



## Online Learning Interaction Patterns During the Covid-19 Pandemic: Prospective teachers' Perceptions

<sup>1\*</sup>Ismail, <sup>2</sup>Agus Muliadi, <sup>3</sup>Ni Nyoman Sri Putu Verawati

<sup>1</sup>Universitas Islam Negeri Mataram, Jl Gajah Mada No. 100 Mataram, Mataram 83116, Indonesia

<sup>2</sup>Universitas Pendidikan Mandalika, Jl Pemuda No. 59A Mataram, Mataram 83126, Indonesia

<sup>3</sup>Universitas Mataram, Jl majapahit No. 62 Mataram, Mataram 83125, Indonesia

\*Corresponding Author e-mail: [ismail\\_thoib@uinmataram.ac.id](mailto:ismail_thoib@uinmataram.ac.id)

Received: March 2022; Revised: March 2022; Published: April 2022

### Abstract

The intensity of the implementation of learning with the online system during the Covid-19 pandemic certainly has an impact on the learning process and the results that have been achieved. In the process of implementing it in a sustainable manner, it is necessary to evaluate, especially in the aspect of student perceptions as beneficiaries of the implementation of the online learning system during the Covid-19 pandemic. Specifically, this study aims to determine the perceptions of prospective teacher students about online learning interaction patterns during the Covid-19 pandemic. This study is an exploratory descriptive study involving 107 respondents, they are prospective-teachers at one of the private universities in Mataram City, Indonesia. The online questionnaires were filled out by considering accessibility, therefore the convenience sampling technique was used. Perceptions of prospective teacher were measured using a closed questionnaire instrument. Each prospective teacher responses are degraded based on a Likert scale. The questionnaire instrument is composed of 10 items of questions or statements, it contains aspects of online learning interactivity. Prior to application, the psychometric properties of the instrument must be met. The psychometric properties used are aspects of instrument validity. Before being applied, the questionnaire instrument was validated by experts, and the results of the instrument have been declared valid. Data analysis was carried out statistically. The differences in perception by employing the ANOVA test ( $p < 0.05$ ). The findings of the study indicate that the perception of prospective teachers is 'sufficient' regarding online learning interactions during the Covid-19 pandemic. Aspects of the online learning experience for prospective teachers in each department showed that there was no significant difference in the perception of prospective teachers about online learning interactions during the covid-19 pandemic (significance of  $0.213 > p, 0.05$ ). The findings in this study can be the basis for improving the online learning process by universities, where this can be optimized so that in the future online learning services can be even better. As it is known that the online system is the only choice of the best learning mode during the Covid-19 pandemic. In addition, we see the online system as a learning trend that does not last a short time, but becomes a new direction of learning now and in the future.

**Keywords:** online learning interaction; Covid-19 pandemic; prospective teachers perception

**How to Cite:** Ismail, I., Muliadi, A., & Verawati, N. (2022). Online Learning Interaction Patterns During the Covid-19 Pandemic: Prospective teachers' Perceptions. *Prisma Sains : Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 10(2), 373-381. doi:<https://doi.org/10.33394/j-ps.v10i2.5106>



<https://doi.org/10.33394/j-ps.v10i2.5106>

Copyright© 2022, Ismail et al.

This is an open-access article under the [CC-BY](https://creativecommons.org/licenses/by/4.0/) License.



## INTRODUCTION

Covid-19 has been appointed as a global pandemic crisis by the World Health Organization. Covid-19 is still hitting today and has been able to change the social life of the world community in various aspects (Subakti & Pamungkas, 2021). The shift in patterns of social interaction due to the COVID-19 pandemic has led to new arrangements such as the new-normal policy to limit social community activities and online learning to provide education in Indonesia. This policy is the best solution at this time to avoid crowds of people

or social distancing (Sadikin & Hamidah, 2020; Gultom & Sitanggang, 2020), as a preventive measure to suppress the spread of Covid-19 (Kusumaningrum & Wijayanto, 2020). Argument of Muliadi et al. (2021) states that the application of online system in learning is the right policy to ensure basic rights services for every citizen, such as the education sector, so that they are carried out properly even during the Covid-19 pandemic.

