

The Integration of Balinese Local Wisdom Based on 4C in E-Learning of Science Subjects for Grade 8 at SMPN 1 Singaraja

I Putu Oktap Indrawan ^{a*}, I Gede Jaka Mahendra ^b

^a*Politeknik Ganesha Guru, Denpasar, Bali, Indonesia*

* e-mail address: oktap8indrawan@gmail.com

Abstract

E-learning is the best alternative for the learning process during the COVID-19 pandemic. The internet as a source of e-learning can have a negative impact on students; therefore it is necessary to instill the values of local wisdom as a fortress. In addition to local wisdom, one of the demands of the 4.0 Revolutionary Era towards the 5.0 Social Revolution is 4C skills. Therefore, it is very urgent to integrate 4C-based local wisdom in e-learning, especially science learning for Grade 8 Junior High Schools with students in the developmental level of adolescents who are still unstable. The purpose of this study is to find out: (1) the way to integrate Balinese local wisdom based on 4C in 8th grade science subjects; (2) curriculum analysis to classify the material of science subjects for grade 8 junior high schools that can be used for the development of e-learning integrated with Balinese local wisdom based on 4C; (3) implementation of an integrated e-learning design of Balinese local wisdom based on 4C in the 8th grade junior high school science subject in Google Classroom. The research method used is a literature review by reviewing various theories and previous research related to the material being studied. The results of the research show: (1) the way to integrate Balinese local wisdom in e-learning is to make syntax, content, and/or learning context, while 4C can be implemented in materials, practicum, discussion presentations, and work in small groups; (2) all materials of grade 8 junior high school science subjects can be used for the development of e-learning integrated with Balinese local wisdom based on 4C; (3) the implementation of an integrated e-learning design of Balinese local wisdom based on 4C in the grade 8 junior high school science subjects can be applied to Google Classroom.

Keywords: e-learning, local wisdom, 4C, science subjects

1. Introduction

The development of learning in the Industrial Revolution Era 4.0 towards the Social Revolution Era 5.0 leads to technology-based learning. This was accelerated by the COVID-19 pandemic which forced all lines of education to carry out the learning process from home (Learning From Home), especially in Indonesia. The objectives of learning from home or better known as learning from home (LFH) according to the SE Secretary General Number 15 of 2020 include: 1) ensuring that the right to education is still obtained by students during the pandemic; 2) protecting the education community from the impact of COVID-19; 3) preventing the spread of COVID-19; and 4) ensuring that the psychosocial needs of all educational community members and the parties involved are met (Kemendikbud, 2020). This is implemented by e-learning (online

learning). E-learning in general can be divided into two, namely synchronous learning (synchronous online) and asynchronous learning (asynchronous online). Synchronous learning is an online learning that is carried out simultaneously, looking at the screen at the same time or in real time, for example video conferencing, chat, or video calls. Meanwhile, asynchronous learning is an independent learning process with online learning resources, students organize themselves according to their schedule and learning targets based on an online system.

The development of the learning process in the Revolutionary Era 4.0 is expected to be able to develop the skills needed by students. Learning and innovation skills are the types of skills that are needed by students to be able to compete in this era (Zubaidah, 2018). The US-based Partnership for 21st Century Skills (P21) categorizes learning and innovation skills or what is often referred to as the 4Cs, including: critical thinking; creativity; communication skills; and ability to work collaboratively (Zubaidah, 2018; Kemendikbud, 2017). These skills are future skills that students need to be able to adapt, learn for life, and be innovative in their lives (Indrawan, I P.O. & J. Mahendra, 2020). The development of these skills is expected to be able to be carried out in the implementation of e-learning. It is also hoped that the improvement of these 4C skills will also be measured through the implementation of e-learning.

