

Students' Scientific Writing Skills With Disciplinary Literacy Instruction

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Abstrak:

Scientific writing skills are a very urgent need for students. This study aims to show the effect of the implementation of disciplinary literacy instruction as a strategy for scientific writing skills. The population of the study is the senior high school in Sleman region with quasi-experimental method. The results of two replications were analyzed and showed normal and homogeneous results. This indicates that there is no difference in the learning outcomes of the two classes and shows the similarity of the cognitive abilities of the two classes, so research may proceed. The treatment given was in the form of disciplining literacy habits in students by using articles that contained problem-solving. Data collection using authentic assessment was in the form of student laboratory work reports. The analysis technique used to analyze the effect of the implementation of disciplinary literacy instruction on scientific writing skills was ANOVA test analysis at 0.05 significance level. The results showed that the sig value below 0.05 that is 0.01. This number indicates that there is an effect of the implementation of disciplinary literacy instruction to the students' writing skills on the material of electrolyte and non-electrolyte solution in the first grade of senior high school.

Keywords: *Disciplinary literacy, laboratory work, scientific writing skills*

Introduction

Literacy is interpreted as a state of being literate and subsequently interpreted understanding or comprehension. In the first step, reading and writing are emphasized because these two language skills are the basis for the development of literacy in various fields or called multiliterate. In the context of the school literacy movement, literacy is the ability to access, understand, and use something intelligently through various activities, including reading, viewing, listening, writing, and speaking (General Directorate of Primary and Secondary Education, 2017). In Indonesia, literacy movements in schools are planned in three stages including the stage of habituation, development stage, and the learning stage. The stage of habituation is done with the activity of growing interest in reading through the activity of 15 minutes reading before class, the development stage is the next step to improve literacy capability through book enrichment activities, the stage of habituation and development is the foundation to the last stage, the learning stage (General Directorate of Primary

and Secondary Education, 2017). At the learning stage, not all schools and teachers apply disciplinary literacy to improve students' literacy skills. This has become the focus of the government in recent years to improve literacy skills, which are still low.

Schools are just one of the places where literacy occurs. I realize that the resources used to teach in the classroom may be different from the resources used by students in their homes (Pahl & Rowsell, 2014). Therefore, our literacy abilities and skills are greatly affected by the way we get literacy itself both in the school, family, and community environment. Even with the type of reading we choose. Even so, it is important to instill literacy in schools deeply because students in Indonesia spend a lot of their time in school daily. Successful literacy is obtained by continuous hard work done by thousands of teachers and students by implementing national literacy strategies (Fisher, Lewis, and Brooks, 2003). This is the result of a large investment in education if it is seriously planned by the central government, either through material training or programs in literacy-related consulting services. Literacy is a

basic skill that every citizen must-have. Therefore, preparing the younger generation to become literate individuals is very important, especially the most basic literacy, namely reading and writing literacy.

Students in school feel confused in starting the writing process, there is a need for the presence of a guide to help write. Several interviews conducted with high school students felt less motivated if only through conventional seminars without training. Hillocks (Fisher, Lewis, and Brooks, 2003) states that the guided writing approach is two to three times more effective than the natural process or the individual approach and more than four times more effective than the presentation approach. Furthermore, according to Hillocks, the presentation approach is only minimally effective because it only tells students what is strong or weak in writing, but does not provide opportunities for students to learn procedures to apply this knowledge to work. Individual processes and approaches are only effective enough because they encourage the incorporation of ideas and plans in specific writing, but do not ensure that students develop their ideas and plan

independently. This is especially so in the organization of various types of writing. Guided writing approaches are more effective because they present new forms, models, and criteria, and facilitate their use in different writing assignments. Writing directions that can be followed according to Orr (2006) include positive thinking and attention, using all resources, focusing on words not the number of words, reading them to gain understanding, compiling puzzles as well as exercises, exercises, exercises.

