

Teacher competence in implementing higher-order thinking skills oriented learning in elementary schools

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Abstract: Information and technology development in the last decade have caused fundamental changes in all of the life aspects, including in the educational aspect. Learning in the school was demanded to be an agent of instilling the ability of higher-order thinking (HoTS) so that the students could deal with life challenging in future life. The teachers also must have competence in implementing HoTS oriented learning. This study aimed to explore teachers' competencies and implement HoTS oriented learning in the public elementary school 2 of Ketaon, Boyolali Regency. Data was collected through interviews, observation, and documentation. The data collected further were analyzed by using the data analysis technique of the interactive inductive model of Miles and Huberman. The the research results showed that 1) there are five competencies used by the teachers in implementing HoTS oriented learning as follows; Educational Competence, Competence for Technological Commercialization, Competence in Globalization, Competence In Future Strategies, and Counsellor Competence. 2) Efforts made by teachers are to improve competence in implementing HoTS oriented learning by following the training and education program, participating in the empowerment of professional teacher development organizations such as teachers' cluster working groups (KKG), teacher working group (MGMP), webinar, technical guidance, and workshop. In addition, the role of colleagues contributed to increasing teachers' competencies.

Keywords: Teachers' competencies, HOTS learning, 21st-century skills, Elementary school.

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INTRODUCTION

In the development of the 21st century, there are various changes in all aspects of life, marked mainly by advancing science, technology, information, and communication, including in educational aspect Teachers and educators are demanded having good instructional ability, so they can equip their students to have 21st-century skills. The teachers have to face challenges in order to be able to survive in the current educational reform era. The teachers have a massive challenge since Indonesia is currently facing science and technology advances. It gives the teachers a responsibility to prepare their students to compete in the current development.

21st-century learning has a challenge. Preparing 21st-century students for a global society identifies that, in 21st-century skills, there are four essential skills known as "4C" or in Indonesia known as "four K" consisting of communication, critical thinking, creativity, and collaboration. Critical thinking is that students must be able to critically respond to the knowledge (Saputri et al., 2019); communication refers to a student's communication ability like receiving dan conveying the information ; collaboration is that students can cooperate with other parties. Creativity means students can develop their ability based on an individual's talent and interest Pertiwi, Atanti, & Ismawati (2018) explained that 21st-century skills are student-centred learning and demand student to participate actively during the learning process. Teachers and students have to synergize with each other to face 21st-century challenges. Saepudin (2018), Mubarak et al. (2019), and Yahya et al. (2012) explained that by having the ability of higher-order thinking skills (HoTS), the students are expected to face the 21st-century challenges, in which someone is not only able to think and understand, but also is capable of analyzing, evaluating, and creating.

HoTS is a thinking process used higher cognitive level from taxonomy bloom (Anderson & Krathwohl, 2001; Moore & Stanly, 2010). It is suitable with Ariyana, Bestary, and Zamroni (2018) stated that HoTS is a unity of cognitive, affective, and psychomotor domain that becomes the aspects of competence achievement of the learning process in the class. Students with HoTS tend to be more successful and have an academic achievement (Tanujaya et al., 2017). In addition, students with HoTS can participate in classroom learning well, improve performance, and reduce their weaknesses (Yee et al., 2011). Ritter & Mostert (2017) explained that HoTS is the main competency that children need to have to exist in the 21st century. Due to the HoTS's importance, many studies recommended that teachers facilitate the development of HoTS for all students in their class (Yeh, 2012). Teachers are asked to improve HoTS oriented learning competence according to the subjects they taught. The teachers in 21st-century have different challenge compared to the teachers in the previous era. In the current era, the teachers are demanded having an excellent soft skill, mastering technological developments, and having HoTS learning-oriented learning a skill so that the skills mentioned equip the students to have 21st-century skills. Furthermore, the teachers have to improve their competence by continuously learning, either through education and training, self-learning, colleagues-learning, pursuing a higher degree, or other relevant ways to improve their competencies.

