JURNAL PENDIDIKAN DAN PENGAJARAN
Volume 55 Nomor 3 2022, 501-511
E-ISSN: 2549-2608; P-ISSN: 2301-7821
DOI: https://doi.org/10.23887/jpp.v55i3.46366

Science Teachers Competencies and Problem in Implementing 2013 Curriculum at Primary and Secondary School in Bali

Anak Agung Inten Paraniti[1*], Ketut Suma[2]

[1] Universitas Mahasaraswati Denpasar, Denpasar, Indonesia
[2] Universitas Pendidikan Ganesha, Singaraja, Indonesia
*Corresponding author: intenparaniti@unmas.ac.id

Abstrak

Guru adalah kunci keberhasilan dalam mengimplementasikan kurikulum, namun banyak studi melaporkan masalah dalam mengimplementasikan kurikulum K-13, termasuk kompetensi guru. Belum ada laporan menyeluruh dalam kompetensi guru terkait masalah dalam pelaksanaannya. Penelitian ini bertujuan mengkaji kompetensi guru IPA dalam tiga aspek utama, yaitu keterampilan merancang, mengelola dan melaksanakan pembelajaran pada kurikulum K-13. Mix method digunakan dalam penelitian ini dengan desain concurrent mixed method. Pertama, survei melibatkan 67 responden yang mengisi angket kompetensi guru IPA berdasarkan standar proses kurikulum K-13. Sedangkan bagian kualitatif dilakukan dengan melakukan wawancara terstruktur dengan 12 guru IPA tentang tantangan dan permasalahan terkait tiga aspek utama kompetensi guru IPA dalam implementasi kurikulum K-13. Pengumpulan data kuantitatif berupa persentase, sedangkan analisis data kualitatif dilakukan melalui tahapan reduksi data, penyajian, dan verifikasi. Kompetensi guru dalam merancang pembelajaran harus lebih ditingkatkan dalam kreativitas dan penetapan tujuan agar sesuai dengan alokasi waktu, kegiatan dan penilaian pembelajaran dalam proses pembuatan rencana pembelajaran. Kompetensi pengelolaan guru IPA perlu ditingkatkan dalam menata tempat duduk sesuai dengan tujuan dan karakteristik pembelajaran. Kompetensi pelaksanaan harus lebih ditingkatkan lagi dalam dua indikator yaitu kreativitas pelaksanaan pembelajaran yang sejalan dengan pemahaman guru terhadap berbagai inovasi model pembelajaran dan pelaksanaan pembelajaran yang sejalan dengan RPP.

Kata Kunci: *Kompetensi Guru, Masalah Pendidikan Sains, Kurikulum 2013, Sekolah Dasar, Sekolah Menengah*

Abstract

Teachers are the key to success in implementing the curriculum; however, many studies report problems implementing the K-13 curriculum, including teachers' competencies. There has been no thorough report on teacher competence related to issues in the implementation. This study examines science teacher competencies in three main aspects, namely skill to design, manage and implement learning in the K-13 curriculum. Mix method was used in this study with a concurrent mixed method design. First, the survey involved 67 respondents who filled out a science teacher competencies questionnaire based on the process standards of the K-13 curriculum. Meanwhile, the qualitative part was conducted by conducting structured interviews with 12 science teachers about challenges and problems related to three main aspects of science teacher competencies in implementing the k-13 curriculum. Quantitative data in percentages is collected, while qualitative data analysis is done through data reduction, presentation, and verification. The competence of teachers in learning design must be further improved in creativity and goal setting to match the allocation of time, activities, dan learning assessments in the process of making learning plans. Science teachers' competence should be improved in arranging the seats according to the goal and characteristics of education. The competence of implementation must be further improved in two indicators: the creativity of learning implementation, which is in line with the teacher's understanding of various innovative learning models, and learning implementation, in line with the lesson plan.

Keywords: Teacher Competencies, Science Education Problem, Kurikulum 2013, Primary School, Secondary School

History:
Received : April 16, 2022
Revised : April 19, 2022
Accepted : September 20, 2022
Published : October 25, 2022

Publisher: Undiksha Press

1. INTRODUCTION

The curriculum is future-oriented in that it aims to form autonomous and responsible individuals who can thrive and flourish in the present and future world (Deng, 2022). To realize these goals Indonesian government designs, develops, establishes, and evaluates curricula at every level of education. Curriculum changes always align with the era's progress

and society's needs (Ana et al., 2021; Hasanah, 2017; Paraniti & Noviyanti, 2019; Pujiati et al., 2017). Curriculum and learning are interrelated. The curriculum as a program that contains a set of documents will be meaningless if it is not implemented. Otherwise, understanding activities cannot take place optimally without guidelines/references in the curriculum (Aeni et al., 2016).

