

TEACHER COMPETENCIES NEEDED BY THE PRINCIPAL IN THE DIGITAL AGE

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Abstract

Teachers, as the spearhead in the field of education, are required to have competence in digital age in the 21st century. The principal hopes that the competence of the teachers who teach in schools is to the current development demands. This study's aim is to determine the competence of teachers needed by the principal. The data were obtained from a questionnaire given to the principal containing 28 statements. Of the 272 principals who filled out the questionnaire, the results showed that 1.6% of principals were very satisfied, 51.6% satisfied, 46% dissatisfied, and 0.8% very unsatisfied with teacher competence.

Keywords: competence of teachers, school principals, literacy, digital era

1 INTRODUCTION

Competence is the ability of the teacher to be able to carry out their duties in teaching. In the current digital era, a teacher must have competencies that are by the demands of the times, namely the ability to understand digital technology. Teachers have a big challenge. The students of this era are familiar with technology, using internet technology. The internet makes it easier for us to access content, including learning content. Teachers are also required to be able to adjust their abilities in serving students who are used to the digital world. The Regulation of the Minister of National Education Number 16 of 2017 states that one of the mandatory components of teachers is to utilize information technology for organizing educational learning activities. Challenges for teachers in the 21st century and with changes to the 2013 Curriculum, pedagogical competence of teachers as instructors demanded to be better able to design learning to make it more interesting (Daryanto and Karim, 2017).

The digital era is not only a challenge for teachers but also for tertiary institutions, especially related to improving the quality of human resources. The competence of teachers must increase according to technological developments to improve the quality of human resources. The improvement will be beneficial for teachers to teach and also for teacher career development. The study is to discover whether teachers who graduated from college have the competencies required by schools and to get

an overview of current teacher competencies according to needs in the digital era. Teachers must have four competencies (Mendikbud, 2007) and have skills in digital technology use in class.

Four Teacher Competencies

By the Regulation of the Minister of Education and Culture Indonesia Number 16 of 2007, there are four teacher competencies those are pedagogical, personal, social, and professional. Pedagogic competence consists of 10 (ten) items, personality 5 (five) items, social 4 (four) items, and professional 5 (five) items. With these four competencies, we hope all teachers will become professionals. The substitute of the 2006 Curriculum to be 2013 Curriculum following the National Education Standards based on Government Regulation Number 57 of 2021 it has an impact on changes in teacher competency standards. Competency standards by graduate competency standards, content standards, process standards, and assessment standards.

Literacy Needed by Teachers

The concept of teacher competency can refer to Aoun's (2017) humanistic model, which is a model that combines the human side with technology application. A teacher must have competence those are data literacy, technology literacy, and human literacy. Data literacy includes abilities related to the ability to read, analyze and digital information. Technological literacy is the ability to understand how a machine works and technology. Human literacy is an ability related to humanity, communication, and design. The ability of data literacy, technology literacy, and human literacy is able to apply artificial intelligence in everyday life (Sudlow, 2017).

Two literacies, namely data literacy and technology literacy, have become literacy that dominates the industrial sector, especially industries based on production and automation techniques (Benešová & Tupa, 2017; Sudlow, 2017; Mourtzic, Vlachou, Dimitrakopoulos, & Zogopoulos, 2018; Sung, 2018). Because two literacy is widely used in the industrial sector, these two literacies can be run by machines so that it is feared that they will replace human labor. This paper will discuss teacher competencies needed by school principals referring to competencies in Permendikbud (2007) and competencies related to literacy concepts Aoun (2017).

Teacher Literacy and Competence

By combining data literacy competency, pedagogical competency, personality competency, social competency, human literacy, and professionalism, we hope that teacher competence will be more qualified. Integrating these competencies can be done by incorporating information technology literacy into competencies in pedagogical and professional aspects. Meanwhile, human literacy is mixed in personality competence and social competence. However, we have not been able to integrate data literacy into existing competencies because the relevance is remote. So for our data literacy competence, we create a separate group.