In Indonesia, the application of online education has been implemented since the beginning of the COVID-19 pandemic, and is still ongoing. The online learning system is a new way of learning for most education units in Indonesia (Iswari, 2021), considering that so far learning is generally held with a face-to-face meeting system (Anhusadar, 2020; Pratiwi, 2020; Firman & Rahayu, 2020). The determination of this system renewal policy is very rational considering that learning is a major component in education that must be ensured to run well (Maulah et al., 2020). Online learning in Indonesia, in general, has been able to be held quite well during the covid-19 pandemic, and some aspects of the shortcomings in its applications have become aspects of evaluation and improvement (Muliadi et al., 2021). This is confirmed by the research results of Muliadi and colleagues (2021) that improvements in the online learning system include aspects of collaboration and communication. A similar argument is confirmed by Surbakti & Pamungkas (2021) where there is limited collaboration and communication between students and lecturers in online learning.

Learning the online system during the current covid-19 pandemic, utilizes information technology media as an instrument of interaction and communication between students and lecturers (Anugrahana, 2020). Because it is only mediated by a digital platform, the patterns of communication and interaction in online learning are certainly different, Putri & Irwansyah (2021) suggest that there is a distance between students and lecturers in each learning mode. In the perspective of psychological communication, the dominance of communication through online systems (audio, video, text, and others) emotionally affects the distance formed in learning between students and lecturers, and this has an impact on expected learning outcomes during the process of online learning. Due to face-to-face learning habits, the presence of a lecturer figure as a role model in front of the class becomes important during learning interaction activities (Ferbriyanto et al., 2020). Toharudin (2020) states that the quality of learning is influenced by the quality of interaction (collaboration and communication) between students and lecturers in each mode of learning that is conducted.

It is undeniable that learners as the millennial generation are currently very close to digital technology, and there should be no obstacles in implementing online learning by utilizing digital platforms. The current generation is a digital technology generation, digital technology are growing rapidly to accompany the formation of the character and knowledge of learners (Buckingham, 2016). The term digital native generation is even pinned on the current generation, where the adoption of digital advances and technological systems accompanies the presence of this generation (Prensky, 2009). However, the online learning system cannot automatically be implemented properly for students who are identified with the digital generation. Lecturers and students are hoped to build good relationships in learning interaction patterns through effective collaboration and communication so that learning objectives and competencies through online systems can be achieved.

Optimizing interactivity between learning actors (lecturers and students) as a guarantee that online learning can be carried out properly (Surbakti & Pamungkas, 2021). Understanding the goals and messages in learning is one indication that the interactivity aspect can be implemented well, and this range can be extended to understanding the learning material, and can even generate learning motivation which has an impact on the performance of more optimal learning outcomes (Soedarsono et al., 2019).

The essential factors that establish the quality of online learning is the interactivity between learning actors, both lecturers and students, and between the two (Toharudin, 2020). The transformation of educational messages in the online learning system can build the communication patterns and learning interactions that can run as effectively as possible. This

is emphasized by Anugrahana (2020) that online learning is required to be able to realize effective learning interaction and communication patterns with digital platform mediation. This condition 'forces' lecturers to develop creativity so that they can build "real" learning interaction patterns for students through online learning (Toharudin, 2020), considering that students are still concerned with the direct presence of lecturer figures (Febrianto et al., 2020). Surbakti & Pamungkas (2021) explained that in order to organize online learning, interactive information design is needed and the use of audio-visual media and learning resources, even though it lacks contextuality (Putri & Irwansyah, 2021).

For example, one of the universities in the city of Mataram is the Mandalika Education University, where online learning is strived to continue and evaluation is carried out. The evaluation results are used as material for improvement every semester to ensure online learning can still run effectively. Utilization of applications and a number of digital platforms is pursued synchronously or asynchronously to support learning during the Covid-19 pandemic. Our claim is that at the beginning of the Covid-19 crisis, online learning system was not familiar at the university level. This is a challenge so that universities and the educator sector can immediately build digital learning infrastructure and adapt to it, in its application this certainly requires optimal efforts from each policy holder at the university and good adaptability. In a more specific context, adaptive, professional, creative and skilled educators are needed in utilizing digital technology, especially online learning modes (Pangondian et al., 2019; Maulah et al., 2020).