Kurikulum 2013, or K-13 curriculum, is an Indonesian curriculum that uses the thematic-integrative model and emphasizes natural, social, artistic, and cultural phenomena with scientific reasoning methods to train and improve students' Higher Order Thinking Skills (HOTS) abilities to be better at observing, asking questions, using their reasoning and communicating (presenting) what they have learned (Anwar, 2014; Paidi et al., 2020). K-13 curriculum tends to be more effective in developing cognitive skills (C4-analysis, C5-evaluating, C6-creating) or HOTS and also as well in metacognitive skills (Anderson et al., 2001; Maharani, 2019; Paidi et al., 2020; Arif Widodo et al., 2020). The scientific approach implemented in K-13 greatly emphasizes learner-centered learning and the inquiry process. Students are expected to have a perspective and think like scientists, which can be done by applying various innovative learning models (Narut & Supradi, 2019; Paidi et al., 2020).

Schools, especially teachers, are the key to success in implementing the curriculum. Thus, teachers must be adaptive to changes for the better (Faudhah et al., 2017; Hasanah, 2017; Ye, 2021). Therefore, a competent teacher is needed. Competence is the basis for knowing teacher quality, and science teachers have the main competencies to plan, enforce and evaluate science teaching practices (Andina, 2018; Ye, 2021). The Law on Teachers and Lecturers states that four competencies must be possessed by teachers (pedagogical competence, professional competence, personality competence, and social competence). The measurement of teacher competence in Indonesia emphasizes pedagogical and professional competence (Andina, 2018). It can be understood because pedagogical competence is the basis for determining the effectiveness of the relationship pattern between teachers and students, while professional competence positively impacts teacher work productivity (Asmarani et al., 2021; Susanto et al., 2020). This paper further discusses in more detail the two competencies based on the learning process standards contained in Permendikbud No.65 Tahun 2013. More specifically, the teacher competencies discussed in this study are about three teacher skills: 1) planning learning, 2) learning management, and implementing learning based on the K-13 curriculum.

During the implementation of this curriculum, there are many obstacles to school readiness, such as supporting facilities and infrastructure, teacher readiness, learning processes, school policies, and administration (Adu-gyamfi et al., 2021; Makaborang, 2019; Rahmatullah & Jumadi, 2020). Various obstacles faced by teachers are 1) difficulties in determining learning media; 2) difficulties in implementing project-based learning; 3) lack of facilities and infrastructure, and 4) learning assessment difficulties (Adu-gyamfi et al., 2021). Another study found that educators' creativity in managing learning still lacked and seems monotonous (Rahmatullah & Jumadi, 2020). The lack of teacher competence in managing learning with a scientific approach that demands student-centered learning can cause students to feel burdened. In addition, the use of non-standard books from authors outside the ministry and the service of learning modules that were not developed according to the needs of students in measuring critical thinking skills caused the learning to become less attractive (Nadhira et al., 2020). Based on these various obstacles, none of them identify the fundamental competencies. Thus, this study aims to examine science teacher competencies in three main aspects: skill to design, manage and implement learning in the K-13 curriculum. Furthermore, the mixed method research used in this study can enrich the findings about the challenges and problems teachers face in the implementation.

2. METHODS

Mix method with a concurrent embedded design was used in this study (Creswell, 2002; Onwuegbuzie & Leech, 2005; Sugiyono, 2019) that involved a cross-sectional survey (Aruan et al., 2016) and an exploratory study (Yuniarti et al., 2021). The survey method was used to support the achievement of broader data related to the problems of science teachers in Bali in primary and secondary education. Technically, the survey was carried out by distributing a google form questionnaire to science teachers in primary and junior high schools and biology teachers in senior high schools in Bali.

The sample was determined using a random sampling technique from 9 districts in Bali. The 67 science teachers from primary and secondary schools filled out a questionnaire who came from schools in Badung, Gianyar, Singaraja, Karangasem districts, and Denpasar city. Meanwhile, an experimental study design was used to dig deeper and meaningful data to reduce bias and support the survey data. Exploratory studies were conducted through interviews, observation, and documentation. Purposive sampling was used to determine the sample in the experimental research, represented by 12 science teachers in primary and secondary schools. The criteria used in this purposive technique sampling are, 1) representatives of science teachers from each level of education (primary and secondary schools); 2) representatives of science teachers who have passed or have not passed teacher certification; 3) representatives of science teachers in urban and suburban areas.

The google form science competencies questionnaire consists of 20 statements related to teacher competencies which have three (3) indicators and those are: 1) planning learning skills, 2) managing learning skills, and 3) implementing learning skills. This questionnaire was developed based on the process standards of the 2013 curriculum. The science teacher competencies refer to a 3-point Likert scale (best, average, bad). Structured interview questions were used to collect data through interviews consisting of inquiries related to science teachers' competence. Quantitative data will be collected by completing self-assessment of science teachers' competencies questionnaires in implementing the K-13 curriculum. The score will process as percentages for each indicator (planning, managing, and implementing skills). The results of interviews, documentation study through teachers' lesson plans, and observation were then analyzed through three stages: data reduction, data presentation, and data verification (Hashimov, 2015; Miles & Huberman, 2014).