Language skills have four components: listening skills, speaking skills, reading skills, and writing skills (Guntur, 2008: 1). In acquiring language skills, at first usually start a regular sequence of relationships, in childhood learn to listen to the language, then speak, and further learn to read and write. These four skills are essentially single chess. Writing skill is a skill in pouring thoughts, feelings, experiences, and others through writing (Mosques, 2012: 24). The simplest writing activity is to write the symbols of the sound of a letter that then tangible into words and sentences. Writing is to lower or depict graphic representations that describe

something a language is understood by a person so that people can read graphic symbols (Guntur, 2008: 22). Writing assignments are essential for any curriculum (Alharthi, 2021). For Deleuze, writing does not reduce, destabilize meaning, and destroy thematic reading (Hein, 2019). Fluency in writing text was defined as efficiency and automaticity in writing connected texts, which acts as a mediator between text creation (spoken language), transcription skills, and writing quality (Kim et al., 2018). Writing systems often represent spoken language. Writing involves multiple processes, drawing on several languages, cognitive, and print-related skills, and knowledge (Kim, 2020). In addition to reading, the ability to implicitly study visual regularity is also explored about writing skills (Nigro et al., 2015). Reading activity, directly proportional to the writing ability. The more people read, the wider the insight and knowledge, so that he has enough reference and will not run out of ideas for writing. If reading is a process of seeing insight through and making it personal knowledge, then writing is a way of presenting the treasures that have been gained to the wider community.

Understanding provides an important foundation for the development of reading comprehension to a higher level. Basic writing skills such as handwriting and spelling provide an important foundation for the development of advanced written expression capabilities. Writing and reading interact in key ways, with specific components of writing can reinforce and promote specific components of the reading. Similarly, writing activities focused on meaning and content such as writing extended responses to texts, writing summaries, and taking notes about texts, all improving reading comprehension (Spear-Swerling & Zibulsky, 2014). Theories of writing typically postulate that increases in writing skills come as individuals increase the efficiency of specific processes and gain greater sophistication and control over the way those processes are coordinated (Deane et al., 2018). Moreover, students who are less confident about their writing skills or have negative attitudes towards writing are more reluctant to write and less put in the effort than students with higher competency or positive tendencies towards writing (Graham et

al., 2018). This is the reason why scientific writing skills are important to be studied in this study, both in terms of good and bad writing skills. Many factors affect, one of which is through disciplining the application of literacy in the class, especially the middle class in Indonesia. Previous research has shown that instruction and practicing personalized writing strategies depend on the literacy skills of previous learners (Roscoe et al., 2019).

When we provide professional development to junior and senior high school teachers, we are further encouraged to begin integrating literacy strategies in the content they teach, always keeping in mind the following three principles: (1) The purpose of content guiding lessons; (2) selection of texts reflecting the contents; (3) the literacy strategy is chosen as a tool to help students access specific text disciplines more effectively and efficiently. Implement these principles together by articulating learning closure when teachers review and clarify keywords and give students a chance to ask questions and can lead to a deeper understanding and retention of content. One of these principals supports this

approach by refining the format of learning implementation plans to incorporate specific literacy discipline strategies and explicit cover claims (Chauvin & Theodore, 2015).

The learning phase activities are conducted with the cooperation of all subject teachers. Teachers should be able to understand the term text, which can be interpreted as something dynamic. The term text can be printed, audio, visual, audio-visual, digital, graphics, diagram, flowcharts, and others. Every subject teacher in preparing the lesson plan should consider the literacy strategy such as a strategy to understand a discourse or text and multimedia representation competence (General Directorate of Primary and Secondary Education, 2017). Chemical learning should be conducted in scientific inquiry to cultivate the ability to think, work, and be scientific and communicate it as an important aspect of life skills (Mulyasa, 2009: 133). Therefore, chemistry learning in Senior high school should be directed towards activities that provide the direct learning experience through the use and development of process skills and scientific attitudes.

Those involved in laboratory work investigations must understand and apply the strict principles of keeping written records of their actions and thoughts during the laboratory work. Researchers use laboratory records for a variety of purposes. It is more important than that to record laboratory work designs, methods, observations, and results. In several observations made at high schools in Yogyakarta, a province in Indonesia, it was found that if the laboratory work was carried out in groups, the process of recording laboratory work designs, methods, observations, and results was only carried out by one member, causing other members to lack control over what happened in the laboratory work process. To this recorded information, one can then add note analytics that discusses, evaluate, and interpret observations and results to reach whatever conclusions are permitted. Supporting materials, such as prints of instruments or photographs, must of course also be safely preserved. If the laboratory records are written in sufficiently clear and detailed terms along with the required accuracy and precision, they can be used in the future

for verification and replication. In addition, well-kept records facilitate their use for further purposes, such as writing laboratory reports or professional papers, filing patents, or planning further research (Goldbort, 2006). In preparing laboratory work reports, it is important to keep documentation such as observation tables, charts, and photos. Making it easier for writers to narrate their writings.

