SPORT TK-EuroAmerican Journal of Sport Sciences

https://revistas.um.es/sportk Online ISSN: 2340-8812

Received: **07/12/2022.** Accepted: **13/02/2023.** Published: **28/03/2023**

# Digital literacy of physical education teachers in the 5.0 era

**Adi S[1], Soegiyanto[2]*, Tjetjep Rohendi Rohidi[2], Tri Rustiadi[2]**

[1] Physical Education Department, Universitas Negeri Semarang, Indonesia.

[2] Universitas Negeri Semarang, Indonesia.

* Correspondence: Soegiyanto; soegiyanto.ks@mail.unnes.ac.id

## ABSTRACT

Digital literacy is a factor that determines a teacher's technology usage in learning. An interesting situation is found when physical education must be conducted in contemporary style, but on the other hand, it must also be able to incorporate practice in the field. This study aimed to investigate the digital literacy level of physical education teachers. The sample in this study was high school teachers in Bojonegoro Regency, consisting of 12 physical education teachers. The sample selection technique used was total sampling. The type of this research is quantitative using a survey method. Data was collected using a questionnaire via Google Form. After the data were obtained and grouped, they were then analyzed using percentages. The outcome of this research was organized into three categories, respectively the low category of 25.06%, the medium one of 33.34%, and lastly the high category of 41.6%. Young teachers fill the high category in the level of digital technology usage. From the results of the Spearman test, the younger the teacher, the better the level of mastery in technology. The computer literacy of physical education teachers affects their use of technology in delivering learning. Several things are related to one another, namely digital literacy, signals, and internet usage.

## KEYWORDS

Digital Literacy; Physical Education; Teachers

## 1. INTRODUCTION

Digitalization leads society towards technological responsiveness (Rachman, Sulaiman & Rumini, 2017). Technology has been integrated into various teaching styles and practices. The technology used as a means of learning is called educational technology (Kiat, Halim & Ibrahim,

2015). Skills in utilizing information and communication technology are considered important (Yaman, 2008; Yaman, 2008; Göktaş, 2012; Adamakis & Zounhia, 2013). Technology improves the quality of learning (Mcvay, Murphy & Yoon, 2008; Mohd Zin et al., 2012). Innovative technology facilitates creativity and learning productivity.

Various technologies have been used in daily. Today's students are Z-generation who have a dependency on technology (Pratama, 2012). The use of technology in the school environment has increased (Wastiau et al., 2013), including the integration of technology in physical education (Leight and Bechtel, 2010). Study stated that physical education teachers have used technology in learning activities, although previous research did not examine the direct effects of digital literacy on physical education teachers. Technology and physical education can integrate well.

Literacy level and the use of technology have a strong relationship (Kreijns et al., 2013). Lack of competence in operating technology has an impact on learning activity (Buabeng-Andoh, 2012). Physical education has more privileges than other subjects in terms of physical activity and human motion (Tinning, 2010; Newell, 2011). This study intends to look at the technological and digital literacy of physical education teachers that are used daily.

Previous research (Konan, 2010) found significant differences between gender, teaching experience, and education level. This research topic is a new study in Indonesia that reveals the use of technology by physical education teachers. Based on the description above, this study is expected to answer current existing problems. This study is also expected to be a recommendation for physical education teachers in integrating technology in the learning activity.

## 2. METHODS

This study aimed to investigate the digital literacy level of physical education teachers. This type of research is quantitative using the survey method (Sugiyono, 2010). The sample in the study was high school teachers in Bojonegoro Regency, consisting of 12 physical education teachers. The sample selection technique used was total sampling. The average age level of physical education teachers was 43.83 years with 17.1 years of teaching experience on average.

Data was taken using a questionnaire through the Google Form. The research was conducted in March 2021. The data used from the questionnaire including age, work experience, digital literacy level, and the use of learning technology in physical education. In the learning technology section, the sample was asked to answer some questions contained in the questionnaire. The obtained data will be converted using a 5-point Likert scale (5 = very frequently, 1 = never). After the data were collected and grouped, the data were analyzed using percentages.

