

The impact of learning during the COVID-19 Pandemic on science literacy, social interaction, and digital literacy at Senior High School Palangkaraya City

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Article Information	Abstract
Keywords: COVID-19; Offline and online learning; Social interaction digital literacy; Science literacy Keywords: COVID-19; Pembelajaran tatap muka dan pembelajaran jarak jauh; Literasi sains; Interaksi sosial; Literasi digital History: Received : 11/05/2022 Accepted : 19/06/2022	The impact of COVID-19 on online learning biology 2020-2021 makes everyone panic, so it is necessary to be alert for innovation in learning, including in public high schools in Palangkaraya City. COVID-19 on social interactions that can affect psychosocial decline, digital literacy, the need for sorting educational information, and scientific literacy in the form of laboratory practicums do not exist because they have not found the right method. The purpose of the study is to describe three aspects that are affected by the pandemic, namely social interaction, scientific literacy, and digital literacy in online learning 2020 - now which is experiencing changes in lifestyle patterns. The type of research is qualitative phenomenological design, the method uses a questionnaire, semi-structured interview, and observation. The research was conducted in April 2022, totaling 58 people and one teacher and using purposive sampling data collection techniques. The data analysis technique used was three conditions and the stages of analysis consisted of data reduction with the help of NVivo-12, data presentation, and conclusion. The results show that COVID-19 with social interactions indicated a decline in students' psychosocial, digital literacy students are required to be able to, and scientific literacy that needs to be retrained because it is not optimal in assessing the performance process. Abstrak Dampak COVID-19 pada pembelajaran online biologi 2020-2021 membuat kepanikan semua orang, sehingga perlu kesiapan inovasi dalam pembelajaran termasuk sekolah SMA Negeri di Kota Palangkaraya. COVID-19 terhadap interaksi sosial yang bisa mempengaruhi penurunan in psikososial, literasi digital perlunya pemilahan informasi pendidikan dan literasi sains dalam bentuk praktikum laboratorium tidak ada karena belum menemukan metode yang tepat. Tujuan penelitian mendeskripsikan tiga aspek yang dipengaruhi oleh pandemi yakni interaksi sosial, literasi sains, dan literasi digital pada pembelajaran online 2020 - sekarang yang mengalami perubahan pola gaya hidup. Jenis penelitian kualitatif desain fenomenologi, metode menggunakan kuesioner, wawancara semi struktur, dan observasi. Penelitian dilakukan April 2022, berjumlah 58 orang dan satu guru serta teknik pengambilan data purposive sampling. Teknik analisis data yang digunakan tiga kondisi dan tahapan analisis terdiri reduksi data dengan bantuan NVivo-12, penyajian data, dan menarik kesimpulan. Hasil menunjukkan COVID-19 dengan interaksi sosial yang diindikasikan mengalami penurunan psikososial siswa, literasi digital siswa dituntut bisa, serta literasi sains yang perlu dilatih kembali karena kurang optimal dalam penilaian proses kinerja.

A. Introduction

In March 2020, WHO declared a global pandemic with a very fast spread and impacted quarantine policies and policies requiring the adoption of innovative approaches (Alban et al., 2021; Freilanda, 2022; Hevia et al., 2022) and have a broad impact on social life, as well as affect educational studies, it is necessary to use interactive telecommunications techniques (Fortuna, 2021). The variety of online learning concepts that are applied and this environment allows teachers to teach and interact with students online asynchronously or synchronously, pushing a new lifestyle within limits (Selvaraj et al., 2021). The pandemic also has an impact on a person's health behavior and behavior change (Ulf, 2020). Implementation of distance learning more controllable reduce crowds (Word, 2020), and lead to the application of adaptive culture (Asanov et al., 2020). There is a dimension of change in online learning, namely learning in 2020 (Argahani, 2020), as the beginning of a pandemic wave in Indonesia because of the need for extra effort (Amany, 2020), but there are still obstacles to limiting the effectiveness of learning such as the use of technology in aspects of digital literacy (Fortuna, 2021).

