self-confidence using technology, understanding of TPACK and teaching quality of physical education's teacher
candidate while online learning

causes the learning atmosphere to be conducive because the teacher is able to control student activity in a learning scene, (Trainin et al., 2017).

The relationship between self-confidence and teaching quality is important for richer and more complete incidental feedback from students, as a result of using a more interactive approach and individual student confidence, (Alhumaid et al., 2020). In addition, the development of how practicing teachers think about teaching especially using online media seems to be associated with changes in the perception of the importance of personal knowledge and experience in operating online media during lectures, (Ledger et al., 2019). Research shows that psychological factors including self-confidence can determine the goals to be achieved by being influenced by experience, knowledge and other skills possessed, (Moreno et al., 2020). Therefore, other research requires prospective physical education teachers to be able to get used to using technology in their teaching through various interventions to increase confidence when teaching and can make students interested in learning, (Browne, 2019). It is important to determine these teachers actually apply their teaching skills and technology integration within them once they enter the field for practice, (Kern & Graber, 2017).

It is not only the self-confidence factor that can create the quality of online physical education teaching. However, other factors that teachers have in relation to the ability to operate technology in the application of physical education learning are also important. Understanding TPACK helps teachers to use technology in learning so as to create quality learning, (Nazari et al., 2019). The findings of previous research stated that the self-efficacy and understanding of teacher candidates' TPACK developed significantly when they designed lesson plans on a virtual platform. In other words, when pre-service teachers are given the opportunity to learn and practice with technology, their self-efficacy and understanding of TPACK increases (Kapici & Akcay, 2020).

For the purpose of this study not to analyze gender differences in the level of confidence in using technology as an online medium, however this

may be an area for further research because differences in gender confidence will affect the objectives to be achieved, including the quality of teaching, (Dehkordi et al.,2020). In addition, the use of technology, especially the use of social media is more widely used by women, (Baek et al., 2018) it is clear that this may affect the difference in confidence between male and female practicing teachers in terms of integrating technology, especially social media into learning. Physical education to improve the quality of learning.

In addition, the limitation of this study is the sampling method using only the convenience sampling method. For future research, sampling can be taken using other sampling methods such as cluster sampling in order to expand the sample coverage to present optimal data results.

CONCLUSION

The self-confidence of prospective physical education teacher students when using technology as a learning medium is related to the quality of teaching when online learning. The level of self-confidence of prospective physical education teacher students is different when using online learning media such as social media, searching for material via Google, presentation software, online videos and also email. The level of self-confidence of prospective physical education teacher students is highest when using social media as an online learning medium. This happens because the TPACK knowledge of practicing students in operating online media that is often used daily fosters confidence to teach physical education online, the impact is that with this ease, knowledge and experience the quality of teaching is also getting better.

Given the importance of understanding TPACK in physical education online learning to foster self-confidence and create quality teaching, it is necessary to become an illustration for relevant institutions in planning a special course that focuses on student knowledge and experience in integrating technology into physical education learning.

REFERENCE

Abbitt, J. T. (2011). An Investigation of the Relationship between Self-Efficacy Beliefs about Technology Integration and Technological Pedagogical Content Knowledge (TPACK) among Preservice Teachers. *Journal of Digital Learning in Teacher Education*, *27*(4), 134–143. https://doi.org/10.1080/21532974.2011.10784670

Alhumaid, M. M., Khoo, S., & Bastos, T. (2020). *sustainability Self-E ffi cacy of Pre-Service Physical Education Teachers Toward Inclusion in Saudi Arabia*. 1–13.

Altun, T., & Akyıldız, S. (2017). Investigating Student Teachers ' Technological Pedagogical Content Knowledge (Tpack) Levels. *European Journal of Education Studies*, *3*(5), 467–485. https://doi.org/10.5281/zenodo.555996

Baek, J., Jones, E., Bulger, S., & Taliaferro, A. (2018). Physical Education Teacher Perceptions of Technology-Related Learning Experiences : A Qualitative Investigation. *Journal of Teaching in Physical Education*, *37*(2), 175–185.

Balakrishnan, V. (2017). *Social media and their use in learning : A comparative analysis between Australia and Malaysia from the learners ' perspectives*. *33*(1), 81–97.