## 3. RESULTS

In the following, we present the results of data analysis conducted in a study involving a sample of 12 physical education teachers. According to Table 1, the age of physical education teachers and digital literacy has a significant correlation (Spearman's rho, r = .24, p <.01) and a moderate positive relation. This implies that the younger the teacher, the better the level of technological mastery. In the work experience data, it was found that the shorter the work experience, the better the level of technological proficiency.

**Table 1.** Sample description

| Variable | N | MIN | MAX | Mean |
|---|---|---|---|---|
| Age | 12 | 22 | 56 | 43.83 |
| Work Experience | 12 | 3 | 34 | 17.1 |

Figure 1 highlights the percentage level of technology utilization. Based on the data, the percentage was found as follows: 3 teachers (25.06%) were in a low level of digital technology usage, 4 teachers were in the medium category (33.34%), and 5 teachers were in the high category (41.6%).

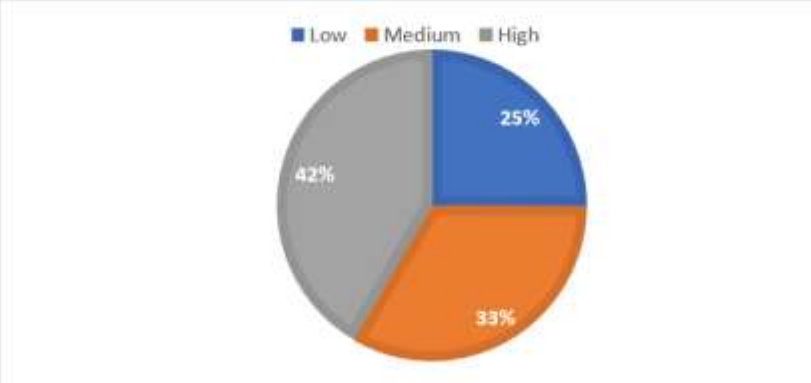


**Figure 1.** Technology usage level of physical education teachers

Based on Figure 2, there are several items in the “very frequent” category, such as Smartphones, TVs, Video Recorders, DVD Players, the Internet, Laptops, and Projectors. In the Frequent Category, Smartphones, TVs, Stereo Systems, Video recorders, DVD players, PCs, Internet, Laptops, Projectors, Pictures, Models, and Notebooks are listed. In the Occasional Category, several items included such as Stereo Systems, DVD Players, PCs, Digital Cameras, Video Cameras, Models and Notebooks. Lastly, in the Rare Category, listed stuff such as Stereo Systems, PCs, Digital Cameras, Video Cameras, OHPs, and Whiteboards.

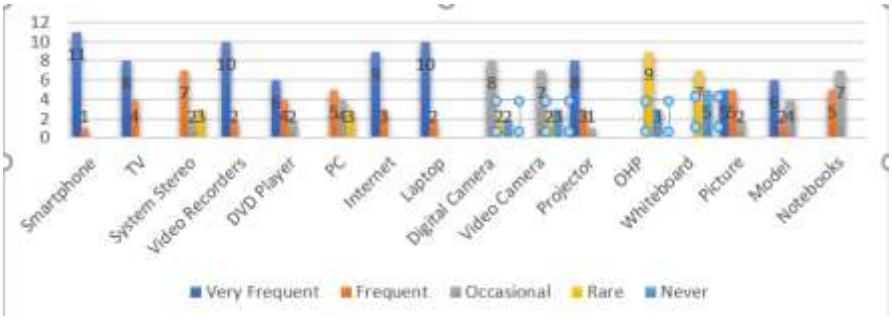


**Figure 2.** Learning technology and media usage in physical education

## 4. DISCUSSION

Most of the physical education teachers in the sample had been working for 17 years. The mean age of the teachers in this study was 43 years old. Age and work experience are crucial factors because the majority of physical education teachers have not mastered the technology to be applied in teaching methods during school and college (Hetland & Strand, 2010). Older physical education teachers can be called digital immigrants, while younger teachers are labeled as digital natives. Following this idea, future generations of physical education teacher candidates are expected to demonstrate a higher level of ICT competence than future candidates of other school subjects teachers All this time, the digital literacy level of physical education teachers is unknown. This is proven by the absence of similar studies examining this subject in physical education.