The use of online learning in the most specific daily tasks of lecturers is expected not only to deliver material, but it is expected that the use of online learning is process-oriented, interaction quality, and the achievement of learning competencies (Syaifuddin, 2020; Kusumaningrum & Wijayanto, 2020). In a broader perspective, each applied learning mode must involve the aspects of didactic, psychological, and pedagogical (Mulyasa, 2013). Therefore, online learning that is carried out is prepared and carried out through the stages of planning, implementation, and assessment such as in face-to-face meetings.

Evaluation of the effectiveness of online learning interaction patterns at universities needs to be carried out, as one of the steps in the control process so that online learning is right on target, especially in the aspect of the quality of its implementation so that the expected learning objectives can also be achieved. Evaluation can be carried out on several aspects, and the main thing is from the quality of the interactivity that is built in online learning, and of course the mastery of learning materials by students in a predetermined learning mode (Rohmawati, 2015). Assessment of the performance of online learning outcomes is very important, and the most important thing is the assessment of the pattern of interaction or interactivity of ongoing learning, as well as the supporting infrastructure (Nugroho, 2012). The effectiveness of its implementation is certainly through an evaluation, starting from the grassroots, namely students as the main stakeholders and recipients of the impact of the online learning process. Therefore, the response or perception of students to online learning is a very important indicator to determine the pattern of learning interactions (Nugroho, 2012). The process of interpreting the stimulus received by students is identified as perception, this is by utilizing the five senses which are then processed into an understanding within each student (Zhafira et al., 2020).

Specifically, this study aims to determine the perceptions of prospective-teacher students about online learning interaction patterns during the Covid-19 pandemic.

## **METHOD**

This study is an exploratory descriptive study adapted from a previous study (Muliadi et al., 2021). The study involved 107 respondents, they were student teacher candidates at the Mandalika University of Education, which is one of the private universities in Indonesia. During the covid-19 pandemic, filling out the online questionnaires by considering accessibility, therefore the convenience sampling technique was used (Fink, 2011). The

distribution of respondents is math prospective teachers (MPT) (n = 28), biology prospective teachers (BPT) (n = 62), chemistry prospective teachers (CPT) (n = 18), and physics prospective teachers (PPT) (n = 23).

Student perceptions of online learning interaction patterns were measured using a closed questionnaire instrument (closed questionnaire). Each student teacher response is degraded based on a Likert scale. The questionnaire instrument is composed of 10 items of questions or statements, it contains aspects of online learning interactivity. Prior to application, the psychometric properties of the instrument must be met. The psychometric properties used are aspects of instrument validity. Before being applied, the questionnaire instrument was validated by experts, and the results of the instrument have been declared valid.

The data analysis of prospective-teacher perception about online learning interaction patterns during the Covid-19 pandemic was carried out statistically (descriptive and inferential). The average perception ( $\bar{p}$ ) was converted in four categories, the highest perception was 'very good' with a score range of 3.51 to 4.00, 'good' in the score range 2.51 to 3.50, 'sufficient' in the score range 1.51 to 2.50, and the lowest the lowest is 'poor' with a score range of 1.00 to 1.50 (Muliadi et al., 2021).

Differences in respondents' perceptions of each department were analyzed by inferential statistics, using the ANOVA test ( $p < 0.05$ ). There are two statistical hypothesis formulations, the first is  $H_0: \mu_1 = \mu_2$ , on the basis of the statement 'there is no significant difference in the perceptions of prospective-teacher students between departments', and the second is  $H_1: \mu_1 \neq \mu_2$ , on the basis of the statement 'there is a difference which is significant on the perception of prospective-teacher students between departments.' The statistical test put forward the prerequisite test, homogeneity test (Levene's test) and normality (Kolmogorov-Smirnov's test) at  $p > 0.05$ , respectively. data analysis using IBM SPSS Statistics 25.0 program.