HoTS oriented learning in Indonesia has just applied massively since three years ago (starting 2017). The Indonesian government considers implementing the program because most of Indonesia's human resources do not have higher-order thinking skills. It happened because the class's learning process was mostly implemented by memorizing the lesson or slightly higher in The research result of Ichsan et al. (2019) mentioned that learning media, learning materials, students' worksheet, and learning evaluation in the various education level are only a few that are HoTS oriented.

This study was conducted in public elementary school 2 of Ketaon in Banyudono sub-district, Boyolali regency, which implemented HoTS oriented learning. It was known from the results of interviews with the school principal, in which public elementary school

2 of Ketaon has been implemented HoTS learning in the school year of 2012/2013; thus, it brings many achievements in academic and non-academic fields. Since 2013, in the academic field, every national examination held, some students gained 100 in a particular subject, particularly mathematics subject. In 2018, public elementary school 2 of Ketaon was included in the top 2 scores for the highest national examination at the Boyolali Regency level. The success of public elementary school 2 of Ketaon in implementing HoTS oriented learning because teachers' competencies supported it in conducting HoTS oriented learning. According to the above-mentioned background, the researcher wants to reveal teacher competencies in implementing HoTS oriented learning in public elementary school 2 of Ketaon. This research is expected to map teacher competencies in implementing HoTS oriented learning; thus, it can be a scientific reference for teachers, school principal, and other educational stakeholders.

METHODS

Research Design

The researcher's research design was qualitative research with a case study approach, understanding a problem by collecting various kinds of information further processed to find the solutions. This research subject is school principal, teachers, and students grade 1, 4, 5 and 6 of public elementary school 2 of Ketaon. This study conducted in public elementary school 2 of Ketaon located at Ketaon village, Banyudono sub-district, Boyolali regency, Middle Java. The activities held was to analyze teacher competencies in implementing HoTS oriented learning. The execution time was in the odd semester of 2020/2021.

Participants

The participants of this research are the principal and teachers. The data source was determined through the purposive and snowball sampling technique. Participants' demographics are explained in the **Table 1**.

Data Collection and Instrument Techniques

Data collection consisted of: 1) depth interviews conducted through question and answer with the school principal and classroom teachers to obtain the information related to teacher competencies in implementing HoTS oriented learning in public elementary school 2 of Ketaon; 2) Observation conducted is to obtain field data regarding teacher competencies in public elementary school 2 of Ketaon with the research data resources are school principal and classroom teachers who are influential in implementing HoTS oriented learning; 3) Documentation is in the form of teaching administrations consisting of the learning lesson plan, syllabus, learning materials, evaluation questions, and learning media used by the teachers. In collecting data, the researcher is guided by research guidelines in interviews, observation guidelines, and document analysis guidelines. Before researchers used the research guidelines, they were consulted first to the expert. Thus, after a revision, a new guideline is used to collect the field data. The instrument indicators can be seen in the **Table 2**.

Data Analysis Technique

Data collected further was analyzed using the interactive inductive data analysis technique of Miles, Huberman, and Saldana (2014), encompassing data condensation, data presentation, and concluding. Data collected the required characterization via an appropriate interpretative qualitative analysis process (Neuman, 2011), the data analysis

steps begin with; first, read the entire data repeatedly so that researchers have a complete understanding of the ideas from the data collected. Second, the researcher did incidental coding and focused coding. Third, the coding results are then divided into two broad categories based on the needs in answering the research problem formulation, namely the teacher competency in implementing HoTS-oriented learning and the teacher's efforts to improve their competence category. In presenting the data, relevant interview citations as evidence from each of the categories described (Fine et al., 2000; Simons (2009).