Based on the result of the research, the level of digital technology usage is grouped into three categories, namely the low category which is 25.06%, the medium category with a percentage of 33.34%, and the high category which is 41.6%. Young teachers occupy a high category in the use of digital technology. This result is strengthened by research that shows that those young physical education teachers are already familiar with "digital" devices. Physical education teachers have adequate literacy levels. Despite the general belief that the use of technology leads to a lack of motion (Perlman, Forrest & Pearson, 2012; Mears, 2013).

The use of learning technology by physical education teachers spotlights the tendency of those teachers to include technology in their learning. Physical education teachers use laptops, video recorders, and the internet more often. The rarest uses of media are Stereo Systems, PCs, Digital Cameras, Video Cameras, OHPs, and Whiteboards. This finding shows that the level of technology usage in physical education is great. This good indicator is seen from the type of media used that has adapted to today's era. Although physical education teachers' interest in technology increased as it is stated in previous studies (Gibbone, Rukavina & Silverman, 2010; Perrotta, 2013) physical education

teachers in this study tend to include technology in their learning. Primarily, ICTs (PCs, laptops, and the Internet) are almost used in physical education. The use of the Internet in physical education (Leight & Bechtel, 2010; Elliott et al., 2013). The effect of physical education teachers' technology literacy on Internet usage theoretically comes from direct Internet connections and computers/laptops. From the exploration of internet signals, the area has a good signal. This can be interpreted that there is a positive relationship between digital literacy, signals, and internet usage. The integration of digital cameras in physical education has been investigated however the functions of digital cameras and video cameras are still questionable in terms of capturing video (Cummiskey, 2011), this study did not examine this uncertainty. Teachers use smartphone cameras because those items are considered simpler.

Based on the results of literature reviews related to digital learning, digital learning requires educational information technology (Harman et al., 2011; Okolie-Osemene, 2012; Thapliyal, 2017), educational revolution and digital literacy (Buchanan, 2011; Brown, 2014; Ruyskensvelde, 2014; Blundell, Lee & Nykvist, 2016; Haag et al., 2018; Madsen, Thorvaldsen & Archard, 2018; Paul et al., 2018; Buckingham, 2020), digital competence (Engen, Giaever & Mifsud, 2015; Amhag, Hellström & Stigmar, 2019; Godhe, 2019) and policy support (Buchanan et al., 2012; Lane, 2012; Comeau & Cheng, 2013; Konstantinidis & Bamidis, 2016; Pedersen, Nørgård & Köppe, 2018; Wierzbicka, 2020). Whereas in the development of an educational technology, several studies are needed, namely Technological Mastery from Teachers (Aypay, Çelik & Sever, 2012; Rauscher, 2012; Semiz & Ince, 2012; Trevallion, 2018; Anderson & Putman, 2019), Technological Mastery from Teachers (Lung-Sheng & Kuen-Yi, 2008; Drader, 2014; Putrawangsa & Hasanah, 2018; Hamzeh, Mershad & Vetohin, 2019; Williams, Windle & Wharrad, 2020), Technology Design (O'Sullivan, 2010; Katsioloudis, 2015; Mclain et al., 2019) and Curriculum (Keirl, 2006; Niiranen & Hilmola, 2016).

This research is limited only to high school teachers. Senior high school is considered a mature environment in using technology. The use of technology and the philosophies of physical education will likely differ in terms of school type and grade levels (Gibbone, Rukavina & Silverman, 2010; Kinash, Wood & Knight, 2013). Physical education in primary schools has different principles from that in secondary schools (Parker, Graham & Holt-Hale, 2013), which leads to different applications and reasons for using technology (Sun, 2012). Parental support, society, culture, availability of time, quality of teachers, quality of school principals, and intensity of technology usage are other factors that influence the use of technology (Prestridge, 2012; Perrotta, 2013). Learning technology will continue to develop in physical education. Physical education teachers have the opportunity to implement technology in their learning (Kinash, Wood & Knight,

2013). The higher the level of teacher's digital literacy, the higher the increase of technology usages such as smartphones, laptops, the Internet, and digital cameras in physical education. The limitation in this study is that there are only 12 samples used as initial data to determine the literacy level of physical education teachers. It is hoped in the future, further research could carry out a comprehensive discussion of digital literacy level and multimedia in physical education learning.