3. RESULTS AND DISCUSSION

Result

This study focuses on the science teachers' competencies in the learning process, which are the ability to design, manage, and implement the learning process. The result of the science teachers' learning design competence is presented in Table 1, the impact of the science teachers' managing learning competence is shown in Table 2, and the result of the science teachers' implementing learning competence is presented in Table 3.

Table 1. Level of Implementation Science Teachers' Competence in Learning Design

Indicator	Result
1. Lesson plan preparation	91.00%
2. Lesson plan is in line with the SKL	97.00%
3. Lesson plan is in line with the standard process	95.50%
4. Creativity in designing the lesson plan	69.60%
5. The objective is in line with time allocation, activities and learning assessment	68.20%

The survey result of the science teachers' competence in learning design, as listed in Table 1, illustrates that teachers' creativity and suitability of the learning goals with time allocation, learning activities, and assessment still need to be improved. This finding is reinforced by the result of interviews, where the teachers feel less confident in designing the creative learning process that allows students to develop their critical thinking skills or Higher Order Thinking Skills (HOTS). The interviews also found that uncertified teachers do not have any experience in the self-development, in contrast to certified teachers who have previously received various kinds of self-development training like being involved in many scientific meetings, including the professional teacher education or *Pendidikan Profesi Guru* (PPG). Through interviews, this study also finds more than 66% of teachers had obstacles in developing the lesson plan, and those are: 1) changes the lesson plan structure from a complex system (including 13 components) to a simple design (only three parts). This simple structure known as *RPP merdeka belajar*. Other problems that teachers faced are: 1) unable to explain the learning goal precisely; 2) discrepancy between the objectives with the activities and or the assessment process.

Table 2. Level of Implementation Science Teachers' Competence in Managing Learning

Indicator	Result
1. Arrange the seats according to the objectives and characteristics of learning	54.60%
2. Material is adjusted to the abilities of the students	78.30%
3. Discipline and safety in learning (class management)	100%
4. Psychological and physical preparation of students before the learning process	91.30%

Table 2 shows that in the aspect of learning management science teachers' competence, the teacher still needs to improve their ability in terms of classroom management, like seating arrangements to the needs and characteristics of the learning process. Through interviews, this study found that teachers who didn't carry out these activities assume that seating arrangements are inefficient and don't contribute to students' learning outcomes. Another thing that needs to be improved in learning management is the teachers' ability to adjust the material to the student's abilities. Interviews found the teachers having a problem with the load of materials to be delivered and the number of students in a class that exceeded 30. Although students' psychological and physical preparation before the learning process is good (91,3%), teachers do their best, but they still need improvement due to 8,7% of teachers in the average category.

Table 3. Level of Implementation Science Teachers' Competence in Implementing Learning

	Indicator	Result
1.	Learning implementation in line with the lesson plan	63.60%
2.	Response and feedback	100%
3.	Motivating the students in asking question or opinions	100%
4.	Apply contextual learning in local, national and international context	87.00%
5.	Asking questions related to the previous material	85.70%
6.	Explain the learning goal and standard competence	91.30%
7.	Asking the latest issues related to the material	91.30%
8.	Proportion in learning both theoretical and practical	78.30%
9.	Using scientific approach in learning process	91.30%
10.	Creativity in implementing the learning process	69.60%
11.	Understanding various innovative learning models	61.00%

Table 3 gives information to us show science teachers' competence in implementing the learning process. From 11 indicators in assessing teacher competence, three indicators need improvement: 1) learning implementation in line with the lesson plan, creativity, and understanding of various innovative learning models. The main obstacle mentioned by the teacher in this aspect is the time is not suited to a load of materials that must be taught. Another problem related to time is the assessment process, where the teachers struggle to evaluate the attitude, cognitive and psychomotor at the same time. Online learning is also an obstacle, primarily assessing students' attitudes, such as discipline and honesty in the test. In terms of creativity, teachers' obstacle is the lack of ability to allow and train the student's critical thinking skills or HOTS and the lack of understanding of how to do contextual learning in a class. Interviews also found that teachers must practice more to prepare for the test-based HOTS evaluation.

Discussions

Based on the aspect of science teachers' competence in learning design, it was found that the teacher's creativity should be improved. Creativity is essential for finding solutions and generating novel and valuable products (Yuan et al., 2019). Creativity in learning can be developed through learning based on problems and projects, the development of independence/autonomy, and education that can create an understanding atmosphere that motivates students (Conradty et al., 2018; Higuera Martínez et al., 2021). The need to increase teachers' creativity is in line with research that states that teachers with a high cognitive level will be able to develop creative pedagogy to train learners' creativity (Hun et al., 2018). It is further explained that highly cognitive teachers are intuitive, confident, and motivated teachers with reflective self-assessments.