TABLE 1. *Demography of Participants*

No.	Initial Name	Gender	Position	Age (in year)
1.	Sy	Female	School principal	56
2.	Ww	Female	Teacher	55
3.	Dw	Female	Teacher	40
4.	Sr	Female	Teacher	56
5.	Wds	Female	Teacher	26

TABLE 2. Indicators of research variable

Research variable	Indicators	Description
Teacher competence in implementing HoTS-oriented learning	1) Educational Competence	The concept of internet of things as a basic skill
	2) Competence for technological commercialization	Implementation of entrepreneurship in learning
	3) Competence in globalization	Concept of global competence
	4) Competence In Future Strategies	Network development through academic activities
	5) Counsellor competence	Development of the potential of students

RESULTS

The research data was analyzed using data analysis stages: data reduction, data display, and conclusion. The relevant data to answer the research question was done by coding. The same codes are then made into specific categories, and several categories that have similarities are then made into themes. Teacher competence in implementing HoTS oriented learning of the data analysis, and it was found four themes to answer the first problem formulation: 1) educational competence; 2) Competence for technological commercialization; 3) Competence in globalization; 4) Competence In Future Strategies; dan 5) Counsellor Competence.

Educational Competence

The teachers in public elementary school 2 of Ketaon implements educational competence on the internet of thing based learning as a fundamental skill. In the Covid-19 pandemic period, the teachers are demanded implementing internet-based online learning during one semester. Through the interview, the school principal mentioned that:

In this period, the students must have higher-order thinking. For students, the parents who support their children with appropriate facilities and infrastructure in their home, the learning runs well. However, for the students who come from low economic class, they have less appropriate facilities and infrastructure so that there is much complaint

about study-at-home. Therefore, the learning is held at school with a one-week shift twice, in which the school system is by taking and collecting a task also discussing a task with learning duration of 2 hours. (Interview by Sy, school principal of public elementary school 2 of Ketaon; August 4, 2020)

The Abovementioned interview result is enforced by the interview result of grade VI teachers:

Currently, all of the learning use the internet. While at this time, using the internet is essential to access all things. In this village, there are many obstacles, especially in accessing the internet, because just a few people who have access to the internet are. Accessing the internet eases to search learning difficulties, which is not discussed in the book. Especially, now the learning is being held at home. When the students carry out face-to-face learning, they can directly ask their teacher questions ; while at home, they can access internet when they meet the difficulties. The school have taught their students to access the internet, but it is still limited .If all of the activities use the internet, the teacher can not monitor their activities one by one. (Interview by Ww, a grade VI teacher of public elementary school 2 of Ketaon; August 5, 2020).

The results of the observations also corroborate the data. According to the observation in the class of grade IV, it showed that the teacher use *ms. Teams* for online learning and use google form to provide a task. The teacher makes the questions first; then, the link is shared with the students via WhatsApp (Observation of Ww, a grade IV teacher; August 10, 2020).

Competence for Technological Commercialization

Students' entrepreneurial attitude obtained from teacher competence through an innovative process that is expected to produce a new creation and can support student's success. The result of the interview below shows competence for technological commercialization in public elementary school 2 of Ketaon. Grade 1 teacher mentioned that:

... teacher competence, which influences the student to have an entrepreneurial attitude, is highly essential to have by the teacher because the teacher must be multitalented (interview by Dw, grade 1 teacher of public elementary school 2 of Ketaon; August 5, 2020).

It is confirmed by the grade IV teacher that:

Having an entrepreneurial attitude is highly essential to build student skill. Students who educated with an entrepreneurial attitude help the student develop their skill and produce a creation that is useful for their future life. (Interview by Ww, a grade VI teacher of Ketaon public elementary school 2; August 5, 2020).

Confirmed by grade IV teacher:

... entrepreneurship skill is for future student life. Before the pandemic period, the students sell their product in front of the class; the concept is a market. In addition, when they are at home and whose parents usually trade on Sunday, the students voluntarily will help their parents (Interview by W, grade IV teacher of Ketaon public elementary school 2; August 10, 2020).

Based on documentation result from research activity in of Ketaon public elementary school 2, the semester program showed that the learning content of SBDP of KD 3.4 encompasses fundamental competencies which form entrepreneurial attitude: providing various creative creation in the showcase and exhibition (Documentation of W, grade VI's semester program of Ketaon public elementary school 2; August 5, 2020).