## 5. CONCLUSIONS

The usage level of digital technology is classified into three categories, namely the low category of 25.06%, the medium category of 33.34%, and the high category of 41.6%. Young teachers sit in a high category in the usage level of digital technology. Items that appear in Very Frequent categories of technological usage are smartphones, TVs, video recorders, DVD players, the internet, laptops, and projectors. At the "frequent level", items that appear are Smartphones, TVs, Stereo Systems, Video recorders, DVD players, PCs, Internet, Laptops, Projectors, Pictures, Models, and Notebooks. In the Occasional Category, the items are Stereo System, DVD Player, PC, Digital Camera, Video Camera, Model, and Notebook. In the Rare Category, the items include Stereo Systems, PCs, Digital Cameras, Video Cameras, OHPs, and Whiteboards. From the outcome of the Spearman test, the younger the teacher, the better the ability in the level of technological ability. Physical education teachers' computer literacy affects their use of technology in learning. Several things are related to one another, namely digital literacy, signals, and internet usage.

## 6. REFERENCES

Adamakis, M., & Zounhia, K. (2013). Greek Undergraduate Physical Education Students' Basic Computer Skills. *The Physical Educator, 70,* 135–154.

Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors Affecting Teachers' Use of Information and Communication Technology. *International Journal of Instruction, 2,* 77-104.

Amhag, L., Hellström, L., & Stigmar, M. (2019). Teacher Educators' Use of Digital Tools and Needs for Digital Competence in Higher Education. *Journal of Digital Learning in Teacher Education, 35*, 1–18.

Anderson, S. E., & Putman, R. S. (2019). Special Education Teachers' Experience, Confidence, Beliefs, and Knowledge About Integrating Technology. *Journal of Special Education Technology, 35*(1), 37–50.

Ayers, S., & Housner, L. (2008). A Descriptive Analysis of Undergraduate PETE Programs. *Journal of Teaching in Physical Education, 27,* 51–67.

Aypay, A., Çelik, H. C., & Sever, M. (2012). Technology acceptance in education: A study of pre-service teachers in Turkey. *Turkish Online Journal of Educational Technology, 11,* 264–272.

Blundell, C., Lee, K. T., & Nykvist, S. (2016). Digital Learning in Schools: Conceptualizing the Challenges and Influences on Teacher Practice. *Journal of Information Technology Education, 15,* 535–560.

Brown, S. (2014). Conceptualizing digital literacies and digital ethics for sustainability education. *International Journal of Sustainability in Higher Education, 15*(3), 280-290.

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using Information and Communication Technology, 8,* 136–155.

Buchanan, R. (2011). Paradox, Promise and Public Pedagogy: Implications of the Federal Government's Digital Education Revolution. *Australian Journal of Teacher Education, 36*(2), 67-78.

Buchanan, R. (2012). Basic Literacy or New Literacies? Examining the Contradictions of Australia' s Education Revolution. *Australian Journal of Teacher Education, 37*(6), 97-110.

Buckingham, D. (2020). Epilogue: Rethinking digital literacy: Media education in the age of digital capitalism. *Digital Education Review, 37,* 230-239.

Comeau, J., & Cheng, T. (2013). Digital "tsunami" in higher education: Democratisation Movement towards Open and Free Education. *The Turkish Online Journal of Distance Education, 14,* 198–224.

Cummiskey, M. (2011). There's an App for That Smartphone Use in Health and Physical Education. *Journal of Physical Education, Recreation & Dance, 82,* 24–30.

Drader, R. (2014). Using technology to engage students in outdoor education: Does it inhibit or benefit the students' experience? *Mount Royal Undergraduate Education Review, 1*(1), 1-14. https://doi.org/10.29173/mruer119

Elliott, S., Stanec, A. D., McCollum, S., & Ann Stanley, M. (2007). Uses of the Internet by Health and Physical Education Teachers. *Strategies, 20,* 19-27.