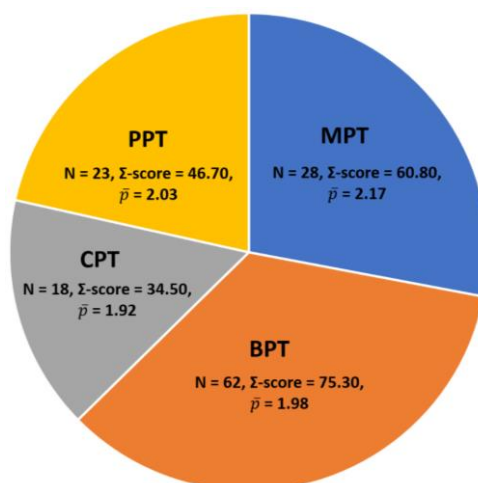
## RESULTS AND DISCUSSION

A study has been conducted on the perceptions of prospective-teacher students on online learning interaction patterns during the Covid-19 pandemic, and the findings are summarized in Table 1. Referring to the perceptions of respondents for each department, then the total score and average score are interpreted into categories.

**Table 1.** Perceptions of prospective-teacher students about online learning interaction patterns

Prospective-teachers	n	$\Sigma$ -score	$\bar{p}$	Category
MPT	28	60.80	2.17	'sufficient'
BPT	62	75.30	1.98	'sufficient'
CPT	18	34.50	1.92	'sufficient'
PPT	23	46.70	2.03	'sufficient'
	107	217.30	2.03	'sufficient'

The findings in Table 1 show that the perception of prospective-teacher students about learning interaction patterns in online learning during the covid-19 pandemic is on average in the 'sufficient' criteria ( $p = 2.03$ ). Although each department has a different score, they are still in the 'sufficient' range (score range, 1.51 to 2.50). The distribution of prospective-teachers' perceptions is shown in Figure 1.



**Figure 1.** Distribution of prospective-teachers' perceptions.

Differences in prospective-teachers' perceptions of online learning interaction patterns were analyzed using inferential statistics, provided that the data variance was homogeneous and normally distributed. At the stage of testing homogeneity with Levene's test and normality with Kolmogorov-Smirnov's test, the results were found to be 0.627 and 0.360, respectively ( $p > 0.05$ ), this indicates the data variance is homogeneous and normally distributed. Data on differences in perceptions of prospective-teachers for each department (MPT, BPT, CPT, and PPT) were analyzed using ANOVA, as presented in Table 2.

**Table 2.** The results of ANOVA test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	88.028	3	29.343	1.523	0.213
Within Groups	1984.794	103	19.270		
Total	2072.822	106			

Based on the results of the ANOVA test in Table 2, it shows that the significance value is 0.213 ( $> p, 0.05$ ). If it is aligned with hypothesis testing, this means that there is no significant difference in prospective-teachers' perceptions of online learning interaction patterns during the Covid-19 pandemic. Confirmation of the hypothesis proposed in this study that  $H_0$  is accepted and  $H_1$  is rejected.

Referring to the results of this study, although accumulatively the perception of prospective teacher students shows the 'sufficient' criteria, there are still negative perceptions or responses to online learning interactions, especially related to the ineffectiveness of online learning in building interactions. This condition can be caused by the factors, such as the preparedness of the students, lecturers, learning environment, and supporting facilitation in supporting the effectiveness of online learning (Muliadi, et al., 2021). Optimal preparation is needed in online learning, such as the readiness of students and lecturers to use digital platforms, interactive information design, use of appropriate media and learning resources, and support from the learning environment and adequate infrastructure (Surbakti & Pamungkas, 2021; Putri & Irwansyah, 2021). Good preparation can realize interactive online learning such as effective communication and collaboration. This is supported by the argue of Muliadi et al. (2021) that online learning interactivity requires optimal support from all parties such as supporting facilities, lecturers, family environment, and the others. The involvement and synergy of all parties will be able to create an online learning environment that is integrative and fulfills the crucial components such as discursive, adaptive, and the others (Daheri, et al, 2020; Oktavian & Aldya, 2020; Ulfah & Suryantoro, 2020).

The negative response to collaboration and communication between learning actors (students and lecturers) proves that online learning interactions during the Covid-19 pandemic using digital platforms are recognized as different, because students feel there is a 'distance' between lecturers and students (Putri & Irwansyah, 2021; Anugrahana, 2020). This is in accordance with the findings of study by Muliadi et al. (2021) which asserts that online learning interactions tend to be authorized by communication through audio, video, or text, so that it is emotionally felt that there is a distance formed between students and lecturers. This finding is reinforced by the opinion of Ferbriyanto et al (2020) that most learners cannot ignore the importance of the presence of a lecturer figure in front of the class as a role model in learning interaction, communication, and collaboration activities.