Competence in Globalization

To face the globalization era with many various cultures, the teacher must strive to embed culture, ethical value, and social norm existed in the community regarding teacher experience and full of responsibility. In facing the globalization era, the teachers in Ketaon public elementary school 2 have a global competence. In the interview, the school principal explained:

With the existed technology, the school requires to enhance more. Furthermore, school enhancement, it can improve student achievement, and they can better keep up with new educational developments. (Interview by Sy, school principal of Ketaon public elementary school 2; August 4, 2020).

The above mentioned explanation supported by teachers explained that:

Global competence is an ability that teachers have as a whole, not only in one area but as a whole. Now, globalization is globally in enormous scope; it is not only in a narrow scope. In learning, books are a source of guidance, but teachers are given the authority to explore more widely. The teacher is only one of many learning resources. Therefore, the teacher must have broad insight. With a global perspective, teachers must follow the developments, especially when delivering lesson materials, in which they can use either book as sources or the internet, which they can explore widely. (Interview by Sr, grade V teacher of Ketaon public elementary school 2; August 6, 2020).

The results of the interview of the grade 1 teacher also corroborated similar data. D (grade 1 teacher) stated that:

It is vital for the teacher to master global competence., IT has a significant impact, so that it is essential for the teacher to master IT skills in this modern era. Otherwise, the teacher will be left behind (Interview by Dw, a grade 1 teacher of Ketaon public elementary school 2; August 5, 2020).

Based on the result of documentation and observation, to determine the goals to be achieved, the school uphold the view that education must be able to translate and answer every global problem, it means that educational quality must always be improved so that it is in line with current development. In addition, in the school, there are a lot of Indonesian cultural images posted on the school walls that aimed to strengthen character education values (Documentation of school principal Sy, Document-1 of Ketaon public elementary school 2; August 4, 2020).

Competence in Future Strategies

In developing networks through academic activities, teachers of Ketaon public elementary school 2 participates in implementing the activities held by the governmental office, regional coordinator, and other institutions. The school principal stated that:

...the school hold and collaborating to other institutions and governmental offices to hold workshop or training both for students and teachers, e.g. classroom action

research, teachers' cluster working groups, curriculum creation of KTSP, K-13, and others (Interview by Sy, school principal of Ketaon public elementary school 2; August 4, 2020).

School principal data is corroborated with the interview result of the grade VI teachers. Through the interview, W explained that:

...regarding collaborating with other parties, we have a health program called "dokter kecil". We collaborate with the public health centre of Banyudono 1 to provide counselling related to health; also we provide an immunization, in which the teachers help to coordinate the students. There is also training for "dokter kecil" that is usually held for three consecutive days, in which the participants of this program are all of the elementary school in one of regional coordinator but only one representative with one companion teacher who attends this training (Interview by Wds, a grade VI teacher of Ketaon public elementary school 2; August 5, 2020).

The similarity is corroborated by the interview result of the grade 1 teacher. It is stated that:

... usually school representative attends the training held by governmental offices or group. However, at this time, because of the pandemic, we take webinars to gain knowledge, to know more about our educational world in this pandemic era (Interview by Dw, grade 1 teacher of Ketaon public elementary school 2; August 5, 2020).

Based on the documentation result, in document-1 there is an invitation that invited the supervisor of the Kindergarten and elementary school of Banyudono sub-district, teachers in Ketaon public elementary school 2 to review curriculum 2013 (K-13) jointly. In every meeting held in Ketaon public elementary school 2, it is provided with the list of attendees and the recorder of minutes of the meeting from teacher (Documentation of school principal, Document-1 of Ketaon public elementary school 2; August 4, 2020).