Engen, B., Giæver, T. H., & Mifsud, L. (2015). Guidelines and Regulations for Teaching Digital Competence in Schools and Teacher Education: A Weak Link? *Nordic Journal of Digital Literacy, 10,* 69-83.

Gibbone, A., Rukavina, P., & Silverman, S. (2010). Technology Integration in Secondary Physical Education: Teachers' Attitudes and Practice. *Journal of Educational Technology Development and Exchange, 3,* 1–14.

Godhe, A. (2019). Digital Literacies or Digital Competence: Conceptualizations in Nordic Curricula. *Media and Communication, 7*(2), 1-11.

Göktaş, Z. (2012). The Attitudes of Physical Education and Sport Students towards Information and Communication Technologies. *TechTrends, 56,* 22-30.

Haag, M. (2018). Digital Teaching and Digital Medicine: A national initiative is needed. *Journal for Medical Education, 35*(3), 43.

Hamzeh, W., Mershad, K., & Vetohin, S. (2019). Integrating technology into higher education: A case study in Lebanon. *Journal of Technology and Science Education, 9,* 442–457.

Harman, K. (2011). *Transformation in Teaching.* Social Media Strategies in Higher Education.

Hetland, K., & Strand, B. (2010). A descriptive analysis of undergraduate PETE program in the Central District. *The Journal of Research in Health, Physical Education, Recreation, Sport and Dance, 5,* 3–9.

Katsioloudis, P. (2015). Aligning Technology Education Teaching with Brain Development. *Journal of STEM Education: Innovations and Research, 16,* 6–10.

Kiat, L.B., Dayana Abd Halim, N., & Binti Ibrahim, H. (2015). Issues and future trends in teaching physical education: A preliminary study. *2015 IEEE Conference on e-Learning, e-Management and e-Services (IC3e),* 75-80.

Kinash, S., Wood, K., & Knight, D. (2013). Digital immigrant teachers and digital native students. What happens to teaching? *Learning and Teaching papers, 50,* 055–058.

Konan, N. (2010). Computer literacy levels of teachers. *Procedia - Social and Behavioral Sciences, 2*(2), 2567–2571. https://doi.org/10.1016/j.sbspro.2010.03.374

Konstantinidis, S. T., & Bamidis, P. D. (2016). Why decision support systems are important for medical education. *Healthcare technology letters, 3*(1), 56–60.

Kreijns, K., Vermeulen, M., Kirschner, P. A., Van Buuren, H., & Van Acker, F. (2013). Adopting the Integrative Model of Behaviour Prediction to explain teachers' willingness to use ICT: a perspective for research on teachers' ICT usage in pedagogical practices. *Technology, Pedagogy and Education, 22*(1), 55-71. https://doi.org/10.1080/1475939X.2012.754371

Lane, J. M. (2012). Developing the vision: Preparing teachers to deliver a digital world-class education system. *Australian Journal of Teacher Education, 37*(4), 59-74. https://doi.org/10.14221/ajte.2012v37n4.7

Leight, J., & Bechtel, P. A. (2010). Technology Utilization. *Journal of Physical Education, Recreation & Dance, 81*(6), 53–56.

Madsen, S., Thorvaldsen, S., & Archard, S. (2018). Teacher educators' perceptions of working with digital technologies. *Nordic Journal of Digital Literacy, 13,* 177–196.

McLain, M., Irving, D., Wooff, D., & Morrison-Love, D. (2019). Humanising the design and technology curriculum: why technology education makes us human. *Design and Technology Education: An International Journal, 24*(2), 8-19.

Mears, D. (2013). Technology in Physical Education: Article #4 in a 6-Part Series: Podcasts and Wiki's: Delivering Content Information to Students Using Technology. *Journal for Physical and Sport Educators, 23,* 29–34.

Newell, K. (2011). Physical Education of and Through Fitness and Skill. *Quest, 63,* 46–54.

Niiranen, S., & Hilmola, A. (2016). Female Technology Education Teachers' Experiences of Finnish Craft Education. *Design & Technology Education: An International Journal, 21*, 41-48.

O'Sullivan, G. (2010). Technology Education in New Zealand: The connected curriculum. *Design and Technology Education, 15*, 31-39.