This study also found that there are differences in the creativity of certified teachers and uncertified teachers. Certified teachers have better creativity in designing lesson plans than uncertified teachers. This follows previous studies, which state that certified teachers are more qualified than uncertified teachers (Putra, 2017; Sudirman & Bokingo, 2017; Utomo et al., 2019). Teachers' creativity could be developed by enforcing the discipline of the teachers which can be done through the application of five disciplinary styles (enforcer, abdicator, supporter, compromise, and negotiator) to maintain the ability of certified teachers, and four things need to be done namely: 1) supervision and evaluation; 2) socialization and assistance; 3) education and training; 4) reciprocity (Anggranei, 2020; Slameto, 2019). Other competencies that science teachers need to improve in learning design are describing a specific learning goal and integrating the learning goal with time allocation, activities and assessment in the learning process. This finding, supported by a previous study, states prospective biology students need to improve their ability to adjust between learning goals with activities and assessments (Audina & Harahap, 2022). The solution to the obstacles, such as changes in the structure lesson plan of K-13 curriculum and formulating the specific learning goal, can be done through socialization, training, and mentoring.

The results of interviews found that the teachers feel less confident in designing the creative learning process that allows students to develop their critical thinking skills or Higher Order Thinking Skills (HOTS). HOTS need to be trained in every learning process in the classroom so that students become more critical and creative in studying and solving problems related to their daily lives (Antoni Widodo, 2020). Training and improving students' HOTS capabilities can't only be done during the HOTS assessment but rather to students' habituation in practicing during the learning process. Therefore, the teachers' competencies to design HOTS learning and evaluation are essential. That statement was supported by some studies' findings that HOTS learning cannot be done partially and need a comprehensive and integrated implementation strategy between the learning incredibly

instructional design and assessment process (Fajriyah & Agustini, 2018; Kurniawati & Atmojo, 2017).

From the aspect of learning management, teachers' ability is generally good from the discipline and safety management indicators in the learning process which reaches 100%. Based on the results of the interviews, it was found that all teachers agreed that the formation of discipline was the main thing in the learning process. Disciplined students will learn to study well (Rahmadi & Pancarania, 2020). The construction of a disciplined attitude can be trained with the implementation of school rules, modeling by the teacher (Puspitaningrum & Suyanto, 2014), collaboration with parents, including involving parents in character-building programs (Elfina et al., 2021), applying rewards and consequences in the classroom (Rahmadi & Pancarania, 2020) the teacher wisdom and teacher-student communication (Safonova et al., 2021).

Indicators of students' physical and psychological preparation before starting learning are also in the good category, reaching 91.3%. Students with the excellent physical condition will have good focus during learning, as well as mentally prepared students. The results of this study align with the findings stating that physical and mental readiness is essential to note because it will ultimately affect student learning retention (Hadiningrum, 2018; Yu & Richardson, 2015). Based on the interview results, the teacher mentioned several factors affecting students' mental readiness, including a concentration on learning, student maturity, intelligence, motivation, and student interest. Student interest significantly affects the learning process.

Furthermore, it is also explained that a relationship exists between student interest and science process skills (Budiarti et al., 2022). Giving "choices" to students is a strategy that can be applied to attract students' interest in learning and develop independence in learning. The interviewee agreed that the provision of choice could be used as a strategy that directs students' interest in learning in a more positive. Teachers innovate in learning instruction by allowing students to choose the assigned task. Project tasks are often given in groups, while other studies, such as papers through literature review, are done individually. This "choice" strategy is a form of implementation of the kurikulum merdeka, where since 2022 it has been used as a curriculum choice that can be used in Indonesia.

The choices learners make regarding how they learn, the activities carried out, what is known, and how to learn are said to advance their learning independence (Lengkanawati, 2017). Students learning styles can be applied to another choice option. Learning styles must be considered in learning planning so students can more easily understand the presented concepts (Redhana & Suardana, 2020).

In this study, seating arrangement based on the need for learning (material characteristic) must be improved. Through interviews, this study found that teachers who didn't carry out these activities assume that seating arrangements are inefficient and don't contribute to students' learning outcomes. However, teacher awareness of seating arrangements is essential in classroom management because it will affect the success of learning (Gremmen et al., 2016; Zhang, 2019). Another indicator was delivering material according to students' abilities also needs to be improved. This is urgent for teachers to pay attention to because by knowing the students' prior knowledge, the teacher can design learning more effectively and efficiently. This is in line with previous study findings, which state that prior knowledge is an essential aspect of successful learning, especially in biology and physics, because it can lead to practical understanding, such as identifying students who have problems or misunderstandings in specific topics and also as a trigger for (Binder et al., 2019; Witherby & Carpenter, 2022).