Online learning by utilizing digital-system platforms still tends to only transform information and has not created a good relationship between lecturers and students. The low relational and learning interaction, as evidenced by the student responses about miscommunication between lecturers and students as well as between students that often occurs during the online learning process. This means that communication between lecturers and students has not been effective during online learning. Surbakti & Pamungkas (2021) emphasized that the realization of optimal learning interaction is good if there is optimal and effective collaboration and communication. Learning communication is interpreted well when learners can understand the aims and objectives as well as learning messages. Understanding the goals and messages in learning is one indication that the interactivity aspect can be implemented well, and this range can be extended to understanding the learning material, and can even generate learning motivation which has an impact on the performance of more optimal learning outcomes (Soedarsono et al., 2019).

The findings of this study prove that online learning interactions are less effective because the use of applications used by lecturers tends to be less effective, such as asynchronous media. Student responses show that some lecturers still use WhatsApp to organize online learning. WhatsApp does not allow for synchronous interaction with participants in one class, so that 'forces' lecturers to only explain asynchronously. In the end, lecturers tend to only give independent assignments to students, so communication and collaboration are limited. This is confirmed by Batubara & Batubara (2020) that detailed explanations from lecturers through live videos or video tutorials can provide a better understanding than only being given independent assignments (Muliadi et al., 2021). Effective online learning requires optimum interaction, communication, and collaboration between lecturers and students. This is supported by research by Daheri, et al (2020) that 85% of respondents expect lecturers to provide adequate explanations and elaborations for the assigned tasks.

Learning interactions that accommodate aspects of collaboration and communication between learning actors (lecturers and students) are important aspects that determine the quality of online learning (Toharudin, 2020). Online learning as a process of transforming learning messages must build an effective learning interaction and communication pattern between students and lecturers. This is emphasized by Anugrahana (2020) that online learning is required to be able to realize effective communication and learning interactions with digital platform mediation. This condition 'forces' lecturers to develop creativity so that they can build real learning interaction patterns for students through online learning (Toharudin, 2020), considering that students are still concerned with the direct presence of lecturer figures (Febriyanto et al., 2020). Surbakti & Pamungkas (2021) explained that in order to organize online learning, interactive information design is needed and the use of audio-visual media and learning resources, even though it lacks contextuality (Putri & Irwansyah, 2021). The collaboration and communication are integrated processes in learning interactivity and interactions, and are essential factors that decide the effectiveness of online learning. Therefore, it is necessary to have good communication and collaboration between lecturers

and students as well as between students to be able to realize effective online learning interactions through digital platforms so that learning objectives are achieved.

## CONCLUSION

The research findings exhibit the perception of prospective-teacher students is 'sufficient' regarding online learning interactions during the Covid-19 pandemic. Accumulatively, the perception score of prospective-teacher students is 2.03 (sufficient, if the score ranges from 1.51 to 2.50). Aspects of the online learning experience for prospective-teacher students in four departments showed that there was no significant difference in the perception of prospective-teacher students about online learning interactions during the covid-19 pandemic (significance  $0.213 > p, 0.05$ ).

## RECOMMENDATION

The findings in this study can be the basis for improving the online learning process by universities, where this can be optimized so that in the future online learning services can be even better. As it is known that the online system is the only choice of the best learning mode during the Covid-19 pandemic. In addition, we see the online system as a learning trend that does not last a short time, but becomes a new direction of learning now and in the future.

## ACKNOWLEDGMENT

This study was successfully completed and we would like to thank the students who were the research respondents, as well as those who have provided support in carrying out the research.

