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Profile of Science Processing Skill Primary Teacher Education Students in Simulation of Science Learning Media in Online Learning Period

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ABSTRACT

Online learning due to the COVID-19 pandemic impacts the university level, especially during the learning process. This influence was felt by PGSD students at Yogyakarta State University when simulating online learning media. The simulation of learning media is undoubtedly related to students' science process skills as a provision for prospective teachers. These science process skills must be measured as preparation for becoming a prospective teacher in the learning process in the future. However, detailed measurements have not been carried out. Therefore, this study aims to describe the science process skills of PGSD students in simulating science learning media in a network. The method used in this research is qualitative with a descriptive qualitative approach with data collection techniques using observation and interviews. The data analysis technique uses Miles, Huberman & Saldana, which consists of condensing the data, presenting the data and drawing conclusions. The results of this study are the indicators observing 83.33% very high category, classifying 44.44% moderate category, interpreting 33.33% low category, predicting 50.00% sufficient category, asking questions 50.00% sufficient category, formulating hypotheses 50.00% sufficient category, planning an experiment 77.78% high category, using tools and materials 11.11% deficient category, apply the concept of 61.11% high category and communicate 61.11% high category. In general, students' science process skills have not been able to optimally, so there is a need for a lecture program to simulate science learning media on a network by providing PhET simulation media.

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1. INTRODUCTION

The COVID-19 pandemic has had a considerable impact, especially on the teaching and learning process at the education level. Learning activities in lectures initially conducted face-to-face have become lectures conducted online for the last two years(Hasana & Hidayatuloh et al., 2020). Of course, online learning is a limitation for university students in Indonesia. This also impacts one of the universities, namely the fourth-semester PGSD students of class E at Yogyakarta State University, who experience limitations when learning elementary science learning courses online. In this course, students are required to simulate learning media. Simulation is an illustration activity as a provision for prospective teachers before going into the field. Simulation is a learning model that makes imagery faced by students of an actual situation in a lecture program. Simulation learning is designed to help students experience various processes and realities and to test their reactions (Ritonga et al., 2019). When conducting a learning simulation, it will be more interesting to use learning media.

Learning media is a tool as an intermediary to convey material to students. This is in line with Ahsan et al. (2019), who suggest that learning media is a tool that can help an educator distribute material and learning resources and deliver learning messages correctly. This media can improve students' science process skills (Kelana et al., 2020).

Science process skills (science skills) are the ability to process scientific actions and thoughts to develop an understanding of scientific concepts to support subsequent abilities (Tisrin et al., 2021). Science process skills also emphasize the skills of acquiring knowledge and communicating the acquisition, and this skill is the ability to use the mind of reason efficiently and effectively to achieve a result or creativity. According to Whyne and Beyer (Siswono et al., 2017), Science process skills are a step that can be used to find and process information and tools in understanding the material.

According to Sophia et al. (2019), Science process skills are one of the skills every student must possess. He continued that these skills will help students in the lecture process. The skills possessed by students as prospective teachers must continue to be pursued, so that prospective teachers have the provision to become an educator who can make students who are not only fixated on the theory given but also have to understand aspects of skills (Tisrin et al., 2021). There are 10 science process skills indicators: observing, classifying, predicting, asking questions, formulating hypotheses, planning experiments, using tools/materials, applying concepts, interpreting and communicating (Yolanda et al., 2019). Students must achieve these skill indicators as prospective teachers in elementary schools.

Based on the observations with the indicators above, an assessment instrument sheet was made, which was used to measure students' science process skills. However, the assessment results show that there are still students who have not been able to apply science process skills in simulating elementary science learning. Judging from the results of observations, several students as prospective teachers have not been maximal in making, using and demonstrating elementary science learning media. This is in line with research (Dewi & Muhiri, 2020)that with science process skills, a scientist must be able to do it by observing, classifying, and formulating hypotheses.

Various studies at several universities on the profile of science process skills have shown that indicators using tools and communication generally get excellent categories while interpreting indicators to get inferior categories. (Sofia, 2019). On the other hand, research at the State University of Semarang shows that the indicators of observation, formulating hypotheses, and communication generally get deficient categories(Julianto et al., 2018). Science process skills support students as prospective teachers in conducting learning using science learning media to introduce the material to students. Therefore, this study aims to determine the profile of students' science process skills in science learning media simulations during online learning.

2. METHODS

The method in this study uses a qualitative descriptive qualitative approach. The research was conducted at Yogyakarta State University. The subjects in this study were PGSD students of class A in

the fourth semester, elementary science learning courses with 24 students as objects. The instruments used in data collection are observation sheets and interviews. Data analysis uses the Miles, Huberman and Saldana (2014) model, consisting of condensation data, display data, and conclusion drawings.