The teacher's ability to implement learning is assessed through 11 indicators, with the other four indicators still needing to be improved, including: 1) the implementation of

learning following the lesson plan; 2) proportion in learning both theoretical and practical; 3) the teacher creativity in implementing the learning process and 4) understanding various innovative learning models. First, the suitability of learning with RPP in this study must be improved. This is in line with the findings of previous studies, which stated that the practicality of the implementation of learning with RPP was 77.50% (Nasution & Rizki, 2020). Second, a balance proportion of learning between theory and practice can lead students to thorough and meaningful science learning. The results of interviews in this study stated that 41.6% of science teachers were constrained in carrying out practicums. The interviewee noted that the practicum learning process is denied because of several things, such as lack of time, the large amount of material to be taught, and inadequate laboratory facilities and infrastructure, especially in suburban schools.

This aligns with previous studies on facilities and infrastructure for science practicum classes which are still low (Rochmayanti & Sartika, 2022). The factors that cause teachers to focus more on classroom learning than in the laboratory are due to several things: 1) chemistry practicum takes a lot of time, so the content is not conveyed thoroughly, 2) the materials used in chemistry learning tend to be expensive, 3) chemistry practicums use special tools used such as Erlenmeyer and measuring cups, 4) chemical practicum using hazardous materials, 5) chemical practicum requires special preparation and treatment, for example, some procedures must be carried out in a smoke cabinet. These factors constraint causes practical science learning that is carried out is still low (Redhana & Suardana, 2020).

Third, teachers' creativity in managing learning still needs to be improved, especially in preparing students to practice critical thinking skills and HOTS. The interview results explain that teacher creativity is influenced by several factors: 1) teachers with more ample teaching experience have better creativity; 2) certified teachers have better creativity; 3) teacher motivation affects the ability of teachers to design innovative learning. Finally, related indicators of knowledge and understanding of science teachers about variations in learning models also need to be improved because only 61% of science teachers achieve good scores. Based on the interview results, it was found that the teacher's understanding of this aspect was good. The only time was constrained for implementation because carrying out the learning process with innovative learning models required adequate time. One of the ways to improve teacher pedagogic competence is by implementing lesson study (Dudung, 2018; Junaid & Baharuddin, 2020).

4. CONCLUSION

The creativity of science teachers in designing, managing, and implementing learning still needs to be improved. The lack of imagination of teachers is reflected in the low implementation of HOTS in classroom learning. It needs to be supported by enhancing the pedagogical ability of teachers by understanding various innovative learning models.

5. REFERENCES

Adu-gyamfi, K., Ampiah, J. G., Education, M., Appiah, J. Y., & Education, M. (2021). Overcoming Obstacles in Implementing 2013 Curriculum Policy. *Cypriot Journal of Educational Sciences*, *16*(3), 967–980. https://doi.org/10.18844/cjes.v16i3.5770.

Aeni, U., Chandra, E., Muspiroh, N., Kunci, K., Identifikasi, :, Guru, K., Pembelajaran, P., & Kurikulum, B. (2016). Identifikasi Kesulitan Guru Biologi Dalam Melaksanakan Pembelajaran Kurikulum 2013 Di Sma Negeri 1 Susukan Cirebon. *Scientiae Educatia: Jurnal Sains Dan Pendidikan Sains*, *5*(2), 165–174. https://doi.org/10.24235/sc.educatia.v5i2.975.

Ana, N., Reksa, A. P., & M., D. N. (2021). Analisis Kurikulum 2013. *Didaktik: Jurnal Ilmiah FKIP Universitas Mandiri*, *19*(1), 1–9. https://doi.org/10.36989/didaktik.v7i02.239.

Anderson, L. W., Krathwohl Peter W Airasian, D. R., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Raths, J., & Wittrock, M. C. (2001). *A Taxonomy for Learning, Teaching, and Assessing A Revision of Bloom's Taxonomy od Educational Objectives*. Pearson.

Andina, E. (2018). Efektivitas Pengukuran Kompetensi Guru. *Aspirasi: Jurnal Masalah-Masalah Sosial*, *9*(2), 204–220. https://doi.org/10.46807/aspirasi.v9i2.1103.

Anggranei, F. N. (2020). Realitas Kompetensi Guru Pasca Sertifikasi. *SCIENTIFIC JOURNAL OF REFLECTION : Economic, Accounting, Management and Business*, *3*(4), 331–340. https://doi.org/10.37481/sjr.v3i4.229.

Anwar, R. (2014). Hal-Hal yang Mendasari Penerapan Kurikulum 2013. *Humaniora*, *5*(1), 97. https://doi.org/10.21512/humaniora.v5i1.2987.

Aruan, S. A., Okere, M. I. O., & Wachanga, S. (2016). Influence of Culture and Gender on Secondary School Students' Scientific Creativity in Biology Education in Turkana County, Kenya. *Journal of Education and Practice*, *7*(35), 25–35. https://eric.ed.gov/?id=EJ1126506.