This phenomenon poses a challenge to the world of education that demands precise, accurate, and fast competence distance learning as a technical tool that does not yet assume that digital media is a changer in the way of thinking and (Rusdiana et al., 2020). In addition, there is a large workload of implementing distance learning with face-to-face learning, thus providing problems of work pressure and stress, such as coping with the stress involved with the use of social media, and because much one-way communication causes social media fatigue that burdens individual cognition (Rahardjo et al., 2020) and Moreover, the stress experienced by students from the many online tasks that must be done (Rahmi et al., 2020) The use of social media as educational information is 87.4% and can increase social interaction (Amalia, 2015) and digital literacy (Meilinda et al., 2020).

With changes in learning methods, from face-to-face learning to distance learning, as much as 44.56% of students experience stress and disrupted students psychological conditions. The results of previous studies related to distance learning showed anxiety at 0.9% (severe), 2.7% (moderate), and 21.3% (mild) (Lindasari et al., 2021) and research by Somantri et al. (2019) that a good coping process can reduce stress. Changes in the student's environment when studying, if they

cannot control it properly, will trigger stress, causing maladaptive behavior, for example, laziness to study, depression, and failure to learn. (Argahani, 2020). This is in line with research by Livana (2020), as much as 55.8% of feeling stressed during the pandemic was factored in by the online learning process, which was getting boring.

In everyday life, students need social process relationships such as interactions (Rahman et al., 2021). Impact on distance learning students feels forced to learn with adequate facilities and infrastructure and must adapt to new changes (Nur Khairiyah, 2020). Social change makes students behave individually and socially influences the school environment (Farah, 2020; Lusi, 2021). Although the information and communication paradigm shift is an important component, the selection of media that supports distance learning is also more necessary than the learning model.

In reality, the teacher understands that learning is only the transmission of knowledge, so it is passive and less creative (Argahani, 2020), if it is related to scientific literacy as a positive function, shift from digital literacy in the hope of reducing the constraints of facilities and infrastructure as well as students' psychology which can be controlled by bad consequences distance learning, then it can be the opposite. Scientific literacy as a potential development in PISA is the capacity for scientific knowledge based on evidence to understand, make decisions, and human interactions with nature. The lowest percentage indicator is scientific evidence (Yulistina, 2021), and according to Fadilah et al., (2020), the lowest indicator of intellectual process skills, then can hinder meaningful learning in the XXI century on scientific literacy (Gani et al., 2020). According to Haug (2021), literacy and scientific practice are essential in science teaching. The results of initial observations are known that biology practicum activities were not carried out during the first wave of the pandemic.

The use of digital can be applied through social media as a medium preferred by students as a diversion and the use of virtual laboratories as technology that can attract students' enthusiasm in re-applying scientific literacy which is starting to fade by barely carrying out practical activities with proper performance. The purpose of the research is to describe three aspects that can be affected by a pandemic, namely social interaction, scientific literacy, and digital literacy in children's distance learning during the first wave of the 2020 to 2022 pandemic, now in Palangkaraya City High School,

there have been many changes in lifestyle patterns and the learning process.

B. Materials and Methods

This type of qualitative descriptive research with a phenomenological design. This descriptive research tries to explain one variable or another and relates one variable to another (Puspitorini, 2020). This study uses survey research which in collecting data using questionnaires, instruments, interviews, and observations are the primary data collection tools (Wijaya et al., 2016).

The research was carried out at a public high school level in Palangka Raya City, Central Kalimantan. The total number of students used was 58 students and one teacher. The time of the research was carried out in April 2022. The sample used in this study was 32 students of X MIPA 1 or one class, X MIPA 1 to 5, and XI MIPA 1 to 5 using the Purposive Random Sampling technique. (Wijayanti et al., 2015) namely by determining the sample which has done online learning and students who have a critical dedication to learning with a total of 32 people.