There are several facts in the field that were found after interviewing several high school students that the reason they find it difficult to express ideas in a writing is that they are not used to writing, writing irregularities arise because students are not accustomed to reading, including reading research relevant to the topic of laboratory work carried out so that understanding they are also not very deep. Several reasons weaken the quality of the research identified about the literature and theoretical framework (Biesman-Simons et al., 2020) including less reading in the field, not reading the most appropriate research, not including theory and literature through research texts, taking the 'cookie cutter' approach or 'chunking'

to work with the literature, lack of research rigor, failure to provide a detailed audit trail, underestimating the demands of qualitative research, limited understanding of 'size' and its relationship to rigor, lack of data triangulation, limited and failed data analysis and interpretation understand the role of the researcher's subjectivity.

Writing in a broad sense is different from just putting words on paper. Writing has three steps: thinking about it, doing it, and doing it again (and again and again, as often as desired and it takes patience to endure). The first step is thinking, in the thought process, it involves selecting the subject, finding ways to develop it, and devising a structural strategy and authoring style. The second step is to do or execute, usually called compilation, and the third is to do it again, or it can be interpreted as revising (Kane, 1988). This step is important for writers who sometimes lack confidence in their writing.

Before starting a draft, we need to explore the subject, look for topics. Subject refers to the main focus of a composition, a topic on a particular aspect of the subject. In subject grammar, stylistic sentences, and so on, is a topic.

Any topic, of course, can be a separate topic analyzed into subtopics. Some people like to work on a subject systematically, uncovering topics by asking questions. Others prefer a lesser, structured, less analytical approach, a kind of brainstorming. They are just starting to write, fast and loosely, letting ideas fall in the free association. Then they edit what they have done, discard some topics, choose others for further development (Kane, 1988). Having good scientific writing skills can not only bring you career success but also bring you many personal rewards. Becoming a good writer requires more productive and less frustrating writing time. Being a good writer will help us become good reviewers or editors (Sataloff et al., 2002).

The various effects that a writer might want to have on readers include informing, persuading, entertaining, producing various types of prose (Kane, 1988). The end goal that is intended determines the strategy and style. The strategy involves choice, choosing a certain aspect of the topic to develop, deciding how to organize it, choosing this word, constructing different types of sentences, building paragraphs. The style is the result of strategy, the

language used makes the strategy successful. Think about goals, strategies, and styles in terms of increasing abstractness. Style looks straightforward and clear. It is in the writing process itself; it is the sum of words, sentences, paragraphs. Strategy is more abstract, felt under words as an immediate goal served. The goals go even deeper, support the strategy and involve not only what you write about but how you affect the reader.

The instruction process of chemistry must be able to train literacy by understanding the concepts and writing them according to scientific rules. Therefore it takes an instruction that disciplines students with literacy that can facilitate understanding and is also skilled in writing techniques. The purpose of this study was to see whether there was an effect of an instruction strategy, namely disciplinary literacy instruction in the ability of scientific writing skills on electrolyte and non-electrolyte solution material in class first grade of senior high school students.

Methods

This research used a quasi-experimental method with a posttest only group design. In experimental and

comparison classes applied learning strategy, that is experiment class using disciplinary literacy instruction and in the control class applied by using expository which usually done in class.