Asmarani, A., Sukarno, & Widdah, M. El. (2021). The Relationship of Professional Competence With Teacher Work Productivity In Madrasah Aliyah. *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam*, *6*(2), 220–235. https://doi.org/10.31538/ndh.v6i2.1365.

Audina, R., & Harahap, R. D. (2022). Analysis of learning implementation plans (RPP) for prospective biology teacher students. *BIO-INOVED : Jurnal Biologi-Inovasi Pendidikan*, *4*(1), 17. https://doi.org/10.20527/bino.v4i1.12186.

Binder, T., Sandmann, A., Sures, B., Friege, G., Theyssen, H., & Schmiemann, P. (2019). Assessing prior knowledge types as predictors of academic achievement in the introductory phase of biology and physics study programmes using logistic regression. *International Journal of STEM Education*, *6*(1). https://doi.org/10.1186/s40594-019-0189-9.

Budiarti, R. S., Kurniawan, D. A., Perdana, R., & Eka, S. (2022). Interest and Science Process Skills in Science Education Based on Gender. *Jurnal Pendidikan Dan Pengajaran*, *55*(1), 26–41. https://doi.org/10.23887/jpp.v55i1.37738.

Conradty, C., Bogner, F. X., Conradty, C., & Bogner, F. X. (2018). From STEM to STEAM : How to Monitor Creativity From STEM to STEAM : How to Monitor Creativity. *Creativity Research Journal*, *30*(3), 233–240. https://doi.org/10.1080/10400419.2018.1488195.

Creswell, J. W. (2002). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.

Deng, Z. (2022). Powerful knowledge, educational potential and knowledge-rich curriculum: pushing the boundaries. *Journal of Curriculum Studies*, *54*(5), 599–617. https://doi.org/10.1080/00220272.2022.2089538.

Dudung, A. (2018). Kompetensi Profesional Guru. *JKKP (Jurnal Kesejahteraan Keluarga Dan Pendidikan)*, *5*(1), 9–19. https://doi.org/10.21009/jkkp.051.02.

Elfina, Firman, & Rusdinal. (2021). *Kerjasama Guru dan Orang Tua dalam Membentuk Karakter Disiplin Siswa SMAN 1 Lembah Gumanti*. *3*(3). https://doi.org/10.36418/syntax-idea.v3i3.1030.

Fajriyah, K., & Agustini, F. (2018). Analisis Keterampilan Berpikir Tingkat Tinggi Siswa SD Pilot Project Kurikulum 2013 Kota Semarang. *Elementary School: Jurnal Pendidikan Dan Pembelajaran Ke-SD-An*, *5*(1). https://doi.org/10.31316/esjurnal.v5i1.594.

Faudhah, M., Hasanuddin, & Nurmaliah, C. (2017). Kemampuan pedagogik guru biologi

dalam penerapan kurikulum 2013 di SMAN kabupaten Bireuen. *Jurnal Edubio Tropika*, *5*(2), 54–58. https://jurnal.unsyiah.ac.id/JET/article/view/11300.

Gremmen, M. C., van den Berg, Y. H. M., Segers, E., & Cillessen, A. H. N. (2016). Considerations for classroom seating arrangements and the role of teacher characteristics and beliefs. *Social Psychology of Education*, *19*(4), 749–774. https://doi.org/10.1007/s11218-016-9353-y.

Hadiningrum, I. (2018). Analisis Kesiapan Belajar Mahasiswa dalam Mengikuti Mata Kuliah Pragmatics. *Prosiding Seminar Nasional Dan Call for Papers*, *14–15*(November), 222–229.

Hasanah, U. N. (2017). Evaluasi implementasi Kurikulum 2013 pada SMA pilot project di Kota Yogyakarta. *Jurnal Akuntabilitas Manajemen Pendidikan*, *5*(1), 95. https://doi.org/10.21831/amp.v5i1.13093.

Hashimov, E. (2015). Qualitative Data Analysis: A Methods Sourcebook and The Coding Manual for Qualitative Researchers. *Technical Communication Quarterly*, *24*(1), 109–112. https://doi.org/10.1080/10572252.2015.975966.

Higuera Martínez, O. I., Fernández-Samacá, L., & Serrano Cárdenas, L. F. (2021). Trends and opportunities by fostering creativity in science and engineering: a systematic review. *European Journal of Engineering Education*, *46*(6), 1117–1140. https://doi.org/10.1080/03043797.2021.1974350.

Hun, R., Cheung, P., Mo, M., Mok, C., Hun, R., Cheung, P., Mo, M., & Mok, C. (2018). Early Childhood Teachers' Perception of Creative Personality as a Predictor of Their Support of pedagogy important for fostering Creativity : A Chinese Perspective Early Childhood Teachers' Perception of Creative Personality as a Predictor of Their Supp. *Creativity Research Journal*, *30*(3), 276–286. https://doi.org/10.1080/10400419.2018.1488345.