Balázs, F., Susan, C., & Henriette, D. (n.d.). *Satisfaction and preferences of PE students and the head of the PE department : meeting the new curricular expectations*. *11*(1), 1–18. https://doi.org/10.14198/jhse.2016.111.01

Baloran, E. T. (2020). Knowledge , Attitudes , Anxiety , and Coping Strategies of Students during COVID-19 Pandemic. *Journal of Loss and Trauma*, *0*(0), 1–8. https://doi.org/10.1080/15325024.2020.1769300

Barr-anderson, D. J., Neumark-sztainer, D., Lytle, L., Schmitz, K. H., Ward, S., Conway, T. L., Pratt, C., Baggett, C. D., & Pate, R. R. (2014). *But I Like PE : Factors Associated With Enjoyment*. *November 2014*, 37–41. https://doi.org/10.1080/02701367.2008.10599456

Batane, T., & Ngwako, A. (2017). *Technology use by pre-service teachers during teaching practice : Are new teachers embracing technology right away in their first teaching experience ? 33*(1), 48–61.

Brien, W. O., Adamakis, M., Brien, N. O., Onofre, M., Dania, A., Makopoulou, K., Herold, F., Ng, K., Brien, W. O., Adamakis, M., Brien, N. O., Onofre, M., Martins, J., Dania, A., Makopoulou, K., Herold, F., Ng, K., & Costa, J. (2020). Implications for European Physical Education Teacher Education during the COVID-19 pandemic : a cross-institutional SWOT analysis Implications for European Physical Education Teacher cross-institutional SWOT analysis. *European Journal of Teacher Education*, *00*(00), 1–20. https://doi.org/10.1080/02619768.2020.1823963

Browne, J. (2019). *Computers in the Schools : Interdisciplinary Journal of Practice , Theory , and Applied Research Assessing Pre-Service Teacher Attitudes and Skills With the Technology Integration Confidence Scale Assessing Pre-Service Teacher Attitudes*. *May 2014*,

37–41. https://doi.org/10.1080/07380560802688240

Cavanagh, M. (2018). *Classroom Ready ? Pre-Service Teachers ' Self-Efficacy for Their First Professional Experience Placement*. *43*(7).

D, E. S., Luiz, A., Teixeira, S., Roberto, J., & Silva, D. (2020). *Physical education role during coronavirus disease 2019 (COVID-19) pandemic Physical education and COVID-19*. *2019*, 2019–2020.

Dehkordi, M. R., Gallardo, M., Lee, K., Yamaguchi, Y., Wang, J., & Liu, M. (2020). Professionals ' perception of quality physical education learning in selected Asian cities. *Cogent Education*, *131*(1), 1–17. https://doi.org/10.1080/2331186X.2017.1408945

Devi, K. S., Gouthami, E., & Lakshmi, V. V. (2019). *Role of Social Media in Teaching – Learning Process*. *January*.

Dhawan, S. (2020). *Online Learning : A Panacea in the Time of COVID-19 Crisis*. 1–18. https://doi.org/10.1177/0047239520934018

Eirín-nemiña, R., Sanmiguel-rodríguez, A., & Rodríguez-, J. (2020). Professional satisfaction of physical education teachers. *Sport, Education and Society*, *0*(0), 1–14. https://doi.org/10.1080/13573322.2020.1816540

Erwin, H., & Erwin, H. (2016). *The Use of Social Media by Physical Educators: How Do We Ensure Quality Control? 3084*(March). https://doi.org/10.1080/07303084.2016.1119545

Fischetti, J. (2019). *Preservice Teachers ' Confidence and Preferred Teaching Strategies using TeachLivE ™ Virtual Learning Environment : A Two-Step Cluster Analysis*. *15*(3).