## REFERENCES

- Anhusadar, L. O. (2020). Persepsi Mahasisw PIAUD terhadap Kuliah Online di Masa Pandemi Covid-19. *KINDERGARTEN: Journal of Islamic Early Childhood Education*, 3(1), 44–58.
- Anugrahana, A. (2020). Hambatan, Solusi dan Harapan: Pembelajaran Daring Selama Masa Pandemi Covid-19 Oleh Guru Sekolah Dasar. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 10 (3). <https://doi.org/10.24246/j.js.2020.v10.i3.p282-289>
- Buckingham, D. (2016). Making Sense of the ‘ Digital Generation ’: Growing Up with Digital Media. *Self & Society: An International Journal for Humanistic Psychology*, 40 (3), 7-15. <https://doi.org/10.1080/03060497.2013.11084274>
- Daheri, M., Juliana, Deriwanto & Amda, A.D. (2020). Efektivitas WhatsApp sebagai Media Belajar Daring. *Jurnal Basicedu*, 4 (4), 775-783. <https://doi.org/10.31004/basicedu.v4i4.445>
- Febrianto, P. T., Mas’udah, S., & Megasari, L. A. (2020). Implementation of online learning during the covid-19 pandemic on Madura Island, Indonesia. *International Journal of Learning, Teaching and Educational Research*, 19 (8). <https://doi.org/10.26803/ijlter.19.8.13>
- Firman, F., & Rahayu, S. (2020). Pembelajaran Online di Tengah Pandemi Covid-19. *Indonesian Journal of Educational Science (IJES)*, 2 (2), 81-89. <https://doi.org/10.31605/ijes.v2i2.659>
- Fink, A. (2011). *How to sample in surveys. In how to sample in surveys (2nd edition)*. Thousand Oaks, CA: SAGE Publication.
- Gultom, C.R. & Sitanggang, S.G.M. (2020). Persepsi Mahasiswa Unika terhadap Kuliah Online di Masa Pandemi Covid 19. *Jurnal Pendidikan Bahasa Indonesia dan Sastra (PEDISTRA)*, 3 (1), 6-15. <http://dx.doi.org/10.1234/pbis.v3i1.771>
- Iswari, F. (2021). Komunikasi Efektif dalam Pembelajaran Daring pada Masa Pandemi Covid-19. *GANDIWA: Gagasan, Media dan Wacana*, 1 (1), 35-43.
- Kusumaningrum, B. & Wijayanto, Z. (2020). Apakah Pembelajaran Matematika Secara