Procedures for collecting data by observation and interviews (Yusanto, 2020). The first observation before data collection was informal interviews with teachers regarding the implementation of practicums that were not the right solution in assessing performance in school distance learning—the second observation was on April 21 in class X MIPA 1 by identifying behavior in learning through zoom. The researcher in observing the class aims to observe the behavior of social interaction (between friends and teachers) in the online class. Furthermore, interviews with students, but before that, the students who have been appointed fill out a questionnaire that has been made by the researcher with a semi-structured question instrument. After obtaining the data, the researcher conducts an online interview via zoom, which is included as a communication tool (Gumilang, 2016), and asks further questions about the answers that have been filled in the google form. The interview instrument was based on an adaptation of several articles (Daniels et al., 2021). The interview instrument that has been made consists of 3 interview topics related to social life (social interaction), scientific literacy, and digital literacy.

The data analysis technique used has three conditions: basic skills, scientific literacy, XXI century skills, digital literacy in following distance learning, and social interaction of high school students in Palangka Raya City. The data obtained will be analyzed by several analytical tests, namely:

1. Data reduction

This stage will involve selecting, categorizing, linking, and interpreting data obtained from field observations and interviews with research subjects related to social interaction, scientific literacy, and digital literacy with the help of NVivo-12 and Excel software tools. The results of this reduction are expected to be able to produce an article from the data and will be analyzed further.

2. Data presentation

The results of this data reduction will be presented in the form of basic and XXI century skills groups and social interaction during the first wave of pandemic learning from 2020 until 2022. Then, researchers will connect the three variables and conclude.

3. Draw a conclusion

Researchers will compare the data that has been obtained from the results of the data presentation based on the results of online observations through google meet and online interviews via zoom. The next step is to conclude.

C. Results and Discussion

The results of qualitative research with a phenomenological approach are based on research objectives, research methods, data collection techniques, and data analysis. The respondents in class X were dominated by students aged 16 years, class XI was dominated by students aged 16 and 17 years, and the sex of the students was dominated by males. Reference sources and learning media are dominated by software and websites, and the LMS often used is school e-learning. This can be a factor in the attitude of independence in learning biology.

1. The Impact of the Pandemic on Students' Scientific Literacy Aspects

Aspects of scientific literacy in interview questions, including:

- a) The application of scientifically explained biological phenomena at the beginning of the 2020 wave one pandemic, including only referring to teaching materials, independent practicum implementation, no scientific evidence with performance processes, and many reference sources are obtained on the internet;
- b) The activity of designing and evaluating scientific activities at the beginning of the pandemic, namely carrying out simple observations such as identifying ferns, leaf morphology, testing for nutrients, diffusion and osmosis with materials that are easily accessible and located around the surrounding

environment, and filling out worksheets to make conclusions and collected in e-learning or Google classroom;

- c) The activity of interpreting data and evidence scientifically is only attached in the form of a report of observations with the help of sources of teaching materials such as modules, textbooks, and learning videos, but over time when the number of sufferers of this epidemic decreased, the implementation of the practicum was carried out once by making video activities.

According to research by Idriani et al. (2021), improving students' scientific literacy skills due to COVID-19 through distance learning such as carrying out active and fun learning, as well as facilitating learning resources used by students, and collaborating with parents to improve the learning process and monitor children and provide facilities for insight or information literacy, but according to Idriani et al., (2021) Online learning cannot only rely on the nature of science, so it needs other components as well.

Biology subject learning is now in 2022, including:

- a) The application of scientifically explained biological phenomena with the implementation of face-to-face learning limited employing sessions and practicum implementation can be carried out optimally with evidence of student performance processes and can directly interact with teachers in 2-way communication;
- b) Designing and evaluating scientific activities by carrying out complex practicums with the help of laboratory tools and materials, such as the topic of identifying bacterial colonies by working in groups while still applying health protocols;
- c) Interpretation of data and scientific evidence can be presented in front of the class so that 2-way communication with teachers is more intensive, one of which is by practicum on-air content resulting from respiration and discussions between students are more lively and fun.