Fletcher, T., & Kosnik, C. (2016). *Pre-service primary teachers negotiating physical education identities during the practicum*. *4279*(April). https://doi.org/10.1080/03004279.2016.1169486

Gawrisch, D. P., Richards, K. A. R., Killian, C. M., Gawrisch, D. P., Richards, K. A. R., Killian, C. M., & Gawrisch, D. P. (2019). Integrating Technology in Physical Education Teacher Education : A Socialization Perspective Integrating Technology in Physical Education Teacher Education : A Socialization Perspective. *Quest*, *00*(00), 1–18. https://doi.org/10.1080/00336297.2019.1685554

González-calvo, G., Bores-garcía, D., & Hortigüela-alcalá, D. (2021). *The (virtual) teaching of physical education in times of pandemic*. https://doi.org/10.1177/1356336X211031533

Hilvoorde, I. Van, Amsterdam, V. U., & Koekoek, J. (2019). *Digital technologies : A challenge for Physical Education Digital technologies : A challenge for Physical Education*. *November 2018*.

Hsu, C. Y., Liang, J. C., Chuang, T. Y., Chai, C. S., & Tsai, C. C. (2020). Probing in-service elementary school teachers' perceptions of TPACK for games, attitudes towards games, and actual teaching usage: a study of their structural models and teaching experiences. *Educational Studies*, *00*(00), 1–17. https://doi.org/10.1080/03055698.2020.1729099

Jack R. Freankel. (2017). *How to Design and Evaluate Research in Education*.

Ju, Y., & Wan, H. (2016). Analysis of Physical Education Teaching Mode

Based on Computer Multimedia and Network System. *International Journal of Database Theory and Application*, *9*(10), 397–408.

Kapici, H. O., & Akcay, H. (2020). Improving student teachers' TPACK self-efficacy through lesson planning practice in the virtual platform. *Educational Studies*, *00*(00), 1–23. https://doi.org/10.1080/03055698.2020.1835610

Kern, B. D., & Graber, K. C. (2017). Physical Education Teacher Change : Initial Validation of the Teacher Change Questionnaire- Physical Education Physical Education Teacher Change : Initial Validation of the Teacher Change. *Measurement in Physical Education and Exercise Science*, *00*(00), 1–13. https://doi.org/10.1080/1091367X.2017.1319371

Kinchin, G. D., & Bryant, L. G. (2016). *Using Social Media within Physical Education Teacher Education*. *4562*(March). https://doi.org/10.1080/08924562.2015.1066284

Koehler, M. J. (2006). *Technological Pedagogical Content Knowledge : A Framework for Teacher Knowledge. 108*(6), 1017–1054.

Lawson, M. A., & Lawson, H. A. (2013). *New Conceptual Frameworks for Student Engagement Research , Policy , and Practice* (Vol. 83, Issue 3). https://doi.org/10.3102/0034654313480891

Ledger, S., Ersozlu, Z., & Fischetti, J. (2019). *Preservice Teachers ' Confidence and Preferred Teaching Strategies using TeachLivE ™ Virtual Learning Environment : A Two-Step Cluster Analysis Preservice Teachers ' Confidence and Preferred Teaching Strategies using TeachLivE ™ Virtual Learning Environme*. *February*. https://doi.org/10.29333/ejmste/102621

Louis Cohen, L. M. and, & Morrison, K. (2018). *Research method in education*.

Mccullagh, J., & Doherty, A. (2020). A coteaching model for developing pre-service teachers ' practice and confidence in teaching primary science through inquiry and con fi dence in teaching primary science through inquiry. *Education 3-13*, *0*(0), 1–14. https://doi.org/10.1080/03004279.2020.1854963

Mercier, K., Centeio, E., Garn, A., Erwin, H., Marttinen, R., & Foley, J. (2021). Physical education teachers' experiences with remote instruction during the initial phase of the COVID-19 pandemic. *Journal of Teaching in Physical Education*, *40*(2), 337–342. https://doi.org/10.1123/JTPE.2020-0272

Moreno, F. C., Huertas, M., Serrano, G., Fombona, J., & Tascón, M. G. (2020). *The Emergence of Technology in Physical Education : A General Bibliometric Analysis with a Focus on Virtual and Augmented Reality*. https://doi.org/10.3390/su12072728

Nazari, N., Nafissi, Z., Estaji, M., Marandi, S. S., & Wang, S. (2019). Evaluating novice and experienced EFL teachers' perceived TPACK for their professional development. *Cogent Education*, *6*(1), 1–26. https://doi.org/10.1080/2331186X.2019.1632010

Raut, V., & Patil, P. (2016). *Use of Social Media in Education : Positive and Negative impact on the students*. 281–285.