Of course, in the implementation of e-learning, use loads of new literacy in the internet usage. The use of new literacy in the form of digital literacy and the use of the internet has an impact on the vulnerability of changes in social and cultural structures that occur in students (Carrington, 2005). The internet as a learning resource fulfill students with a variety of information, both positive and negative. The various information they get can be in the form of hoaxes, radical understanding, and or culture that is not in accordance with the values of local wisdom that exist in Indonesia, especially Bali (Indrawan, I P.O., Suwardika, G., Jaya, A.A.N.A & Wijaya, I K.W.B., 2020). The utilization of the internet as part of new literacy will certainly accelerate the absorption of foreign culture and the fading of local culture if there is no good filtration process by the recipients, in this case a student. Based on this, it is necessary to integrate local wisdom in e-learning which is expected to be a filter and shield for foreign cultures that can erode local wisdom, especially in Bali.

Various studies that integrate local wisdom in learning have been carried out but not in e-learning (Anwari, A., Nahdi, M. S., & Sulistyowati, E., 2016; Oktavia, 2018; Yoda, 2017; Pamungkas, A., Subali, B., & Lunuwih, S., 2017). Research on the integration of Balinese Local Wisdom in learning has not integrated local wisdom comprehensively, namely as content (Indrawan, I P.O., Saskara, G.A.J. & I K. W. B. Wijaya, 2019), contexts (Suastra, I W., B. Jatmiko, N.R. Ristiati & L.P.B Yasmini, 2017), and syntax (Indrawan, I P. O., Pramana, M. I., & Gunawan, K. D. H., 2019). In addition, there is no research that integrates Balinese Local Wisdom by including the development of 4C skills in it. Based on this, the researchers carried out initial data collection, literature review, and designed the integration of Balinese Local Wisdom based on 4C in e-learning of Science Subject for Class VIII at SMPN 1 Singaraja. This is the initial part of the research "The Development of E-learning Integrated with Balinese Local Wisdom based on 4C in Science Subjects at SMPN 1 Singaraja".

The purpose of this study is to find out: (1) the way to integrate Balinese local wisdom based on 4C in 8th grade science subjects; (2) curriculum analysis to classify the material of science subjects for grade 8 junior high schools that can be used for the

development of e-learning integrated with Balinese local wisdom based on 4C: (3) implementation of an integrated e-learning design of Balinese local wisdom based on 4C in the 8th grade junior high school science subject in Google Classroom.

2. Research Method

The research method used is a literature study by reviewing various theories and previous research related to the material being studied. The literature study method is a series of activities related to the methods of collecting library data, reading and taking notes, and managing research materials (Zed, 2008). The data resources in this research are including books, journal articles/procedures, science curriculum for Class VIII SMPN 1 Singaraja, and various other printed and digital text sources. The library data collected relates to e-learning, the integration of local wisdom in learning, especially e-learning, Balinese local wisdom, 4C skills, science material for class VIII. Data in the form of theory and or research results are then analyzed to obtain solutions to the formulated problems/objectives. The results were analyzed and presented descriptively qualitatively.

3. Results and Discussion

3.1 *The way to integrate Balinese local wisdom based on 4C in 8th grade science subjects*

The E-learning designed in this study integrates local wisdom in the form of content, context, and syntax (Indrawan, I P.O., Suwardika, G., Jaya, A.A.N.A & Wijaya, I K.W.B., 2020). Local wisdom content will be adjusted to the type of material to be discussed. In this study, the material discussed was science material for class VIII. The context of local wisdom developed is a way of gaining knowledge, learning motivation, learning environment, and character development. Based on the results of interviews and discussions with the science teacher for Class VII, the syntax used in this lesson is *Tri Kaya Parisudha*, which is explained as follows. First, the *manacika* stage (thinking well and correctly), students are given an understanding of literacy, critical thinking, and how to use it in learning science. At the *manacika* stage, students are faced with actual issues related to the material and think critically about alternative solutions that can be used. Second, the *kayika* stage (doing good and right), at this stage students are given practice, practicum, or projects that aim to develop creativity, and students are given space to innovate. Third, the *wacika* stage (speaking well and correctly), students are given the opportunity to present and discuss online, and are given a chat-based discussion forum that discusses an actual, open, and critical problem. At this stage, students were previously given the rules and regulations for presentation and discussion. This second stage is expected to be able to develop students' communication skills. E-learning is packaged in the form of cooperative learning, where in the learning process students are divided into several small groups that aim to increase the ability to work collaboratively. In these three learning stages, Balinese Local Wisdom will also be inserted in the form of content and context that is in accordance with the material discussed. So that the development of e-learning integrated with Balinese Local

Wisdom based on 4C in junior high school science subjects is expected to be able to encourage students to understand science learning materials, connect materials with local wisdom, be sensitive to science issues, use their knowledge creatively for sustainable learning, and be able to innovate. to produce an innovation.