Counsellor competence

The teachers of Ketaon public elementary school 2 have the competence as a supervisor, The supervision is not only related to the lesson, but also they supervise students' potential related to the emotional, social, moral, and spiritual aspects. Through the interview, grade VI teachers explained that:

Developing students' potentials is by providing some training and focusing on mapping the students' potentials. For now, we control students' learning by monitoring their activities and asking them to send their photos while learning. When in the class, we usually can guide them directly (Interview by Wds, grade VI teachers of Ketaon public elementary school 2; August 5, 2020).

S, as grade V teacher, stated to corroborate the previous argument. Through the interview, S stated that:

...giving motivation to the students is that they are active and want to work hard, the important is they want to read not only lesson book but also a magazine or newspaper. In addition, it is also expected that the students want to use social media; and watch the educative program on television; for example, a public television channel called TVRI provides the program for students aired every morning. Besides motivation, the teacher also makes observations every day and looks for the information to students'

parents (Interview by Wds, a grade VI teacher of Ketaon public elementary school 2; August 5, 2020).

Grade IV teacher revealed the reinforced argument. Through the interview, W stated that:

...through learning in the class, the teacher is usually going to understand students' characteristic and talents, but in this online learning, the teacher meets the difficulties. Students' potential is mapped according to their talents; for instance, if there is a student who is good at dance also the dance movement is flexible; furthermore, the dance teacher and I will discuss to map this student's skill. Besides, if students are good at academic aspects like English, they will be directed to extracurricular focused on English. In mapping the students' talents and interest, the teacher arranges the lists of students who have some talents, then is proposed to the school principal to get the agreement (Interview by Wd, grade IV teacher of Ketaon public elementary school 2; August 10, 2020).

Based on the researcher's documentation: the lists of extracurricular book, the teacher make the lists of extracurricular activities such as scout, dance, reading Tajwid Al-Qur'an (BTA), skills, mini volley, and basketball as well as the lists of execution time and the information about extracurricular known by the school principal and homeroom teacher (Documentation of S, extracurricular list of Ketaon public elementary school 2; August 5, 2020).

The Teacher's Efforts to Improve Competence in Implementing HOTS-Oriented Learning in Public Elementary School 2 of Ketaon

The teachers of public elementary school 2 of Ketaon increase HOTS oriented learning competence by implementing and attending the events held by the governmental office, regional coordinator, and other related institutions such as workshop and training. In the Covid-19 pandemic, most of the events are held online up to an unspecified time limit. Through the interview, the school principal stated that:

...carry out the program such as teachers' cluster working groups (KKG), Principal Working for Group Activities (K3S), then is carried out webinar during Covid-19 pandemic, the teachers attend webinar held by DIKBUD respectively, in which at the end of events all of the participants are given an award in the form of a charter (Interview by Sy, school principal of Ketaon public elementary school 2; August 4, 2020).

The results of the teacher's interview reinforce the principal school argument. Grade VI teacher said that:

...to enhance teacher competence, the teachers participated in seminars, workshop, and KKG. Twice a week, school principal, teachers, and educator staff discussions about the advancement of competence enhancement, also conduct a discussion with teachers who master HOTS learning and technology (Interview by Ww, grade IV teacher of Ketaon public elementary school 2; August 5, 2020).

Grade 1 teacher stated that:

...I practice often, read an e-book about HOTS learning and searching many sources from the internet that usually I use to study, also participated in KKG, while now there

are many webinars that I can participate in (Interview by Dw, grade 1 teacher of Ketaon public elementary school 2; August 5, 2020).

While grade V teacher said that:

...teachers participate in technical guidance, seminars, and workshop held through DIKPORA, DIKBUD, and several programs held outside school that increase teacher competence, also KKG, the program that facilitates teachers to share mutually with their other colleagues (Interview by Sr, a grade V teacher of Ketaon public elementary school 2; August 6, 2020).

Grade IV teacher said that:

...recently, the teacher participated in the training of arranging K-13 (curriculum 2013) of HOTS development, KKG, school meeting also encourage to study together, and attempt to increase the effectivity (Interview by Ww, a grade IV teacher of Ketaon public elementary school 2; August 10, 2020).