2 METHODOLOGY

Research data collection by distributing questionnaires to school principals. From the questionnaire data, we obtained data from 149 elementary school heads, 78 junior high school heads, and 45 high school heads. We collected data using a proportional stratified random sampling technique. We attack the number of respondents using $(n) = N / ((1 + (N \times e^2)))$, n is the number of samples, N is the population, and e is the level of error, which is 5%. The questionnaire that spreads the reach of 33 proxies uses a Likert scale of 4 with excellent (SB), good (B), average (TB), and poor (STB). As for statements for each aspect, namely literacy as much as 5, pedagogic 11, personality 6, social or human literacy 6, and professional 5. Data were analyzed using the formula: $H = ((4 \times \text{Separation}) + 1) / 3$ (Sumintono & Widiharso, 2013)

3 FINDINGS and discussion

After the data is processed, we can group the data into 7 difficulty strata based on the results of the statement logit distribution (Wibisono, 2016). Of the 28 statements used in this study, 13 statements fall into the categories of low scores. This means that school principals are not satisfied with this competency. So these 13 statements are statements of competence needed by teachers. Data literacy competence includes statements number 1, 2, and 3. Pedagogic competence includes statements 6, 8, 9, 12, and 13. Professional competence includes statements number 24, 25, 26, 27, and 28.

While there were 15 that were considered good by school principals, namely statements 4, 5, 7, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, and 23. Principals gave high scores which shows that the principal is satisfied with the competence of the teachers.

So from these several statements, the findings are: (1) there are two competencies, namely personal and social competencies in all aspects that are excellent. (2) two competencies, namely data literacy competency and professional are the most needed competencies. (3) five pedagogic sub-

competencies are urgently needed, namely the ability to develop curriculum, the ability to utilize information and communication technology, the ability to facilitate the potential development of students, the ability to utilize the results of assessment and evaluation, and the ability to take reflective action to improve the quality of learning.

3.1 School Principal Satisfaction with Teacher Competence

The satisfaction of school principals regarding teacher competency is excellent at 1.6%, good at 51.6%, average at 46%, and poor at 0.8%. If the percentages of good and poor mixed, it becomes 47.4%, while excellent and good mixed, it becomes 53.2%. It means that school principals are satisfied with the competence of existing teachers, although not ignoring competencies that are sufficient.

To the demands of scientific development, there is a need for renewal. One of the reforms is the link and match that connects the world of education and industry. The need for teacher competence must be by the competency needs in the school world or in the world of work or the field. The need for this competency is in line with the trend of the needs of large companies, such as Microsoft and Apple (Care, Griffin, & McGaw, 2012; Salgues, 2018). The need for this competency also encourages schools to create qualified human resources as desired by the company (Care, Griffin, & McGaw, 2012). The formation of the competence of qualified workers starts with qualified teachers. Teacher competence now and in the future is closely related to the willingness of tertiary institutions to prepare their curriculum (Nasir, 2018). Hopefully, tertiary institutions are expected to produce quality graduates, especially teachers who have the competence and can adapt to the internet of think era and the big data era (Aoun, 2017).

3.2 School Principal Satisfaction with Teacher Competence

3.2.1 Data Literacy Competence

Data literacy includes skills, namely the ability to read, analyze, and use information in the digital world (Aoun, 2017; Sudlow, 2017), and these competencies are needed by workers (Aoun, 2017). When these literacies are applied in the field of education, they are hoped that teachers will be able to collect, analyze, and interpret data to help develop learning (Mandinach & Gummer, 2016; Huda, et al., 2017). It means that teachers can combine the understanding of data with standards, disciplinary knowledge and practices, curricular knowledge, pedagogical content knowledge, and an understanding of how children learn (Heafner, Fitchett, & Knowles, 2016).

Seven main knowledge areas are integrated with the use of data in the inquiry process. The seven knowledge areas are content knowledge, general pedagogy, curriculum, student characteristics, educational context, educational goals, and values (Mandinach & Gummer, 2016). These seven pieces of knowledge inform the use of data for the teaching domain (Mandinach & Gummer, 2016).

Literacy is an important element in improving learning (Campaign, 2014) with sub-aspects, namely breadth of insight across disciplines, the ability to comprehensively analyze data or information in supporting the learning process, and the ability to present data or information obtained. In the future, teachers in schools will be faced with very large, continuous, and very instant data (Aoun, 2017; Sudlow, 2017)

3.2.2 *Professionalism Competence*

The professionalism sub-competencies needed in this research consist of statements number 24, 25, 26, 27, and 28. These statements are often the subject of research studies. According to Dudung's research (2015), teachers' professional competence shows low, medium, and high. For science teachers at SMPN 1 Kota Ternate, low 26%, medium 46%, and high 28%. While teachers at SMPN Kota Tobelo shows low 27%, moderate 43%, and high 30%. Based on these data, they are still necessary to increase teacher qualifications related to professional competence.