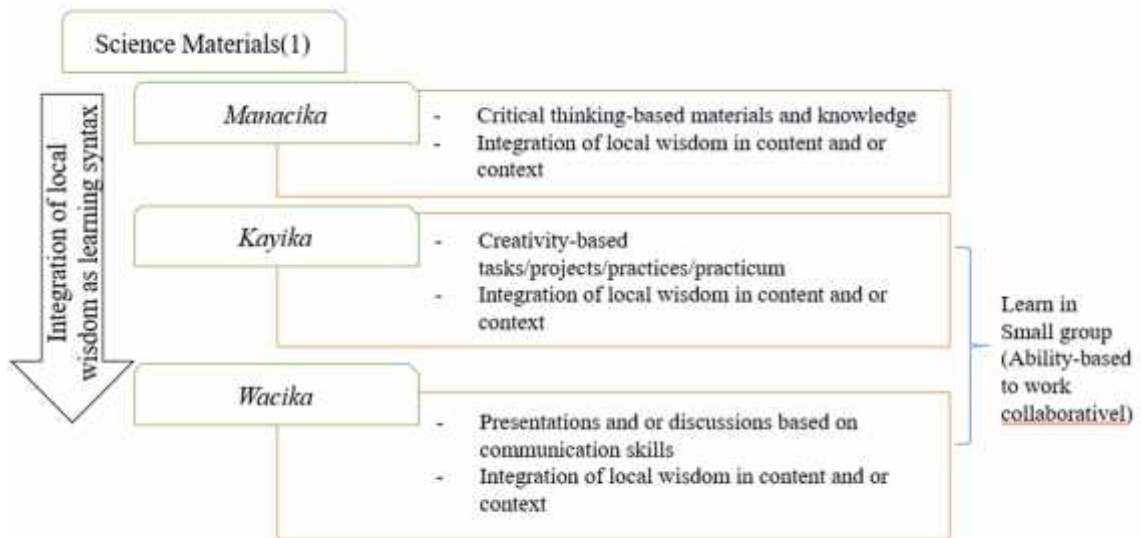


Fig 1. The Design of E-Learning Integrated with Balinese Local Wisdom Based on 4C

3.1 Curriculum analysis to classify the material of science subjects for grade 8 junior high schools that can be used for the development of e-learning integrated with Balinese local wisdom based on 4C

Based on the results of the material analysis in the grade 8 junior high school curriculum, there are six materials in the even semester and five materials in the odd semester. The results of the curriculum analysis for classifying materials are shown in Table 1.

Table 1. Classification of grade 8 junior high school materials that can be used for the development of integrated e-learning Balinese local wisdom based on 4c

No.	Science Learning Materials	Balinese Local Wisdom Integrated							Category
		Syn.	Cn.	Cs.	Cr.	Cm.	Co.	Ce.	
1.	Motion of Objects and Living things in The Environment	✓	✓	✓	✓	✓	✓	✓	Can be used
2.	Work and Simple Machine in Daily Life	✓		✓	✓	✓	✓	✓	Can be used

3.	The Structure and Functions of Plants	✓	✓	✓	✓	✓	✓	✓	Can used	be
4.	Human Digestive System	✓	✓	✓	✓	✓	✓	✓	Can used	be
5.	Additive and Addictives Substances	✓		✓	✓	✓	✓	✓	Can used	be
6.	Human Circulatory System	✓		✓	✓	✓	✓	✓	Can used	be
7.	Pressure and Its Application in Daily Life	✓		✓	✓	✓	✓	✓	Can used	be
8.	Human Respiratory System	✓	✓	✓	✓	✓	✓	✓	Can used	be
9.	Human Excretion System	✓	✓	✓	✓	✓	✓	✓	Can used	be
10.	Vibrations, Waves, and Sounds in Everyday Life	✓		✓	✓	✓	✓	✓	Can used	be
11.	Light and Optic	✓		✓	✓	✓	✓	✓	Can used	be