Based on the data presentation, it can be concluded that teachers' competence in implementing HoTS-oriented learning in the public elementary school 2 of Ketaon is educational competence, competence for technological commercialization, competence in globalization, competence in future strategies and counselor competence. For teachers to have these five competencies, the teachers often attend education and training, active in KKG, MGMP, seminars, technical guidance and workshops. In addition, the teachers also took advantage of discussions with peers to improve their competence.

DISCUSSION

Based on data analysis, there are two significant findings.

Teacher Competence in Learning Becomes the Primary Factor in the Success of HOTS Learning

Teachers have five essential competencies in implementing HOTS oriented learning that is required to be supported by 21st-century learning ability in facing industrial revolution 4.0, encompassing Educational Competence, Competence for Technological Commercialization, Competence in Globalization, Competence in Future Strategies dan Counsellor Competence. By implementing five competencies, the teachers can answer the 21st-century challenge in implementing HOTS oriented learning in industrial revolution 4.0.

The students highly require HOTS to have the competencies to existed in the 21st century. HOTS-oriented learning characteristics consist of starting with a challenging question, analyzing data, defining the concept, drawing conclusions, analyzing data logically, processing the information, asnd using the information to solve the problem faced by the students (Ariesta, 2018). In line with the previous argument, Conklin (2012) said that the ability of higher-order thinking encompassing critical thinking and creative thinking demanded the students be actively involved. HoTS involves complex thinking in describing the material, concluding, building the representation, analyzing, and building relationships by involving the most basic mental activity (Resnick in Ariyana et al., 2018).

The finding reinforces the previous research, which stated that five competencies required by teachers as the impacts of information and technology consist of; a) internet of things based on learning competence as necessary skills; b) Competence For Technological Commercialization is a competence that forms the students to have an entrepreneurial attitude with student's creation; c) global competence is the competence

that demands the teachers to have knowledge and skill globally; d) the ability to predict the demands and challenges in the future; and e) teacher competence to be a counsellor (Qusthalani, 2018; Rahayuningrum & Sari, 2019). In facing the 21st century, the students are demanded developing critical thinking, knowledge and the ability of digital literacy, information, media, and mastering the technology of information and communication (Frydenberg & Andone, 2011). HOTS oriented learning consists of four conditions: a) in a particular learning situation, it is required a specific learning strategy; b) an intelligence is seen as a unity of knowledge that is influenced by learning factor, strategy, and unity in learning; c) interactive and multidimensional views; d) by HOTS, the students are supposed to have analytical thinking, reasoning, critical thinking so that eventually the students can solve the problem creatively (Kemendikbud, 2017).

To support the implementation of HOTS learning in this era, the teacher must adapt to communication and information development well, either in class management or learning based on the advancement of communication and information development. In line with the research of Sonia (2019), the 21st-century teacher requires to have the ability to facilitate the student to have competencies that are suitable with the educational need of the industrial revolution 4.0 era. Therefore, the teacher is demanded take the advantages of communication and information development to support the learning.

Teacher creativity in implementing innovative learning is one of the determining factors in HOTS-oriented learning implementation. HoTS oriented learning development is an attempt at educational quality enhancement and graduate quality improvement. That learning is expected to equip the students to have many essential skills that existed in the 21st century.

The Importance of The Support from Government and Institution Toward Teachers Regarding Improving HOTS Oriented Learning Competencies

The role of government in holding workshop or training and professional teacher development organization empowerment such as KKG and MGMP supports the enhancement of teacher competence. The support of government toward teacher competence enhancement that is suitable with the need learning in 21st-century can improve teacher competence to support students' learning success. Teacher competence enhancement also related to other educational institutions' role to hold a webinar, technical guidance, and workshop.