Rindrayani, S. R. (2016). No Title（表示不可能）. *EQUILIBRIUM Jurnal Ilmiah Ekonomi Dan Pembelajarannya*, *4*(2).

Run, H. (2017). BSc in Psychology The relationship between social media use and self-esteem : gender difference and the effects of parental support . *Physicologycal Education*.

Sadler, I. (2018). *Innovations in Education and Teaching International The role of self-confidence in learning to teach in higher education. January 2015*, 37–41. https://doi.org/10.1080/14703297.2012.760777

Schmidt, D. A., Thompson, A. D., Koehler, M. J., & Shin, T. S. (2009). *Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers*. *42*(2), 123–149.

Sharma, S., & Sahu, D. (2018). *Effect of Social Networking Sites on Self Confidence*. *3*(11), 1211–1216.

Starck, J. R., Richards, K. A. R., Neil, K. O., Starck, J. R., Richards, K. A. R., & Conceptual, K. O. N. A. (2018). A Conceptual Framework for Assessment Literacy : Opportunities for Physical Education Teacher Education A Conceptual Framework for Assessment Literacy : Opportunities for Physical Education Teacher Education. *Quest*, *00*(00), 1–17. https://doi.org/10.1080/00336297.2018.1465830

Stoicescu, M., & Stănescu, M. (2018). *The 14 th International Scientific Conference eLearning and Software for Education Bucharest , April 19-20 , 2018 Social Media as a Learning Tool in Physical Education and Sports Area. April*. https://doi.org/10.12753/2066-026X-18-193

Sullivan, M. O., & Sullivan, M. O. (2020). Research Quarterly for Exercise and Sport Global Challenges and Opportunities for Physical Education Teacher Educators Global Challenges and Opportunities for Physical Education Teacher Educators. *Research Quarterly for Exercise and Sport*, *00*(00), 1–12. https://doi.org/10.1080/02701367.2020.1730295

Trainin, G., Reeves, J., Wessels, S., & Reeves, J. (2017). *DigitalCommons @ University of Nebraska - Lincoln Pre-service Teachers ' Confidence and Attitudes toward Teaching English Learners. January*.

Tsuda, E., Wyant, J., Sato, T., & Haegele, J. A. (2019). Pre-Service Physical Education Teachers ' Practicum Experiences Teaching PreK Children Pre-Service Physical Education Teachers ' Practicum. *International Journal of Kinesiology in Higher Education*, *0*(00), 1–13. https://doi.org/10.1080/24711616.2019.1644980

Tutyandari, C. (2020). *Exploring Pre- Service Teachers ' Perceptions of Preparedness for Teaching in Indonesia*.

Vayre, E., & Vonthron, A. (2016). *Psychological Engagement of Students in Distance and Online Learning : Effects of Self-Efficacy and Psychosocial Processes*. https://doi.org/10.1177/0735633116656849

Voogt, J., & McKenney, S. (2017). TPACK in teacher education: are we preparing teachers to use technology for early literacy? *Technology, Pedagogy and Education*, *26*(1), 69–83. https://doi.org/10.1080/1475939X.2016.1174730

Wagh, A. (2020). *Effects Of Social Media On Self-Confidence Of Millennials*. *29*(6), 3095–3109.

Ward, P., & Cho, K. (2020). Five Trends in Physical Education Teacher Education. *Journal of Physical Education, Recreation & Dance*, *91*(0), 16–20. https://doi.org/10.1080/07303084.2020.1768182

Wickens, C. M., Walther, C. S., Parker, J., Wickens, C. M., Walther, C. S., & Pre-service, J. P. (2020). Pre-Service Physical Education Teachers ' Attitudes toward Literacy and Literacy Integration in Physical Education Settings Pre-Service Physical Education Teachers ' Attitudes toward Literacy and Literacy. *Reading Psychology*, *0*(0), 1–35. https://doi.org/10.1080/02702711.2020.1782548

Zheng, Y., Yang, X., Liu, Q., Chu, X., & Huang, Q. (2020). Computers in Human Behavior Perceived stress and online compulsive buying among women : A moderated mediation model. *Computers in Human Behavior*, *103*(September 2019), 13–20. https://doi.org/10.1016/j.chb.2019.09.012