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Profile of Research Skills in the Integrated Guided Inquiry Model Research Skill Development (RSD) Framework

Neni Nuryani[1*], Jujun Ratnasari[2], Sistiana Windyariani[3]
[1,2,3]Biology Education Study Program, Faculty of Teacher Training and Education, Universitas Muhammadiyah Sukabumi, Jl. R. Syamsudin, S.H. No. 50, Kota Sukabumi, Jawa Barat 43113
*Corresponding author: neninuryaniiii@ummi.ac.id

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Abstract: *Research skills are one of the skills that exist in educational goals; research skills must be possessed to be able to face the 21st century. Research skills of students in Indonesia are still in the low category; this is evidenced by research that has been conducted by previous researchers with an average score -of 68.5 out of 100 points. This study aims to determine the research skill profile of students in one of the MAN schools in Sukabumi City. This study used a descriptive method; the subjects were class XI students, totaling 22 students, determined by a sampling technique, namely purposive sampling. The instruments used were an attitude scale for research skills and a Research Skill Development (RSD) assessment rubric. The results showed that students' research skill profiles were in a suitable category with an average score on the attitude scale of 83 ± 6.2% and the practicum report of 71 ± 8.5%. Therefore, the research skills profile of students using the guided inquiry learning model integrated with the Research Skill Development (RSD) Framework in this study is in a suitable category.*

Keywords: *Research Skills; RSD; Guided Inquiry; descriptive method.*

1. INTRODUCTION

Life in the 21st century is experiencing many changes; in this century, Indonesia is faced with very rapid developments in science, so students are required to master many skills in order to be able to face the demands of increasingly advanced times, especially skills in the research process. (Shanty, 2016), developing research skills is one of the main goals in education (Anggraeni *et al.*, 2017); research skills are seen as skills that can stimulate students to think scientifically (Rahmiati, 2013). Research skills study and apply learning by integrating cognitive skills and abilities in developing scientific knowledge (Kuo *et al.*, 2015). However, the facts show that secondary schools have no interest in preparing human resources to meet today's needs (Corebima, 2016).

Previous research conducted by (Subekti *et al.*, 2018) shows that research skills are still in the medium category, with an average score of 65.8 out of 100 points; based on this, it can be concluded that students still lack mastery of research skills. This shows how important it is for this problem to be studied scientifically because research skills are increasingly considered an important component of science education at the school level. (Kapon, 2016).

Research skills in the biology learning process play an essential role. One of the strategies that can be used in learning to practice research skills is the practicum method. Practical activities are expected to support activities focusing on developing specific skills, including research skills. (Hamidah *et al.*, 2014). Learning using the practicum method can provide students with direct and first-hand experience that can change students' perceptions (Maknun *et al.*, 2020). Students must have a clear direction and flow in the research activities they carry out; this is one of the critical learning stages that they must go through. The improvement in students'

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research abilities can be evaluated using an evaluation matrix created by (Willison, *et al*., 2007) (Mataniari *et al*., 2020) can be used as an assessment matrix for developing student research skills. The Research Skill Development (RSD) Framework offers organized, methodical guidance. Student achievements in the research process can also be described using these criteria, which indicate the essential stages that students must go through in the learning process apart from measuring the student research process, which includes analyzing and communicating. Research Skill Development (RSD) explains six aspects of research skills, where students find information or generalize data, evaluate information or data (Willison *et al*., 2007) (Mataniari *et al*., 2020).

Apart from using appropriate methods, research skills can also be developed in various ways, one of which is by using a learning model that can be used to encourage student participation in the learning process; this learning model is guided inquiry, learning using this model can support students in their role. Active in the learning process (Haryati *et al*., 2020). In maximizing the learning model used in this research, researchers want to combine or integrate the Research Skill Development (RSD) Framework into the guided inquiry learning model of biology learning. This aligns with research conducted by (Haryati *et al*., 2020). It was explained that by integrating the Research Skill Development (RSD) Framework with the guided inquiry learning model, students could improve their research skills.

Based on observations that have been made and the results obtained from observations at one of the MAN schools in Sukabumi City, it was found that there is still a lack of research skills possessed by students; this can be seen from the learning provided by the teacher, learning activities in class are rarely engaged students in hands-on and mind-on activities. This means that the learning activities that occur in class are still focused on the teacher, not focused on the students.

Based on the data above, this research was carried out to find out the profile of research skills possessed by class XI students at one of the MAN schools in Sukabumi City when studying biology with excretory system material.