- Daring Efektif? (Studi Kasus pada Pembelajaran Selama Masa Pandemi Covid-19), *Kreano: Jurnal Matematika Kreatif-Inovatif*, 11 (2), 136-142. <http://dx.doi.org/10.15294/kreano.v11i2.25029>
- Maulah, S., Nurul, F. & Ummah, N.R. (2020). Persepsi Mahasiswa Biologi terhadap Perkuliahan Daring sebagai Sarana Pembelajaran Selama Pandemi Covid-19. *ALVEOLI: Jurnal Pendidikan Biologi*, 1 (2), 49-61. <https://alveoli.iain-jember.ac.id/index.php/alv/article/view/6>
- Muliadi, A., Prayogi, S., Bahalwan, F., Nirmala, W. & Verawati, N.N.S.P. (2021). Online Learning During the Covid-19 Pandemic: Preservice Teacher's Perception. *Jurnal Penelitian Pendidikan IPA*, 7 (3), 464-467. <https://doi.org/10.29303/jppipa.v7i3.787>
- Muliadi, A., Mirawati, B. & Jannah, H. (2021). Efektivitas Pembelajaran Daring di Masa Pandemi Covid-19: Persepsi Mahasiswa Pendidikan Biologi, *Jurnal Ilmu Sosial dan Pendidikan*, 5 (2), 625-633. <http://dx.doi.org/10.36312/jisip.v5i2.2020>
- Muliadi, A., Mirawati, B. & Prayogi, S. (2021). The Effect Entrepreneurship Education and Subjective Norm on Biology Students' Self-Efficacy in Entrepreneurial. *Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 9 (1), 127-135. <https://doi.org/10.33394/jps.v9i1.3981>
- Muliadi, A. (2020). Sikap *Entrepreneur* Mahasiswa Pendidikan Biologi. *Jurnal Ilmu Sosial dan Pendidikan*, 4 (3), 286-291. <http://dx.doi.org/10.36312/jisip.v4i3.1208>
- Muliadi, A. & Mirawati, B. (2020). The Impact of Personal Attitude and Subjective Norm on Entrepreneurial Interest of Biological Education Students. *E-Saintika: Jurnal Penelitian dan Pengkajian Ilmu Pendidikan*, 4 (3). <https://doi.org/10.36312/e-saintika.v4i3.307>
- Muliadi, A., Asri, I.H. & Lestari, Y. (2020). Efek Pengetahuan dan Lingkungan Keluarga terhadap Sikap *Entrepreneur* Mahasiswa. *Educatio: Jurnal Ilmu Kependidikan*, 15 (2). <https://doi.org/10.29408/edc.v15i2.2836>
- Mulyasa, E. (2013). *Pengembangan dan Implementasi Kurikulum 2013*. Bandung: Remaja Rosadakarya.
- Nugroho, S. (2012). Profesionalisme Guru SD Negeri se-Kecamatan Warungasem Kabupaten Batang. *Jurnal VARIDIKA*, 24 (2).
- Oktavian, R., & Aldya, R. F. (2020). Efektivitas Pembelajaran Daring Terintegrasi di Era Pendidikan 4.0. *Didaktis: Jurnal Pendidikan dan Ilmu Pengetahuan*, 20(2), 129-135. <http://dx.doi.org/10.30651/didaktis.v20i2.4763>
- Pangondian, R. A., Santosa, P. I., & Nugroho, E. (2019). Faktor-Faktor Yang Mempengaruhi Kesuksesan Pembelajaran Daring Dalam Revolusi Industri 4.0. *Seminar Nasional Teknologi Komputer & Sains (SAINTEKS)*, 1 (1), 56-60. <https://www.prosiding.seminar-id.com/index.php/sainteks/article/view/122>
- Pratiwi, E. W. (2020). Dampak Covid-19 Terhadap Kegiatan Pembelajaran Online di Sebuah Perguruan Tinggi Kristen di Indonesia. *Perspektif Ilmu Pendidikan*, 34(1), 1-8.
- Premsky, M. (2009). *H. Sapiens Digital: From Digital Immigrants and Digital Natives to Digital Wisdom*, 5 (3).
- Putri, A.N.A. & Irwansyah. (2021). Efektivitas Komunikasi Dalam Pembelajaran Online, *Jurnal Teknologi dan Informasi Bisnis*, 3 (1), 54-63. <https://doi.org/10.47233/jteksis.v3i1.184>
- Rohmawati, A. (2015). Efektivitas Pembelajaran. *Jurnal Pendidikan Usia Dini*, 9(1), 15-32.
- Sadikin, A. & Hamidah, A. (2020). Pembelajaran Daring di Tengah Wabah Covid-19. *BIODIK: Jurnal Ilmiah Pendidikan Biologi*, 6 (2), 214-224. <https://doi.org/10.22437/bio.v6i2.9759>
- Soedarsono, Sari, & Rina. (2019). Komunikasi Pembelajaran Guru PAUD Dalam Pembentukan Karakter Anak (Studi Deskriptif Komunikasi Pembelajaran Pada Kegiatan Belajar Mengajar di PAUD Lembah Madu, Cimahi). *JIKA (Jurnal Ilmu Komunikasi Andalan)*, 2 (2), 75-94.



- Surbakti, K.B. & Pamungkas, I.N.A. (2021). Komunikasi Melalui *Learning Management System* Selama Pembelajaran Daring di Telkom University Bandung (Studi Kualitatif pada Mahasiswa Rumpun Ilmu Sosial dan Humaniora Telkom University Bandung). *Jurnal Dinamika Pendidikan*, 14 (2), 33-45. <https://doi.org/10.51212/jdp.v14i2.38>
- Toharudin, M. (2020). Komunikasi Dalam Pembelajaran Di Era Pandemi Covid-19. *Prosiding Seminar Nasional FIP 2020*, 238 – 248.
- Ulfah, Y., & Suryantoro, A. (2020). Studi Awal Tentang Penggunaan Media Daring Selama Pandemi Corona Di SMPN Purworejo Lampung Tengah. *Al Jahiz: Journal of Biology Education Research*, 1 (1), 34-43. <https://e-journal.metrouniv.ac.id/index.php/Al-Jahiz/article/view/2046>
- Zhafira, N.H., Ertika, Y. & Chairiyaton. (2020). Persepsi Mahasiswa terhadap Perkuliahan Daring sebagai Sarana Pembelajaran Selama Masa Karantina Covid-19. *Jurnal Bisnis dan Kajian Strategi Manajemen*, 4 (1), 37-45. <https://doi.org/10.35308/jbkan.v4i1.1981>