Note:

Syn. = integrasi Kearifan Lokal Bali berupa sintaks

Cn. = integrasi Kearifan Lokal Bali berupa konten/materi

Cs. = integrasi Kearifan Lokal Bali berupa konteks

Cr. = critical thinking (ability to think critically)

Cm. = communication skills (ability to communicate)

Co. = ability to work collaboratively

Ce. = creativity

This study uses the *Tri Kava Parisudha* syntax which consists of *manacika*, *kavika*, and *wacika*. In the *manacika* activities students are given concepts and invited to think critically regarding real problems that exist in their environment related to the material being studied. In this step, students are invited to conduct experiments or practicums related to the material being studied, and of course emphasize the development of students' creativity. The *kavika* process is expected to be able to produce a product/outcome which can be presented and discussed at the *wacika* stage in synchronous online learning or in discussion forums provided through certain media. Learning and inovation skill will be developed on the students through those three stages. Critical thinking developed on the *manacika* stage. Critical thinking skills are developed by providing real problems related to the material being studied, then students are given time to find alternative solutions before being discussed in the *wacika* stage. Creativity is developed in e-learning through the *kavika* process. Students carry out practicals/practicums directed at developing creativity so as to produce interesting and innovative products to support the learning process. Communication skills are developed through the presentation discussion process by leading to effective, polite, and reasonable communication. Ability to work collaboratively is developed in the *kavika* and *wacika* processes which are packaged in the form of cooperative learning. Students in the *kavika* and *wacika* steps are divided into small groups consisting of 4-5 people collaborating in practice/practicum and presentation of the results.

The integration of Balinese local wisdom in the form of content, for example in the material: (1) Motion of objects and living things in the environment by connecting the *tri prama* and the meaning of *karma* as motion; (2) Work and simple machines in daily life are integrated with the creative concept of the *tri datu* model: red is a symbol of how to create, black is a symbol of how to maintain, and white is a symbol of change (how to change) (Sutajaya, 2020). Simple machines are part of the results of human creativity to simplify their work; (3) The structure and functions of plants are related to the content of *taru pramana* and plants for rituals in Bali; (4) Human digestive system and additives and addictive Substances associated with Balinese child song *Buyung* and *Merta Dahar*, it's content related to digestive system diseases and also healthy and natural food sources (Parmini, 2020). In addition, it can be related to the concepts of *Sauca* (holy and spiritual) and *Aharalagawa* (healthy eating in moderation); (5) The human circulatory system is associated with *akrodha* (not angry) and *Aharalagawa* (healthy food to avoid circulatory diseases); (6) The human respiratory system can be linked to *pranayama*, namely the regulation of breath for physical and spiritual health; and (6) Vibration, waves, and sounds in daily life are related to the content of the gamelan sounds types at the *panca yadnya* ceremony, because the types of sound waves create different atmospheres and feelings.

Integration of local wisdom as a learning motivation context "*Joh pejalane, liu ne tepukin*" which means the further the journey the more things are found, the meaning of this local wisdom is the practice of giving more knowledge or more learning the more knowledge gained; "*puntul-puntulan tiyuke yen sangih pedas dadi mangan*" which means a dull knife if sharpened will become sharp, as stupid as a person if he/she learns he/she will be smarter (Parwati, 2015). Some of the Balinese children stories also has moral messages and motivational values that can be used as an alternative context for learning motivation in e-learning, for example the story of *I jalak nantang I kebo nginem yeh pasih*, which means knowledge can be a solution to the problems of life that we have (Indrawan, I P. O., Suwardika, G., Jaya, A.A.N.A & Wijaya, I K.W.B., 2020). Furthermore, *de gancangan tindak kuangan daya* this message can be used in the context of thoroughness and prudence in acting, conducting practicum or concluding the results of discussions in the learning process (Parwati, 2015).