2. RESEARCH METHOD

The method used in this research is quantitative descriptive analysis; the population in this research is students at one of the MAN schools in Sukabumi City, with the sample used being 22 students of class XI IPA 1.

Preparation for this research begins by examining the problem to be analyzed and studying the research variables, namely the guided inquiry learning model, which integrates the research skill development (RSD) framework and students' research skills, including the ability to find various sources of information, describe problems, formulate hypotheses, analyze data. Collected evaluating research results and communicating research results both orally and in writing. The researcher then prepared the teaching tools that would be used in learning. The instruments used in this research were a research skill attitude scale sheet and a practicum report assessment rubric adapted from the research skill development (RSD) assessment rubric.

The technique used to collect sample data in this research is the purposive sampling technique. This research was conducted in May 2023. The research skills attitude scale instrument used in this research is an instrument developed based on indicators of research skills according to (Willison *et al*., 2007) (Mataniari *et al*., 2020) and the Research Skill Development (RSD) Framework assessment rubric (Mataniari *et al*., 2020). This research was carried out on excretory system material.

The procedures in this research include learning carried out face-to-face in class. The learning in this research uses the Integrated Guided Inquiry Research Skill Development (RSD) Framework learning model. The data analysis technique in this research is calculating the average percentage value on the attitude scale. The percentage results of the attitude scale data are measured into categories in Table 1.

Table 1. Practical Attitude and Value Scale categories

Percentage	Category
81% - 100%	Very Good
61% - 80%	Good
41% - 60%	Average
21% - 40%	Below Average
0% - 20%	Deficient

(Sugiyono, 2016)

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The data analysis technique used to calculate the student practicum report score is by calculating the student practicum report score. The data from the practicum report is measured into categories in Table 2.

Tabel 2. RSD Rubric Level

Value Range	Rubric Level
76 – 100	4
51 – 75	3
26 – 50	2
0 – 25	1

3. RESULTS AND DISCUSSION

The results obtained from this research include the value of students' research skills; the results of the attitude scale in this research will be presented in table 3.

Table 3. Results of the Research Skills Attitude Scale

No	Research Skill Attitude Indicators	%	Category
1	Initiate Investigation	88 ± 13,1%	Very Good
2	Finding Information	93 ± 5,6%	Very Good
3	Evaluating information or data	84 ± 0,8%	Very Good
4	Managing information or data	78 ± 8,0%	Good
5	Analyze, synthesize, and apply new understanding	78 ± 2,4%	Good
6	Communicate research results	78 ± 0,0%	Good
	Average	83 ± 6,2%	Very Good

The average value of the practicum report is based on the Research Skill Development (RSD) Framework indicators. The average value of the practicum report in this study will be presented in Table 4.

Table 4. Practical Report Results

Indicator	%	Category
1	76%	Good
2	85%	Very Good
3	68%	Good
4	72%	Good
5	61%	Good
6	65%	Good
Average	71%	Good
S	+8,5	

A summary of the grade levels of students' practicum reports in this study will be presented in Table 5.

Table 5. Summary of Practicum Report Values

Rubric Level	The number of students	Student Score Range
4 (76-100)	2	77-82
3 (51-75)	19	51-75
2 (26-50)	1	49
1 (0-25)	0	

Based on the attitude scale from the data above, the research skills of class XI students at one of the MAN schools in Sukabumi City are in the outstanding category. The details of the attitude scale data in this study indicate starting an investigation; the answer was 88 ± 13.1%. Regarding finding information, the answer was 93 ± 5.6%. In the indicator of evaluating information or data, it is 84 ± 0.8%. In the indicator of managing information or data, it is 78 ± 8.0%. In the indicators of analyzing, synthesizing, and applying new understanding, it was 78 ± 2.4%. The indicator for communicating research results is 78 ± 0.0%, and the average of all indicators is 83 ± 6.2%.

Based on the practicum report from the data above, it can be categorized that students' research skills are in an excellent category with an average of 71 ± 8.5%. The details of the practicum value data in this research indicate starting an investigation; the answer was 76%. On the indicator of finding information, the answer is 85%. On the indicator of evaluating information or data, it was 68%. In the indicator of managing information or data, it was 72%. In the indicators of analyzing, synthesizing, and applying new understanding, it was 61%. In the indicator of communicating research results, it is 65%.