Observation using an indicator instrument of student science process skills consisting of observing, classifying, predicting, asking questions, formulating hypotheses, planning experiments, using tools/materials, applying concepts, interpreting and communicating with 18 alternative assessments based on these indicators. Thus, the results of the acquisition of values are analyzed by the following percentage formula:

$$PRS=\frac{A}{B}X100$$

With description:
PRS = Percentage of science process skills kemampuan
A = Score obtained
B = Maximum score

Furthermore, after calculating the Percentage, the categories can be grouped according to the following table:

Table 1. Percentage categories of student science process skills assessment

Percentage Interval	Category
81%≤X<100%	Very high
61%≤X<80%	Tall
41%≤X<60%	Enough
21%≤X<40%	Low
0%≤X<20%	Very low

Source: Sugiyono, 2015

3. FINDINGS AND DISCUSSION

Yogyakarta State University students in the fourth semester of class E-learning online during the covid-19 pandemic are currently simulating science learning media online. Based on research, when students perform science learning media simulations, the results of the calculation of the percentage value of science process skills are as follows:

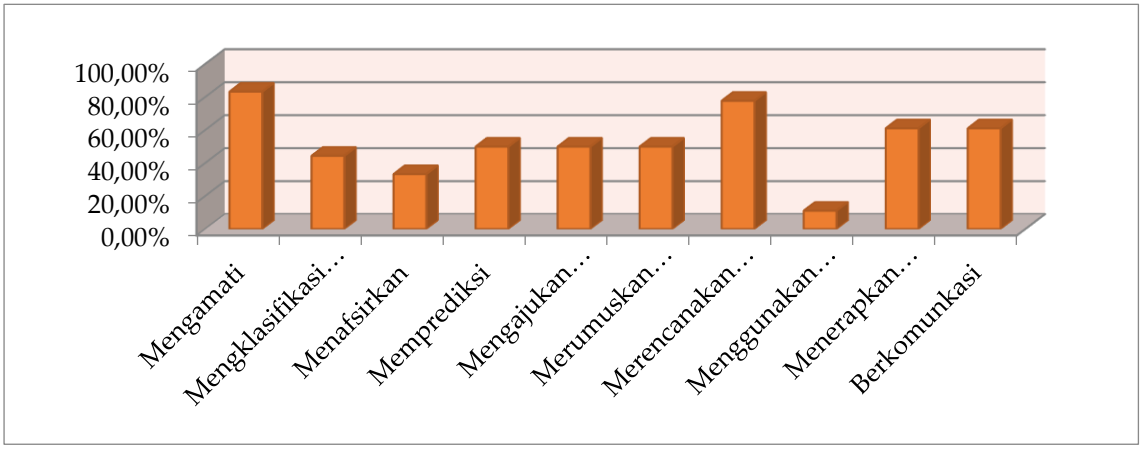

Image 1. Science process skill percentage chart

Table 2. Student KPS percentage assessment results

KPS Indicator	Percentage	Category
Observe	83.33%	Very high
Classify	44.44%	Enough
Interpret	33.33%	Low
Predict	50.00%	Enough
Asking question	50.00%	Enough
Formulating a hypothesis	50.00%	Enough
Planning an experiment	77.78%	Tall
Using tools and materials	11.11%	Very low
Applying the concept	61.11%	Tall
Communicate	61.11%	Tall

Based on table 2, the assessment of the Percentage of students' science process skills in the first indicator, observing, obtained a percentage of 83.33%, with a very high category. From the assessment following the first indicator, when students simulate online learning media as prospective teachers are already able to use the senses as a whole and use relevant facts to support the existence of learning media as experiments. This skill is a skill that students must possess because students, as prospective teachers, will ask students to observe the material being studied for themselves, and find facts using their senses, namely smell, sight, and touch. (Yunita & Nurita et al., 2021).In this case, several studies claim that observation has the potential to lead to new findings in an experiment(Effendi et al., 2021).

The second indicator is classifying with the acquisition of a percentage of 44.44% in the sufficient category. From what students do when simulating science learning media, students are not optimal in finding differences and grouping based on the characteristics of experimental events conducted online. According to Dimyati(Agustina & Zannah et al., 2020), classifying is a skill in sorting out various objects of events based on their unique properties so that similar groups or groups are obtained from experimental events.

The third indicator is interpreting the acquisition of the percentage value of 33.33% with the low category. The results of interviews with students reinforce this because the limitations of the simulation of science learning media in the network cannot make students use security in an optimal sequence, and it is not easy to reach things that occur in circumstances that have not been observed. In this case, students' process skills in interpreting must be trained in line with Handayani et al. (Mutmainnah et al., 2019), which state that the lack of understanding of concepts in students causes the interpretation process to be less than optimal.