Junaid, R., & Baharuddin, M. R. (2020). Peningkatan Kompetensi Pedagogik Guru melalui PKM Lesson Study. *To Maega : Jurnal Pengabdian Masyarakat*, *3*(2), 122. https://doi.org/10.35914/tomaega.v3i2.413.

Kurniawati, W., & Atmojo, S. E. (2017). Pembelajaran Sains Bermuatan Karakter Ilmiah Dengan Alat Peraga Barang Bekas Dan Asesmen Kinerja. *JPI (Jurnal Pendidikan Indonesia)*, *6*(1), 49–59. https://doi.org/10.23887/jpi-undiksha.v6i1.8866.

Lengkanawati, N. S. (2017). Learner autonomy in the indonesian efl settings. *Indonesian Journal of Applied Linguistics*, *6*(2), 222–231. https://doi.org/10.17509/ijal.v6i2.4847

Maharani, A. D. (2019). HOTS pada assesment pembelajaran tematik muatan pembelajaran IPA siswa sekolah dasar. *Prosiding Seminar Nasional Pendidikan Dasar*, 502–510.

Makaborang, Y. (2019). Evaluasi Implementasi Kurikulum 2013 Mata Pelajaran Biologi Di SMA Negeri. *Kelola: Jurnal Manajemen Pendidikan*, *6*(2), 130–145. https://doi.org/10.24246/j.jk.2019.v6.i2.p130-145.

Miles, M. B., & Huberman, M. A. (2014). Qualitative Data Analysis. In *CEUR Workshop Proceedings* (second, Vol. 1304). SAGE Publication, Inc.

Nadhira, D. M., Zaini, M., & Hardiansyah. (2020). Development of Worksheets for High School Biology Students Based on Critical Thingking Skills on the Archaebacteria and Eubacteria. *BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan*, *2*(1). https://doi.org/10.20527/BINO.V211.7900.

Narut, Y. F., & Supradi, K. (2019). Literasi sains peserta didik dalam pembelajaran ipa di indonesia. *Jurnal Inovasi Pendidikan Dasar*, *3*(1), 61–69. https://jurnal.unikastpaulus.ac.id/index.php/jipd/article/view/214.

Nasution, T., & Rizki, A. (2020). Analisis Kesesuaian antara Rencana Pelaksanaan Pembelajaran (RPP) dengan Pembelajaran yang Diterapkan di Kelas oleh Guru Matematika di MAN 1 Aceh Tamiang. *Prosiding Seminar Nasional Peningkatan*

Mutu Pendidikan, 559–563.
Onwuegbuzie, A., & Leech, N. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology: Theory and Practice*, *8*(5), 375–387. https://doi.org/10.1080/13645570500402447.
Paidi, P., Mercuriani, I. S., & Subali, B. (2020). Students' competence in cognitive process and knowledge in biology based on curriculum used in Indonesia. *International Journal of Instruction*, *13*(3), 491–510. https://doi.org/10.29333/iji.2020.13334a.
Paraniti, A. A. I., & Noviyanti, P. L. (2019). Evaluasi Rencana Pelaksanaan Pembelajaran pada Pelaksanaan PPL terhadap Pemahaman Mahasiswa. *Jurnal Bakti Saraswati*, *08*(01). https://e-journal.unmas.ac.id/index.php/baktisaraswati/article/view/503.
Pujiati, S. R., Purwanto, S., & Istyarini. (2017). Program Pendampingan Kurikulum 2013: Apakah Betul- Betul Berdampak Positif bagi Guru? *Indonesian Journal of Curriculum and Educational Technology Studies*, *5*(2), 101–111. https://doi.org/10.15294/ijcets.v3i1.8675.
Puspitaningrum, D., & Suyanto, T. (2014). Implementasi Tata Tertib Sekolah Dalam Membentuk Disiplin Siswa Di Smp Negeri 28 Surabaya. *Kajian Moral Dan Kewarganegaraan*, *2*(2), 343–357. https://jurnalmahasiswa.unesa.ac.id/index.php/30/article/view/7789.
Putra, P. (2017). Pengaruh Kinerja Guru Bersertifikasi Dan Belum Bersertifikasi Terhadap Prestasi Belajar Siswa Di Min Se-Kabupaten Sambas. *JMIE (Journal of Madrasah Ibtidaiyah Education)*, *1*(1), 14–26. https://doi.org/10.32934/jmie.v1i1.22.
Rahmadi, P., & Pancarania, D. P. (2020). Peran Guru Dalam Membentuk Sikap Disiplin Siswa Kelas I Sekolah Dasar Melalui Penghargaan Dan Konsekuensi [the Role of Teachers in Shaping the Discipline Attitudes of Grade 1 Elementary School Students Through Rewards and Consequences]. *JOHME: Journal of Holistic Mathematics Education*, *4*(1), 80. https://doi.org/10.19166/johme.v4i1.2755.
Rahmatullah, & Jumadi. (2020). Evaluasi Keterlaksanaan Kurikulum 2013 Pada Sekolah Menengah Atas Di Kota Mataram. *Jurnal Pendidikan Dan Kebudayaan*, *5*(2), 210–221. https://doi.org/10.24832/jpnk.v5i2.1697.
Redhana, I. W., & Suardana, I. N. (2020). *Green Chemistry Practicums at Chemical Equilibrium Shift to Enhance Students' Learning Outcomes*. *14*(1), 691–708. https://doi.org/10.29333/iji.2021.14142a.
Rochmayanti, N., & Sartika, S. B. (2022). Analisis Pembelajaran Guru IPA SMP Melalui Model Evaluasi CIPP di Masa Pandemi Covid-19. *Jurnal IPA Terpadu*, *6*(1). https://doi.org/10.35580/ipaterpadu.v5i2.27280.
Safonova, O. V., Voronkova, E. G., Voronkov, E. G., Bolbukh, T. V., & Kocheeva, N. A. (2021). Forming Conscious Discipline Among Students of Higher Educational Institutions. *Propósitos y Representaciones*, *9*(SPE3). https://doi.org/10.20511/pyr2021.v9nspe3.1186.
Slameto. (2019). Determinan Kreativitas Guru Sekolah Dasar Pasca Pendidikan dan Latihan Profesi Guru. *Jurnal Penelitian Humaniora*, *20*(02), 80–88. https://journals.ums.ac.id/index.php/humaniora/article/view/6929.
Sudirman, & Bokingo, A. H. (2017). Kinerja Guru Pasca Sertifikasi. *Perspektif Ilmu Pendidikan*, *31*(2), 98–104. https://doi.org/10.21009/PIP.312.5.
Sugiyono. (2019). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, Kombinasi R & D dan Penelitian Tindakan* (3rd ed.). Alfabeta.
Susanto, R., Rozali, Y. A., & Agustina, N. (2020). Pedagogic Competence Development Model: Pedagogic Knowledge and Reflective Ability. *International Conference on Progressive Education (ICOPE 2019)*, *422*, 19–23.