In the indicator of starting an investigation, students are in an outstanding category with a score of (88%); this is shown by students' enthusiasm in searching for related sources of information during the learning process. One of

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the factors that determines the effectiveness of learning in the classroom is student interest (Budiningsih, 2007). However, in the practicum report, students are in the excellent category (76%); this is because the attitude scale is an instrument filled in by the students themselves, where when filling in the attitude scale, students adjust it to the students' perceptions. If a student has a strong desire to learn new things and improve their academic performance, they will all work hard and be able to reach their full potential (Shanty, 2016). Motivation in a student's learning is essential in encouraging students' enthusiasm for learning (Sari, 2014). Therefore, an educator must trigger each student's learning motivation so that learning in the classroom can run according to the learning objectives (Roito *et al.*, 2019).

Students' skills in finding information based on the attitude scale are in an outstanding category (93%); this is also supported by students' practicum reports (85%). In this second indicator, most students can find information relevant to the learning concept being studied. The ability that students have to find information can help students in solving scientific problems (Fakhriyah *et al.*, 2017).

Student skills in the third indicator, namely evaluating information or data, based on the student attitude scale (84%), have the perception that they can evaluate their performance during practical learning, but this is not by the results obtained in the student's practical report. In the Evaluating Information or data indicator, students are in a suitable category (68%), which means (16%) of students who answered that they could evaluate the learning process did not reflect this in their practicum reports. Similar data was found in research conducted by (Roito *et al.*, 2019), where some students have the perception that evaluation activities are optional to carry out in research.

Students research skills in the fourth indicator, namely managing information or data, on the attitude scale show that students' skills in managing information are reasonable (78%), meaning that most students can manage the information and data they find; this is in line with the results of Student practicum reports are in a suitable category (72%), based on these results, it shows that some students still struggle to place the sources of knowledge they have acquired because this skill is quite a complex skill (Yuliati *et al.*, 2012) even though they have received guidance during learning.

Students research skills in the fifth indicator, namely Analyzing, synthesizing, and applying new understanding, which the guided inquiry learning model facilitates through practical learning, show that some students (78%) can meet the standards of the rubric (RSD). This shows that some students still struggle to put the sources of knowledge they have acquired to use to overcome visible problems. This is in line with the practicum report, which shows that only a portion of students (61%) could apply the sources of information obtained to analyze the problems being observed. This is in line with the findings of the research (Roito *et al.*, 2019), which states that skills in analyzing, synthesizing, and applying new understanding are complex skills.

The sixth research skill, namely communicating research results, on the attitude scale, shows that students are reasonable (78%) at communicating research results; in this case, it means that students can already communicate practicum results in the form of practicum reports by the RSD rubric. The results obtained from the attitude scale are supported by the results of student practicum reports, which are in the excellent category (65%); the results of student practicum reports show that students have not been able to put the learning activities carried out into written form, this is also supported by research conducted by (Roito *et al.*, 2019) which shows that students have not been able to pay attention to Indonesian Spelling (EBI) consistently and optimally.

The guided inquiry model integrated research skill development (RSD) framework facilitates students in learning activities to describe the research skills possessed by students; the guided inquiry model is very suitable to use because learning by inquiry is a learning that is highly recommended in learning science, mathematics, language, and science. social (Kusherawati *et al.*, 2020). One learning model that is very important in encouraging student engagement and developing the abilities needed to learn specific skills is the guided inquiry learning model. (Setiono, 2017). Learning using the guided inquiry model is an approach where the teacher

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asks questions that have been formulated and guides them into the new knowledge needed by students (Audu et al., 2018). The guided inquiry learning model gives full responsibility to students for developing experiments, and there is little guidance from the teacher during the learning process; this learning paradigm is student-centered (Blanchard *et al.*, 2010). In learning, it is essential to create a learning environment where students have a role as researchers and can carry out research (Dekker *et al.*, 2017) by using the guided inquiry model, the Research Skill Development Framework, which is integrated with the guided inquiry learning model can improve students' research skills (Haryati *et al.*, 2020). Students who learn using practical activities develop more (Yadav *et al.*, 2013) because research skills exist during the learning process, which consists of 6 indicators of research skills, namely starting an investigation, finding information, evaluating information or data, managing information or data, analyzing, synthesizing and applying new understanding, communicating research results.

This can also be seen in the practicum report category, which is assessed based on the RSD assessment rubric. A total of 2 students are at level 4, with a score range of 77-82; 19 people are at level 3, with a score range of 51-75, and 1 person is at level 2, with a score of 49.

4. CONCLUSION

From the research, it can be concluded that the research skills of class XI students at one of the MAN schools in Sukabumi City are in a good category (77%). The recommended learning model is a guided inquiry model integrated with a research skill development (RSD) framework, where this model can empower students' research skills, which makes students more enthusiastic in carrying out the learning process.

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