The fourth indicator is to predict a percentage value of 50.00% in the sufficient category. In this case, students cannot simulate science learning media in a network using patterns of observations in a sequence and can express things that occur in circumstances that have not been observed. In this case, students have not been able to understand the visible pattern, which can lead to a tendency to be able to submit their predictions(Putri & Muhartati et al., 2019). In predicting indicators, students should be able to use facts to estimate the sequence of events or the following sequence of processes based on the information that has been obtained.

The fifth indicator, asking questions with a percentage gain of 50.00%, is included in the sufficient category. In this indicator, students simulating science learning media in the network have been unable to optimally ask what and how and ask for clarity on the experiments that were done well. Students do

not explore experimental activities less(Titin, 2014). According to Asih & Eka, it is difficult or easy to think students can be seen from the questions given to students(Sakinah et al., 2018). This is reinforced by Sakinah et al. (2018), which state that the skill of asking questions by asking the explanation should be pretty easy for students to do because students can ask questions about things that students have not understood.

The sixth indicator, namely formulating a hypothesis, obtained a percentage value of 50.00% with a sufficient category. It can be seen that the student's ability is not optimal to allow one or more explanations of an event and can realize that an explanation needs testing by obtaining more evidence in carrying out the solution method. Therefore, students have not fully understood how to apply the concept of what has been learned in certain situations(Anita et al., 2022).

The seventh indicator is planning an experiment with a percentage value of 77.78% in the high category. According to Dimyati (Kharunnisa et al., 2019), in planning skills for the experiment, students must be able to determine the tools and materials used. Furthermore, students must determine which of the observed variables are changing and which are constant. This is in line with how students can determine the tools/materials and sources that will be used in the experimental process that will be carried out and can determine the work steps and what things must be considered to be observed and recorded.

The eighth indicator is using tools and materials with a PPP percentage value of 11.11%, which is very low. In this category, students cannot bring and use the tools and materials that have been determined. Based on student interviews, students said they had difficulty bringing and using tools and materials in the simulation of online science learning media. In this case, students have difficulty involving natural objects as scientists (Julianto et al., 2018) because it has limitations in simulating learning media for using tools and materials in the network.

The ninth indicator applies the concept by obtaining a KPS percentage value of 61.11% in the high category. Where students have been able to use the concepts that have been learned in new situations, as well as use the concepts in new experiences to explain what is happening when conducting experiments. This is in line with the opinion of Rustaman et al. (Sari et al., 2018), which states that applying concepts is related to the ability to explain new events using previously owned concepts.

The tenth indicator, communicating, obtained a percentage value of 61.11%, with a high category. Students can check the results after experimenting, discuss the experimental results, and draw an overall conclusion. This communication skill is not only seen in terms of verbal delivery. In this skill, what is observed is how students can communicate the experiment results (Rahayu et al., 2020) to conclude. In line with opinion, Djamarah & Zain (Yatnikasari et al., 2021) states that conclusion can support students' understanding and development of learning materials.

4. CONCLUSION

The conclusion of science process skills with an average score of 52.22% is included in the sufficient category, which shows that students' science process skills when simulating online learning media have not been optimal in applying all these skill indicators. The improvements that must be made to support students' science process skills when simulating learning media provide space for PhET-based learning media simulations. PhET is very supportive of simulating online learning media.

REFERENCES

Agustina, H. P., & Zannah, S. N. (2020). Analisis Ketrampilan Proses Sains: Fokus Studi Pembiasan Cahaya Melalui Aplikasi Online quizizz Received, *1*(2), 40–47.

Ahsan. (2019). Desain Pembelajaran Daring Mata Kuliah. *Engineering and Sains Journal*, *3*, 37–44.

Anita. (2022). Analisis Keterampilan Proses Sains Mahasiswa Pendidikan Biologi Pada Kegiatan Praktikum Mikrobiologi. *Prima Magistra: Jurnal Ilmiah Kependidikan*, *3*(2), 240–249. https://doi.org/10.37478/jpm.v3i2.1765

Dewi, T. M., & Muhiri, M. (2020). Profil Keterampilan Proses Sains Mahasiswa Pendidikan Guru Sekolah Dasar (PGSD) pada Mata Kuliah Konsep Biologi. *Simbiosa*, *9*(2), 150. https://doi.org/10.33373/sim-bio.v9i2.2602

Effendi, E., Rosa Sinensis, A., Widayanti, W., & Firdaus, T. (2021). Keterampilan Proses Sains Mahasiswa Pendidikan Fisika STKIP Nurul Huda pada Mata Kuliah Optika. *JIPFRI (Jurnal Inovasi Pendidikan Fisika dan Riset Ilmiah)*, *5*(1), 21–26. https://doi.org/10.30599/jipfri.v5i1.1000

Hasana, S. N., & Hidayatulloh. (2020). Preferensi Media Pembelajaran Daring Mahasiswa Pendidikan Matematika pada Masa Pandemi Covid-19 Ditinjau dari Prestasi Belajar. *Senandika*, 191–197.