Okolie-Osemene, J. (2012). Towards Utilizing New Digital Media Technologies for the Promotion of Peace Education in Nigeria. *African Journal of Teacher Education, 2,* 1-9. https://doi.org/10.21083/ajote.v2i1.1936

Parker, M., Graham, G., & Holt-Hale, S. (2013). *Children Moving: A Reflective Approach to Teaching Physical Education.* McGraw-Hill Education.

Paul, P., Bhimali, A., Kalishankar, T., Aithal, P. S., & Rajesh, R. (2018). Digital Education and Learning: The Growing Trend in Academic and Business Spaces — An International Overview. *International Journal on Recent Researches in Science, Engineering & Technology*, *6*(5), 11-18.

Pedersen, A. Y., Nørgård, R., & Köppe, C. (2018). Patterns of Inclusion: Fostering Digital Citizenship through Hybrid Education. *Educational Technology & Society, 21,* 225–236.

Perlman, D., Forrest, G. J., & Pearson, P. J. (2012). Nintendo Wii: opportunities to put the education back into physical education. *Australian Journal of Teacher Education, 37,* 1-10.

Perrotta, C. (2013). Do school-level factors influence the educational benefits of digital technology? A critical analysis of teachers' perceptions. *British Journal of Educational Technology*, *44*(2), 314-327. https://doi.org/10.1111/j.1467-8535.2012.01304.x

Pratama, H. C. (2012). *Cyber Smart Parenting. Bandung: PT.* Visi Anugranh Indonesia.

Prestridge, S. (2012). The beliefs behind the teacher that influences their ICT practices. *Computers & Education, 58,* 449–458.

Putrawangsa, S., & Hasanah, U. (2018). Integrasi Teknologi Digital Dalam Pembelajaran Di Era Industri 4.0. *Jurnal Tatsqif, 16,* 42–54.

Rachman, I., Sulaiman, K., & Rumini, U. (2017). Pengembangan Alat Pelontar Bola Tenis Meja (Robodrill IR-2016) Untuk Latihan Drill Teknik Pukulan Drive Dan Spin. *Journal of Physical Education and Sports, 6*(1), 50–56.

Rauscher, W. (2012). How project-based learning manifests itself in technology education textbooks. *African Journal of Research in Mathematics, Science and Technology Education, 16*(1), 18–31.

Van Ruyskensvelde, S. (2014). Towards a history of e-ducation? Exploring the possibilities of digital humanities for the history of education. *Paedagogica Historica, 50*(6), 861–870.

Semiz, K., & Ince, M. L. (2012). Pre-service physical education teachers' technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations. *Australasian Journal of Educational Technology, 28*(7), 1248-1275.

Sugiyono, I. (2010). *Metode penelitian kuantitatif dan R&D.* Bandung: Alfabeta.

Sun, H. (2012). Exergaming Impact on Physical Activity and Interest in Elementary School Children. *Research Quarterly for Exercise and Sport, 83*, 212–220.

Thapliyal, N. (2017). Eduresistance: a critical analysis of the role of digital media in collective struggles for public education in the USA. *Globalisation, Societies and Education, 16*, 1–17.

Tinning, R. (2010). Pedagogy and human movement: Theory, practice, research. *Theatre Topics, 22*, 104-105.

Trevallion, D. (2018). The changing professional identity of pre-service technology education students. *International Journal of Innovation, Creativity and Change, 4*, 1–15.

Wastiau, P., Blamire, R., Kearney, C.A., Quittre, V., gaer, E.V., & Monseur, C. (2013). The Use of ICT in Education: a survey of schools in Europe. *European Journal of Education, 48*, 11-27.

Wierzbicka, A. (2020). Polish philology education in the digital age. Is it still present at Polish schools and universities? *Acta Universitatis Lodziensis Folia Litteraria Polonica, 56*(1), 127-141.

Williams, A., Windle, R., & Wharrad, H. (2020). How will Education 4.0 influence learning in higher education? *Journal of Learning Development in Higher Education, 17*, 1-18.

**AUTHOR CONTRIBUTIONS**

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

**CONFLICTS OF INTEREST**

The authors declare no conflict of interest.

**FUNDING**

This research received no external funding.

**COPYRIGHT**