The integration of local wisdom in the form of context can be viewed from: (1) *Tri Kaya Parisudha* namely think, speak, and act well in daily life; (2) Do not do bullying that causes psychological injury to others by applying *twam asi*. Behave well, respect and respect others as we respect and value ourselves; (3) Provide a good example so that it becomes an example for many people by publishing activities that implement "*Sagilik-Saguluk Salunglung Sabayantaka, Paras-Paros Sarpanaya, Saling Asah, Asih, Asuh*" which means unite, respect the opinions of others, and remind each other, love each other, help each other; (4) Development prioritizes of *swadharma* (personal obligations) and state *dharma*, such as love for the homeland, tax awareness, and etc (Indrawan, I P. O., Saskara, G.A.J. & Wijaya, I K. M. W. B., 2019).

Regarding the context of collaboration, there are several local wisdoms that can be used, for example: (1) *Caruk gong, muah aud kelor* which means in group work all must participate; (2) *De liunan krebek kuangan ujan* which means talk less do more; (3) *Gede kayu, gede papanne* which means People who work more are sure to earn more. Regarding the context of communication skills, for example *paksi bina paksa* which means different people have different thoughts, so there needs to be tolerance and open

thinking. Integration in the context of learning can be very much embedded, especially in the cultivation of national character, collaboration, and communication in the learning process.

Based on the results of the material analysis, it was found that all materials can be used for the development of e-learning integrated with Balinese local wisdom based on 4C. Although there are difficulties in finding similar content on some materials. However, this can be covered by integrating Balinese local wisdom in the context of the material.

3.2 Implementation of an integrated e-learning design of Balinese local wisdom based on 4C in the 8th grade junior high school science subject in Google Classroom.

The design of e-learning integrated with Balinese local wisdom based on 4C in the 8th grade junior high school science subject at Google Classroom in this study is exemplified in one of the materials, namely "Human Excretion System". Stage 1. Implementation of the design on Google Classroom begins with making topics according to the material being studied. After that, make the material according to the syntax of *Tri Kaya Parisudha* (Fig 2).



Fig 2. Stage1

Stage 2. Each learning step includes content and context related to the material being studied, and includes the development of 4C skills according to plan (Fig 3; Fig 4; and Fig 5).