2. The Impact of the Pandemic on Aspects of Student Social Interaction

Feelings of calling for "social distancing" limits and their impact, difficulties and problems due to the pandemic, effects of social distancing, and its consequences during the pandemic in making friends and socializing, especially in interactions during the first wave of pandemics

such as feelings of sadness, worry, disappointment, alertness, stress, feeling not accessible by keeping a distance, reducing interaction, so that not being free to make friends and making friendships feel awkward, it triggers feelings of being lazy to study with a lack of socializing and interacting, even though you can do activities outside the home such as communicating outside the house, it is still highly recommended not to do it, worship activities in the mosque which are one meter away will cause feelings of distrust this is fun I agree Elmer et al. (2020), that interactions and learning networks together become less frequent, and more students end up learning on their own, then triggering students' levels of stress, anxiety, loneliness, and depressive symptoms to become worse, when compared to before this social isolation,

As the pandemic is now in 2022, some feelings and activities can be carried out with the application of health protocols such as limited interaction, being able to communicate but keeping a distance of one meter, being able to do activities outside the home such as eating out or doing other activities. in a room with a certain capacity limit, interaction and communication between friends begins to establish intimacy, and begins to be consistent in implementing health protocols. According to Elmer et al. (2020), Social distancing policies aim to protect public health, but when applied universally, it is important to consider and counter the potential adverse effects on individual social networks and mental health, especially on students who are still in the social development stage.

As for the difficulties and problems due to the pandemic, such as: *"...difficulty understanding the material given due to the lack of explanation from the teacher, although there is a zoom meeting but it is not as clear as direct explanation"; "... doesn't understand learning, the material explained via whatsapp is because it is difficult to understand"*, but this is the opposite according to Sakina et al. (2020) distance learning the need for integration of various technologies in the learning process for example using zoom meetings, whatsapp group chats for synchronous and asynchronous learning with google classroom, then *"...do not understand the material because there are teachers who only give assignments without explaining them first"* this is an evaluation aspect for students that learning during a pandemic relies on self-directed learning or self-directed learning supported by research from Hanik (2020), then *"...difficulty in understanding the material given due to limited time and meetings"; "...difficulty in understanding the material given by the teacher due to connection problems sometimes";*

"... less effective distance learning because there are obstacles and limitations in the learning and socialization process"; "...the learning environment is sometimes not conducive which affects concentration"; "...distance learning because at home often called parents ". Research from Elmer et al. (2020) demonstrated the results of an exploration of COVID-19-specific anxiety, isolation on social networks, lack of emotional interaction and support, and physical isolation were associated with adverse mental health trajectories.

3. The Impact of the Pandemic on Digital Literacy Aspects

Learning during the current pandemic needs to return to learning motivation because it is followed by many assignments from schools that must be done, activities with a session system need to wait for a turning schedule because there is a capacity limit for the number of students in class, but can facilitate communication between students and teachers during lessons in line with Sumiati & Wijonarko (2020), that there are benefits of digital literacy such as saving time, always getting the latest information, always connected, making better decisions, making happier and according to Nahdi & Jatisunda (2020), that the online learning strategy means that students' digital literacy skills are absolute.

As for the effects of social distance and its consequences, for example, Interpersonal relationships between teachers and peers are a bit difficult because of feelings of awkwardness/fear of communication but can make them closer to their families and the consequences at the beginning of the pandemic, namely *"...the existence of social distance can lead to different consequences and depends on the discipline of the teacher towards his students and digital media / Social media cannot be blamed because it is a supporting learning material, but it is necessary to provide material first by the teacher"* and according to Hanik (2020) digital literacy with the application of the use of social media or digital media reviews to be able to use wisely, carefully, precisely, intelligently and law-abidingly in guiding daily communication and interaction, then *"...student ineffectiveness in learning that is difficult to monitor (online)"* and if it occurs If you don't use digital media, you need the proper learning model when face-to-face learning (Darwis, 2018), then *"... lack of interest in learning and reading because students prefer to find answers instantly through available media, one of which is Google"* according to Adnyana & Sudaryati (2022) The impact of the pandemic in education is a decrease in interest in learning and according to

Sutrisna (2021) reading interest is also influenced by the low scientific literacy of students who are self-study activities.