The low competency in mastering and developing this material is due to the teacher's educational background. (Hidayat, Agusta, Siroj, & Hastiana, 2019). In addition, according to Wilujeng, Prasetyo and Djukri (2016) teachers are still experiencing difficulties related to the skills of integrating Basic Competency (KD) and Competency Achievement Indicators (GPA) in Subject Specific Pedagogic (SSP) analysis.

3.2.3 *Pedagogical Subcompetencies Required by Teachers*

The pedagogic sub-competencies that are urgently needed by teachers in the future include statements 6, 8, 9, 12, and 13. Research on the pedagogical competence of science teachers at SMPN Kota Ternate shows that there are low 12%, medium 36%, and high 52%. (Dudung, 2015). The pedagogic competence of SMPN teachers in Loa Kulu District, Kutai Kertanegara Regency, shows a low of 15%, a medium of 49%, and a high of 36% (Dudung, 2015). Research (Maryati, Prasetyo, Wilujeng, & Sumintono, 2019) shows that teachers have mastered curriculum knowledge and students' understanding of science.

Meanwhile, the competence to utilize information and communication technology for learning is still low. According to (Antony & Paidi, 2019), the technological pedagogical and content knowledge abilities of biology teachers at SMAN Magelang are low. The role of information and communication technology is predicted to change the role of teachers in the future (Baron, 1969; Mitzel, 1974).

4 CONCLUSION

This paper concludes that the principal is very satisfied with the current teacher competencies, although they still expect additional competencies in the form of data literacy competencies and professionalism.

REFERENCES

- Antony, M. K., & Paidi. (2019). *Analisis Kemampuan Technological Paedagogical and Content Knowledge Guru Biologi SMAN se-Kota Magelang Berdasarkan Lama Mengajar Guru dan Tingkat Kefavoritan Sekolah*. Yogyakarta: Universitas Negeri Yogyakarta. Diambil kembali dari <http://eprints.uny.ac.id/id/eprint/65646>
- Aoun, J. E. (2017). *Robot Proof: Higher Education in the Age of Artificial Intelligence*. London: MIT Press.
- Baron, W. L. (1969). Technological Forces and The Teacher's Changing Role. *Journal of Teacher Education*, 20(4), 451-464.
- Benešová, A., & Tupa, J. (2017). Requirements for Education and Qualification of People in Industry. *Procedia Manufacturing* , 2195 – 2202.
- Brown, B., Chui, M., & Manyika, J. (2011). Are you ready for the era of Big Data? *McKinsey Quarterly*, 24-35.
- Campaign, D. Q. (2014). *Teacher Data Literacy: It's About Time*. Washington DC: Data Quality Campaign (DQC).
- Care, E., Griffin, P., & McGaw, B. (2012). *Assessment and teaching of 21st century skills*. London: Springer.
- Dudung A. Kompetensi Profesional Guru. *JKKP (Jurnal Kesejaht Kel dan Pendidikan)*. 2018;5(1):9-19. doi:10.21009/jkkp.051.02
- Fisher, J. W. (2007). Rating Scale Instrument Quality Criteria. *Rasch Measurement Transaction*, 21(1), 1095.
- Harjanto, I., Lie, A., Wihardini, D., Pryor, L., & Wilson, M. (2018). Community-based teacher professional development in remote areas in Indonesia. *Journal of Education for tEaching*, 44(2), 212-231.
- Heafner, T. L., Fitchett, P. G., & Knowles, R. T. (2016). Using Big Data, Large-Scale Studies, Secondary Datasets, and Secondary Data, Analysis as Tools to Inform Social Studies,