This research reinforces the research of Royani (2020), which stated that to improve teacher competence, the government also plays a vital role to support teacher competence enhancement by organizing the training in some regions, empowerment supervision, KKG, and MGMP. On the other hand, needs teacher competence enhancement sustainability organized through the Sustainable Professional Development program (PKB). PKB aims to improve knowledge, skills, social and personal competencies to fit the future need (Kementrian Pendidikan dan Kebudayaan, 2012). As research conducted by Fadhillah et al (2019), teacher competence enhancement has always been conducted by educational stakeholders such as the central government, regional government, education authorities, school principal and the community who care about education.

In line with the research of Rahayuningrum & Sari (2019), enhancing teacher competence aimed to face the 21st learning of industrial revolution 4.0 era is by participating in forums organized by the government and related educational institutions such as scientific forums, MGMP, training and other activities that can develop teachers' skills. The purpose of teacher training is to develop and improve skills, knowledge, and attitude improvement. The training is organized adequately adjusted this era's development, so that the teacher to more professional and competent.

The development of teacher professional competence is carried out by arranging the program of human resources development that includes supervision program, MGMP, training, workshop, teacher participation in scientific activities, collaborating with school

supervisor, Ministry of Religion, education authorities, and others various human resources coaching programs (Azhar, 2014). Furthermore, Muis (2019) explained that workshop, training, technical guidance, and other programs are expected to enhance teacher competence. Apart from those organizations, colleagues' role is positively contributed to enhancing teacher competence since the colleague activities help each other to exchange the information, share the inspiration, and bear the innovation and teacher creativity.

This research concurs with the research of Junaidi (2015) that stated that teacher competence enhancement is carried out to develop teachers' quality through 1) training and education; 2) formal education; 3) supervision from senior; 4) workshop, seminar, program socialization; 5) colleague supervision; 6) exchanging educators in the form of collaboration; 7) comparative study, training and education are one of the fast ways in fulfilling in industrial revolution 4.0. Wahyuni (2018) explained that to achieve teacher competence in this era consist of six ways: 1) technology mastery is one of the teacher recruitment standards; 2) teacher competence enhancement is bottom-up so that the problems and obstacles met by teachers can be discussed together; 3) PKB is one of the programs to accommodate teaching profession enhancement; 4) lesson study is used to enhance teacher competence; 5) e-literacy; 6) adjustments to learning and best practices through integrated learning or blended learning. The research conducted by Ibda (2018) stated that building the teacher literacy competence is not only held by educational program organized by universities, but other parties also must be synergized to this program like UPTD Education, Education Quality Assurance Institution, teachers' cluster working for groups (KKG), education authorities, and all of the other related parties.

CONCLUSION

To implement HOTS oriented learning must be supported by teacher competence corresponding to the need for 21st-century learning. To achieve HOTS oriented learning, teachers in public elementary school 2 of Ketaon have been implemented five essential competence supported by skill 21st-century learning skill, *educational competence* (the use of internet of thing as an essential skill for teacher competence in instruction); competence for technological commercialization (teacher competence to form the entrepreneurial skill); competence in globalization, teachers' global competence as problem-solving skills; competence in future strategies (competence to predict the future); and counsellor competence (teacher competence as counsellor and psychologist) Implementing that five teacher competence in the learning activities becomes the main factor for the success of 21st-century HOTS oriented learning in the industrial revolution 4.0 era.

The teachers' effort to enhance teacher competence in implementing HOTS oriented learning is by following the government's instruction, participating in professional teacher development organization empowerment like KKG and MGMP. In this case, the support from government and other related institutions that are webinar, technical guidance, and workshop is highly influential for teacher competence enhancement corresponding to the educational need of 21st-century in industrial revolution 4.0; therefore, it enhances teacher competence that encourages the success of student learning. In addition, the role of colleagues also contributes to teacher competencies.

This study's limitations include; first, the research was only conducted in one public elementary school in a certain district, so the results cannot describe the overall condition of teacher competence in implementing HoTS-oriented learning. Therefore, other researchers can carry out similar topics by involving more research subjects and a wider coverage area. Second, this study uses a cross-sectional design to not describe the sustainability of the teachers in increasing competence in implementing HoTS-oriented learning. Therefore, research using a longitudinal design is necessary.

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