https://doi.org/10.2991/assehr.k.200323.082.

Utomo, K., Sulasmono, B. S., & Mawardi. (2019). Evaluasi Kinerja Guru Bersertifikasi. *Kelola: Jurnal Manajemen Pendidikan*, *4*(1), 2541–4429. https://doi.org/10.24246/j.jk.2016.v3.i2.p219-229.

Widodo, Antoni. (2020). Implementasi Program Gerakan Literasi Sekolah di Sekolah Menengah Pertama (SMP). *Tarbawi : Jurnal Ilmu Pendidikan*, *16*(1), 11–21. https://doi.org/10.32939/tarbawi.v16i01.496.

Widodo, Arif, Indraswati, D., Radiusman, R., Umar, U., & Nursaptini, N. (2020). Analisis Konten HOTS dalam Buku Siswa Kelas V Tema 6 "Panas dan Perpindahannya" Kurikulum 2013. *Madrasah*, *12*(1), 1–13. https://doi.org/10.18860/mad.v12i1.7744.

Witherby, A. E., & Carpenter, S. K. (2022). The rich-get-richer effect: Prior knowledge predicts new learning of domain-relevant information. In *Journal of Experimental Psychology: Learning, Memory, and Cognition* (Vol. 48, Issue 4, pp. 483–498). American Psychological Association. https://doi.org/10.1037/xlm0000996.

Ye, J. (2021). Constructing core teaching competency indicators for secondary school science teachers in China. *Journal of Baltic Science Education*, *20*(3), 389–406. https://doi.org/10.33225/jbse/21.20.389.

Yu, T., & Richardson, J. C. (2015). An exploratory factor analysis and reliability analysis of the student online learning readiness (SOLR) instrument. *Online Learning Journal*, *19*(5), 120–141. https://doi.org/10.24059/olj.v19i5.593.

Yuan, Y. H., Wu, M. H., Hu, M. L., & Lin, I. C. (2019). Teacher's Encouragement on Creativity, Intrinsic Motivation, and Creativity: The Mediating Role of Creative Process Engagement. *Journal of Creative Behavior*, *53*(3), 312–324. https://doi.org/10.1002/jocb.181.

Yuniarti, Y., Mulyati, T., Abidin, Y., Herlambang, Y. T., & Yusron, E. (2021). Eksplorasi Pembelajaran Matematika Secara Daring dalam Dimensi Pedagogik. *NATURALISTIC : Jurnal Kajian Penelitian Pendidikan Dan Pembelajaran*, *5*(2), 856–871. https://doi.org/10.35568/naturalistic.v5i2.1208.

Zhang, M. (2019). 'If you take learning seriously, I'll assign you to a good seat': moralized seating order and the making of educational success in China's public schools. *Ethnography and Education*, *14*(4), 428–447. https://doi.org/10.1080/17457823.2018.1441733.