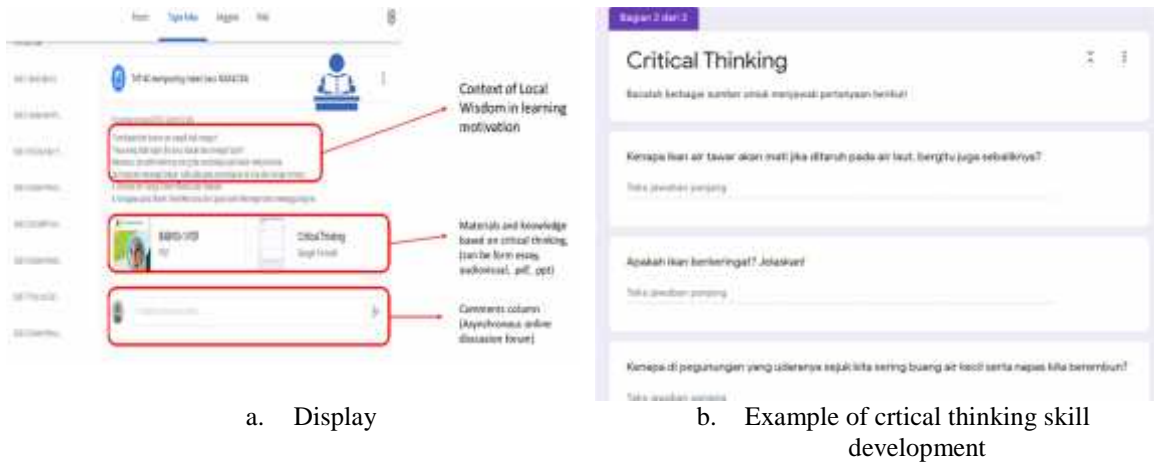


Fig. 3. Stage 2 on the *Manacika* stage

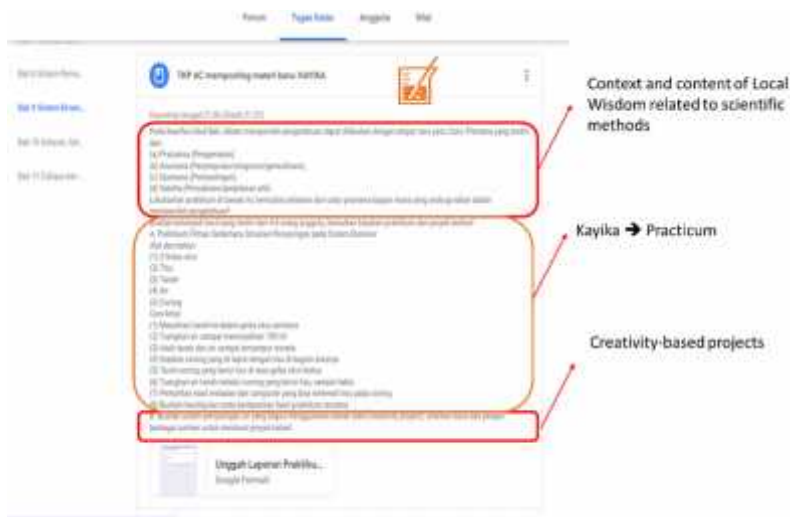


Fig. 4. Stage 2 on the *Kayika* stage



Fig. 5. Stage 2 on the *Wacika* stage

Based on this design, it shows that e-learning integrated with Balinese local wisdom based on 4C in the science subjects of grade 8 junior high school can be applied to Google Classroom. It is not too difficult to implement an integrated e-learning of Balinese local wisdom based on 4C in the Science Subjects of grade 8 junior high school, it can be applied to Google Classroom, if the teacher is stimulated, it will be easy to follow this design pattern.

4. Conclusion

Based on the results and discussion it can be concluded that: (1) the way to integrate Balinese local wisdom in e-learning is to make syntax, content, and/or learning context, while 4C can be implemented in materials, practicum, discussion presentations, and work in small groups; (2) all materials of science subjects for Grade 8 junior high school can be used for the development of e-learning integrated with Balinese local wisdom based on 4C; (3) the implementation of an integrated e-learning design of Balinese local wisdom based on 4C in the science subjects of grade 8 junior high school can be applied to Google Classroom.

The final result of this study shows that the integrated e-learning design of Balinese local wisdom based on 4C in the science subjects of grade 8 junior high school can be applied to Google Classroom. However, it is necessary to do: (1) development on a larger scale of Grade 8 science material, for example material for one semester; (2) expert opinion regarding design, language, and material density; (3) small trials and field trials; (4) evaluation and revision related to the improvement of the design and implementation of 4C-Based Balinese Local Wisdom Integration in E-Learning Science Subject grade 8 at SMPN 1 Singaraja; (5) measurement of the effect of development towards the learning achievement and 4C skills.