Some of the results of interviews with teachers have a common opinion, and there are limitations of space and time. This is in line with the opinions of Andriyanti & Alberida (2021) that there are restrictions on learning activities by applying online learning. Opinions Aji et al. (2020) that there are challenges for teachers, namely poor internet connections, limited tools and materials for observation, lack of technology literacy skills, task collection through YouTube media, some students are still embarrassed because they quickly delete their work results, there is still a lack of interest for teachers to innovate.

In contrast, research from Nahdlatul et al. (2021) related to teacher creativity in the development of innovative teaching materials and learning media, as well as creativity in doing assignments uploaded on YouTube and social media during the current pandemic, then unable to fully monitor student activities online, so parental assistance is needed too, digital media from the application Some teachers have different digital literacy skills, some rely on e-learning only, Zoom and Google Classroom, and there are e-learning and zoom when the training activities for teachers start to be realized more optimally than before, when in fact they have to be given earlier.

Regarding the internet connection network, which is the main obstacle, the teacher has anticipated by allowing students to come home to ride Wi-Fi, and the psychological, psychosomatic impact of students still does not show any indication of burdensome pressure and stress, but psychosocial behavior may exist because some students are still difficult to interact well even though using zoom as distance learning two-way communication, this can be influenced by psychological needs in application self-determination theory (SDT) in distance learning according to Chiu (2022) such as autonomy, competence, and relatedness, then The teacher also gives tips, so you do not get tired in activities distance learning with the occasional small exercise by taking a walk to see the environment in nature for 10 minutes.

The psychosocial is part of psychology, and according to Chiu (2022), three psychological needs can be felt in self-determination theory (SDT) that can affect student involvement in learning distance learning, namely autonomy, competence, and relatedness, meaning that there is a digital support strategy that is more satisfying to the needs of students and all needs are predictors

of the level of involvement, as well as support for a very important role linkage.

The results of the study found that students who entered the school during the academic year when applying distance learning most students find it difficult to socialize, especially interacting with friends. Impact distance learning making students and teachers due to the first wave of the COVID-19 pandemic, there is a gap in receiving information on biology material that is not systematic. This is in agreement, according to Basar (2021), that changes in the learning system during the pandemic can affect the process and level of student development in responding to the material described, so the teacher must prepare for innovation. The gap between students' social interactions with students creates confusion in asking/communicating related to biology learning, but not for a small number of students who already have friends in junior high school who can still communicate well. This gap can be anticipated by implementing blended learning which has a positive impact on opinions Aji et al., (2020), then according to students, namely flexible learning, motivation, interaction, and increasing ICT skills from students' digital literacy.

Several studies of the impact of the pandemic make students stressed that intersects with psychosocial, psychological, and psychosomatic, but the results I get are that some students say that they are stressed because they are given a lot of assignments but do not direct psychological or psychosomatic problems, but some students have psychosocial indications between classmates or other students. other peers, such as research Khotimah (2022) a factor in the decline in students' psychosocial development, for example the lack of interaction during COVID-19 which causes a lack of confidence in students, study Holubnycha et al. (2021) stress and anxiety levels increased significantly from the online learning period waves 1 and 2 due to the pandemic due to quarantine which triggered depression caused by lack of socialization, resulting in mental changes and depression in students, research Robledillo et al., (2022) Stress levels are influenced by negative situations such as teacher methodological deficiencies, excessive academic burdens and self-confidence about performance, as well as pandemic situations forcing students not only to change living conditions, but also to adjust students' individual abilities, then research from Al Azzam et al. (2021); Naff et al. (2022) Pandemics can increase levels of stress, anxiety, and depression that are factored in the mental health relationship of caregivers (eg, parents) with children, and are also strongly

influenced by aspects of age, gender, socioeconomic status, and mental health diagnoses.