- Teaching and Learning. Dalam A. Crowe, & A. Cuenca, *Rethinking Social Studies Teacher Education in the Twenty-First Century* (hal. 359-383). Springer, Cham.
- Hidayat, S., Agusta, E., Siroj, R., & Hastiana, Y. (2019). Lesson Study & Project Based Learning sebagai Upaya Membentuk Forum Diskusi dan Perbaikan Kualitas Pembelajaran Guru IPA. *Jurnal Pengabdian kepada Masyarakat (Indonesian Journal of Community Engagement)*, 4(2), 171-178.
- Huda, M., Maselena, A., Shahrill, M., Jasmi, K. A., Mustari, I., & Basiron, B. (2017). Exploring Adaptive Teaching Competencies in Big Data Era. *International Journal of Emerging Technologies in Learning*, 12(3), 68-83.
- Lai, M. K., & Schildkamp, K. (2013). Data-based Decision Making: An Overview. Dalam K. Schildkamp, M. Lai, & L. Earl, *Data-based Decision Making in Education. Studies in Educational Leadership*, vol 17. (hal. 9-21). Springer, Dordrecht.
- Mandinach, E. B., & Gummer, E. S. (2016). What does it mean for teachers to be data literate: Laying out the skills, knowledge, and dispositions. *Teaching and Teacher Education*, 366-376.
- Maryati, M., Prasetyo, Z. K., Wilujeng, I., & Sumintono, B. (2019). Measuring Teachers' Pedagogical Content Knowledge using Many-Facet Rasch Model. *Cakrawala Pendidikan*, 38(3), 452-464. doi:<https://doi.org/10.21831/cp.v38i3.26598>
- Mendikbud. (2007). *Standar Kompetensi Guru Nomor: 16 Tahun 2007*. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- Mitzel, H. E. (1974). Computer Technology: Its Future Role in Basic Education. *Journal of Teacher Education*, 25(2), 124-129.
- Mourtzic, D., Vlachou, E., Dimitrakopoulos, G., & Zogopoulos, V. (2018). Cyber-Physical System and Education 4.0-The Teaching Factory 4.0 Concept. *Procedia Manufacturing*, 129-134.
- Nasir, M. (2018, 1 17). Orasi Dies Natalis Universitas Katolik Parahyangan ke-63, Pendidikan Tinggi Berkualitas: Mendorong Kemajuan IPTEK, Inovasi, dan Daya Saing Bangsa di Era Revolusi Industri 4.0. Parahyangan, Jawa Barat, Bandung Barat.
- Saito, E., Hendayana, S., Imansyah, H., Ibrohim, Isamu, K., & Hideharu, T. (2006). Development of School-Based In-Service Training under The Indonesian Mathematics and Science Teacher Education Project. *Improving Schools*, 9(1), 47-59.
- Salgues, B. (2018). *Society 5.0: Industry of the Future, Technologies, Methods and Tools*. London: John Wiley & Sons.
- Sevilla, C. G., Ochave, J. A., Punsalan, T. G., Regala, B. P., & Uriarte, G. G. (2007). *An Introduction to Research Methods*. Quezon: Rex Printing Company.
- Sudlow, B. (2017). Review of Joseph E. Aoun (2017). Robot Proof: Higher Education in the Age of Artificial Intelligence. *Postdigital Science and Education*, 1-4.
- Sumintono, B., & Widiharso, W. (2013). *Aplikasi Model Rasch untuk Penelitian Ilmu-ilmu Sosial*. Cimahi: TrimKom Publishing House.

- Sunarno, W. (2018). Pembelajaran IPA di Era Revolusi Industri. *Seminar Nasional Pendidikan Fisika IV 2018 "Peran Pendidikan dan Ilmuwan Sains dalam Menyongsong Revolusi Industri 4.0* (hal. 1-7). Madiun: FKIP Universitas PGRI Madiun.
- Sung, T. K. (2018). Industry 4.0: A Korea perspective. *Technological Forecasting & Social Change*, 40-45.
- Suwignyo, A. (2017). The American influence in Indonesian teacher training, 1956–1964. *History of Education*, 46(5), 1-21.
- Tanang, H., Djajadi, M., Abu, B., & Mokhtar, M. (2014). Challenges of Teaching Professionalism Development: A Case Study in Makassar, Indonesia. *Journal of Education and Learning*, 8(2), 132-143.
- Thair, M., & Treagust, D. F. (2003). A Brief History of a Science Teacher Professional Development Initiative in Indonesia and The Implications for Centralised Teacher Development. *International Journal of Educational Development*, 23, 201-213.
- Uhlig, G. (1983). Dimensions of Technology Literacy in Teacher Education. *Journal of Teacher Education*, 34(5), 1-5.
- Wibisono, S. (2016). Aplikasi Model Rasch untuk Validasi Instrumen Pengukuran Fundamentalisme Agama bagi Responden Muslim. *Jurnal Pengukuran Psikologi dan Pendidikan Indonesia*, 1-29.
- Wilujeng, I., Prasetyo, Z. K., & Djukri. (2016). Development The Subject Specific Pedagogy (SSP) of Natural Science to Optimize Mastery Knowledge, Attitude, and Skills Junior High School Students in Yogyakarta. *International Conference on Research, Implementation and Education of Mathematics And Science* (hal. 53-60). Yogyakarta: Universtias Negeri Yogyakarta.