References

- Anwari, A., Nahdi, M. S., & Sulistyowati, E., 2016. Biological science learning model based on Turgo's local wisdom on managing biodiversity. s.l., s.n.
- Carrington, V., 2005. New textual landscapes, information and early literacy. In: Popular Culture, New Media and Digital Literacy in Early Childhood. London and New York: RoutledgeFalmer, pp. 10-20.
- Indrawan, I P. O., Pramana, M. I., & Gunawan, K. D. H., 2019. Developing Tri Kaya Parishuda Based Blended Learning Media Using Adobe Captive for Probstat Courses. Journal of Educational Research and Evaluation, 3(3), pp. 157-171.
- Indrawan, I P. O., Saskara, G.A.J. & Wijaya, I K. M. W. B., 2019. Kreativitas dan Motivasi Belajar Mahasiswa dalam Implementasi Blended Learning Berbasis Bali. . International Journal of Natural Sciences and Engineering, 3(2), pp. 70-78.
- Indrawan, I P.O. & J. Mahendra, 2020. Pengembangan E-Learning Terintegrasi Kearifan Lokal Bali Berbasis 4C pada Mata Pelajaran IPA di SMPN 1 Singaraja. Proposal Penelitian 2020 (PDP).
- Indrawan, I P.O., Saskara, G.A.J. & I K. W. B. Wijaya, 2019. Kreativitas dan Motivasi Belajar Mahasiswa dalam Implementasi Blended Learning Berbasis Bali. International Journal of Natural Sciences and Engineering, 3(2), pp. 70-78.
- Indrawan, I P.O., Suwardika, G., Jaya, A.A.N.A & Wijaya, I K.W.B., 2020. Integrasi Pembelajaran IPA dalam Pembelajaran Berbasis Teknologi. Singaraja, UNDIKSHA PRESS, pp. 61-65.
- Kemendikbud, 2017. Pendidikan Karakter Dorong Tumbuhnya Kompetensi Siswa Abad 21. [Online]
Available at: [https://www.kemdikbud.go.id/main/blog/2017/06/pendidikan-karakter-dorongtumbuhnya-kompetensi-siswa-abad-21#:~:text=Hal%20itu%20sesuai%20dengan%20empat,Work%20Collaboratively%20\(kemampuan%20untuk%20bekerja.](https://www.kemdikbud.go.id/main/blog/2017/06/pendidikan-karakter-dorongtumbuhnya-kompetensi-siswa-abad-21#:~:text=Hal%20itu%20sesuai%20dengan%20empat,Work%20Collaboratively%20(kemampuan%20untuk%20bekerja.)
[Accessed 15 10 2020].
- Kemendikbud, 2020. bersamahadapikورونا.kemdikbud.go.id. [Online]
Available at: <https://bersamahadapikورونا.kemdikbud.go.id/wp-content/uploads/2020/05/SE-Sesjen-Nomor-15-Tahun-2020-2.pdf>
- Oktavia, R. A. U. U. & Y. Y., 2018. Development of physics learning material based on problem based learning by integrating local wisdom West Sumatra to improve critical thinking ability of students. International Journal of Progressive Sciences and Technologies (IJPSAT), 553(2), pp. 544-553.
- Pamungkas, A., Subali, B., & Lunuwih, S., 2017. Implementasi Model Pembelajaran IPA Berbasis Kearifan Lokal untuk Meningkatkan Kreativitas dan Hasil Belajar Siswa. Jurnal Inovasi Pendidikan IPA, pp. 118-127.
- Parmini, N., 2020. The Integration Of Traditional Balinese Children's Song Lyrics In Indonesian Learning To Instill Moral Education Of Elementary School Students In Ubud. International Journal of Elementary Education, 4(4), pp. 537-548.
- Parwati, N., 2015. Pengembangan Model Pembelajaran Pemecahan Masalah Berorientasi Kearifan Masalah Pada Siswa SMP di Kota Singaraja. Jurnal Pendidikan Indonesia, 4(2), pp. 612-624.
- Suastra, I W., B. Jatmiko, N.R. Ristiati & L.P.B Yasmini, 2017. Developing Characters Based On Local Wisdom Bali in Teaching Physics in Senior High School. Jurnal Pendidikan IPA Indonesia, 6(2), pp. 306-312.

- Sutajaya, I. M., 2020. Mendidik Masyarakat Melalui Konsep Tri Datu Untuk Memertahankan Sikap Kewirausahaan Saat Pandemi Covid-19. Singaraja, UNDIKSHA PRESS, pp. 78-84.
- Yoda, I. K., 2017. The development of cooperative learning model based on local wisdom of Bali for physical education, sport and health subject in junior high school. s.l., s.n.
- Zed, M., 2008. Metode penelitian kepustakaan. Jakarta: Yayasan Obor.
- Zubaidah, S., 2018. Mengenal 4C: Learning and Inovation Skill untuk Menghadapi Era Revolusi Industri 4.0. Madura, Universitas Trunojoyo.