The impact of anxiety, stress and depression is a manifestation of the psychotic disorder which is in line with the research results by Zidkova et al., (2021). The relationship between the coronavirus pandemic has an impact on increasing psychosomatic symptoms. It has a significant influence on the prevalence of health complaints and emotional states based on prospective studies in the period before and during the pandemic. Psychosomatics is also related to students' social interactions, which are shown by the results of the study by Atlam et al. (2022). The impact of the pandemic on social interactions as a result of quarantine and lockdown is a psychological challenge faced by students during the pandemic because of the social and psychological consequences on student academic achievement.

Distance learning requires teachers and students to be responsive in using digital media, but some previous studies have also used social media in the learning process, making it easier for students to understand. The findings obtained are that teachers do not use social media as part of the innovative learning process and are liked by students, and the actions of applying scientific literacy during the first wave of the pandemic were not implemented, although some students carried out independent practicums student performance activities were not carried out with documentation and some Previous research on learning biology-based biology materials has implemented virtual laboratories, and the impact of the pandemic has also affected digital literacy, which includes the skills section of the XXI century,

One of them is research that reveals that if schools return to non-performing face-to-face learning, it can be shifted to developing hybrid teaching strategies or blended learning. This will increasingly depend on online learning as a complement to traditional classroom teaching, and students can have the opportunity to interact and socialize in informal social settings. This becomes important for new students who want to start an opportunity to form social bonds with other people. However, if hybrid activities still cannot be carried out directly, then managers, for example, teachers, should also consider the development of online activities and the use of online platforms to support the development of social bonds between students (Elmer et al., 2020).

One alternative in responding to the three research focuses as a result of the COVID-19 pandemic, among others:

- a) Social interaction can be improved with introductory activities that the teacher can do in the form of getting to know each other between classmates by telling the indicators or questions asked to friends at most will get a perfect score, even though this task is part of the process of developing social skills with friends in the subject. Biology and this assignment can be accompanied by documentation in the form of video calls via WhatsApp because it is one of the communication media that students very often use, whether students are good at using technology or not;
- b) Digital literacy that can be applied during the current pandemic is to improve and innovate the way students collect assignments given by the teacher, for example, using the flipped classroom website as the most active communication tool supported by digital video conference media if they are still implementing blended learning, so that it is more lively for a learning atmosphere that is not boring, especially students in general 16-18 years is a period of children who want to always be curious or have a high level of curiosity, so that teachers and parents can support the development of children, because it is known that Indonesian culture and developed country culture, for example, Japan is different, then of course, further research is needed with the use of different digital media and technology in each class meeting to build motivation for students' interest in learning by using technology appropriately;
- c) Scientific literacy can be done by using VR technology can help practicum activities that require tools and materials from the laboratory, but the presence of a virtual laboratory with VR technology is very limited, so the thing that can be done is to carry out the project or project-based learning activities so that the task of biology practicum activities is of value. Finally, because this method is one of the students' efforts to think logically and realistically, it must be accompanied by notification of important components that students must do in the project, for example. recording complex practicum activities.

Every activity in renewal or innovation and creativity is certainly part of a meaningful process in improving the research carried out in the classroom. The impact of the pandemic on these three research focuses is still in the developing

stage as time goes on in new research conducted by academic researchers.

D. Conclusion

The results show that there is a relationship between the impact of COVID-19, which makes social distance suddenly affect students' social interactions, which are indicated by psychosocial decline, digital literacy of students who are required to master digital media in online and face-to-face learning, and scientific literacy that needs to be retrained after online learning because not tested for performance appraisal in practicum. The three research focuses that support each other if responded to positively and applied optimally, can reduce the bad impact of the pandemic on distance learning and learning face-to-face learning.

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