Julianto, Wasis, & Agustini, R. (2018). Profil Sikap Terhadap Sains, Keterampilan Proses Sains, dan Kreativitas Mahasiswa Jurusan PGSD FIP UNESA di Mata Kuliah Konsep Dasar IPA. *Seminar Nasional Pendidikan*.

Kelana, D. (2020). P2M STKIP Siliwangi P2M STKIP Siliwangi. *Jurnal Ilmiah P2M STKIP Siliwangi P2M STKIP Siliwangi*, *3*(2), 1–6.

Kharunnisa. (2019). Keterampilan Proses Sains (KPS) Mahasiswa Tadris Biologi pada, *1*(2), 58–65.

Mutmainnah, S. N., Padmawati, K., Puspitasari, N., & Prayitno, B. A. (2019). PROFIL KETERAMPILAN PROSES SAINS (KPS) MAHASISWA PENDIDIKAN BIOLOGI DITINJAU DARI KEMAMPUAN AKADEMIK PROFILE OF SCIENCE PROCESS SKILLS IN BIOLOGY EDUCATION (CASE STUDY AT A UNIVERSITY IN SURAKARTA), *3*, 49–56.

Putri, A. N., & Muhartati, E. (2019). Keterampilan Proses Sains Awal Mahasiswa Pendidikan Biologi Pada Matakuliah Biologi Umum. *Pedagogi Hayati*, *2*(2), 1–5. https://doi.org/10.31629/ph.v2i2.844

Rahayu, A. (2020). ANALISIS KETERAMPILAN PROSES SAINS MAHASISWA PADA PRAKTIKUM DASAR-DASAR KIMIA ANALITIK Analysis of Students ' Science Process Skills in Practicum on the Basics of Analytical Chemistry, *3*, 1–10.

Ritonga, M. (2019). Studi Literatur Efektivitas Model Pembelajaran Simulasi Digital Marito, 63–70.

Sakinah, N., Sahputra, R., & Sartika, R. P. (2018). DESKRIPSI KETERAMPILAN PROSES SAINS MAHASISWA, 1–12.

Sari, P. M. (2018). Profile of Science Process Skill Mastery from Pre-service Elementary School Teacher. *Jurnal Inovasi Pendidikan Dasar*, *3*(2), 65–72. https://doi.org/10.22236/jipd.v3i2.67

Shofia. (2019). Profil Keterampilan Proses Sains (Kps) Mahasiswa Pendidikan Biologi Ditinjau Dari Kemampuan Akademik Profile of Science Process Skills in Biology Education (Case Study At a University in Surakarta). *Didaktika Biologi: Jurnal Penelitian Pendidikan Biologi*, *3*, 49–56.

Siswono, H. (2017). Analisis Pengaruh Keterampilan Proses Sains Terhadap Penguasaan Konsep Fisika Siswa. *Momentum: Physics Education Journal*, *1*(2), 83. https://doi.org/10.21067/mpej.v1i2.1967

Tisrin, dkk. (2021). DESKRIPSI KETERAMPILAN PROSES SAINS MAHASISWA PGSD UNIVERSITAS KARIMUN PADA MATERI PENGARUH INTENSITAS CAHAYA TERHADAP KECEPATAN TUMBUH TANAMAN TAHUN AJARAN 2019/2020, *3*(1), 6.

Titin. (2014). DESKRIPSI KETERAMPILAN PROSES SAINS MAHASISWA PENDIDIKAN BIOLOGI MELALUI PEMBELAJARAN BERBASIS PRAKTIKUM PADA MATA KULIAH TAKSONOMI TUMBUHAN. *Paper Knowledge . Toward a Media History of Documents*, *7*(2), 107–15.

Yatnikasari, S., Asnan, N., & Zulkarnain, I. (2021). KETRAMPILAN PROSES SAINS DASAR SISWA MADRASAH ALIYAH AL-FIRDAUS SAMARINDA, (20).

Yolanda, Y. (2019). Profil Keterampilan Proses Sains (KPS) Mahasiswa Fisika pada Materi Listrik Magnet. *JIPFRI (Jurnal Inovasi Pendidikan Fisika dan Riset Ilmiah)*, *3*(2), 70–78. https://doi.org/10.30599/jipfri.v3i2.533

Yunita, N., & Nurita, T. (2021). ANALISIS KETERAMPILAN PROSES SAINS SISWA PADA PEMBELAJARAN DARING, *9*(3), 378–385.

Saldana., Miles & Huberman. 2014. Qualitative Data Analysis. America: SAGE Publications

Sugiyono. 2015. Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D. Alfabeta.