Table 1. Research Design

No	Class	Treatment	posttest
1	E	X	Z
2	C	Y	Z

Description:

E: Experimental Class

C: Control Class

X: Learning strategy with *disciplinary literacy instructions*

Y: Learning strategy with expository

Z: the Practice report

The population of the research is the state senior high schools located in the district of Sleman and have implemented literacy at the stage of habituation and development. Some senior high school was interviewed and observed about the implementation of literacy in learning and the results of which have the same characteristics that have not been fully implemented literacy in a learning phase. The sample used in the research of a randomly selected school was selected SMAN 2 Sleman as a sample. Two classes are used for this study are science class A as the experimental class and science class B as the control class. Generally, this research

can be described in the following scheme:

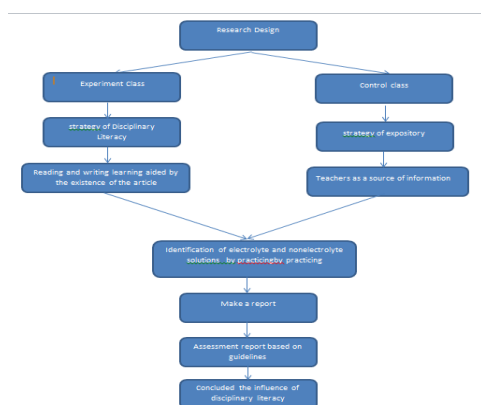


Figure 1. The Research scheme

The independent variable in this research is instruction strategy of disciplinary literacy whereas the control variable is scientific writing skill on electrolyte and nonelectrolyte solution material. The technique of data collecting is done by nontest of data. The non-test data collection technique is done by observation and interview and practice report. Observation is done with teacher worksheet to observe the implementation of learning process according to lesson plans with disciplinary literacy instruction and expository strategy, the interview is done to the teacher and students about the literacy implementation in the learning process.

Nontest used in research using authentic assessment. Authentic assessments are various forms of

assessment that reflect learners' learning, achievement, motivation, and attitudes in instructional relevant activities in the classroom (O'Malley and Pierce, 1996). A picture of the learning progress of the learners should be known by the teacher to ensure that learners experience the learning process correctly. A description of the learning progress is required throughout the learning process, so this assessment is not done at the end of the period. Authentic assessment in this research was conducted to measure the skills of scientific writing using scientific practice reports. Chemical practice report in the form of the ability of students to report the practice that has been implemented in which demand the students' scientific writing skills. The substance of laboratory work reports is the number of systematic scientific reports that are content and writing techniques are considered. As a study stated the report must contain all the factors that improve students' writing skills by using appropriate language and conventions (Masoud & Al Muhtaseb, 2019). Like a study that all essays were checked for accuracy and scored using quantitative measures to evaluate students' writing (Wissinger & De La

Paz, 2020). The laboratory work report in this study must be written directly by each student, except for the references cited as the theoretical basis. To be considered authentic, students' writing in the school environment must produce authentic texts. Generating real-time goals and text can help make instruction more relevant and meaningful because what students write in class can have an impact on the world they live in or the environment outside of school (Wargo, 2020). For example, high school seniors who apply to college are usually involved in essay writing assignments (Aukerman & Beach, 2018). Writing experience, even though in the form of assignment for laboratory work reports, will make students familiar with the writing process so that more or less it affects the subsequent writing process. A set of practical reports consists of basic indicators of scientific writing skills as a reference, reporting system and assessment guidelines as well as a validation process.

The validity of the research instrument is done into two parts namely the content and construct validity by two expert lecturers. The validity of research instruments is divided into two parts

namely theoretical validity and empirical validity. To measure the theoretical validity of all research instruments in the form of learning devices, student worksheets, and lab reports using the assessment of experts or educational experts in the field of scientific appropriate, then expert judgments are calculated with the formula Aiken's V (Aiken, 1985). Analyzing the research hypothesis using ANOVA with the help of SPSS 22 for windows. Before performing data analysis, the data obtained is tested first is the normality test and homogeneity test variance. ANOVA analysis done by paying attention to hypothesis criteria are:

H₀: There is no effect on the implementation of disciplinary literacy instruction to the students' writing skill on the material of electrolyte and non-electrolyte solution in the first grade of senior high school.

H_a: There is an effect on the implementation of disciplinary literacy instruction to the students' writing skill on the material of electrolyte and non-electrolyte solution in the first grade of senior high school.

Results and Discussions

This study aims to determine the effect of the implementation of disciplinary literacy instruction learning strategy on scientific writing skills on the material of electrolyte and nonelectrolyte solution at SMAN 2 Sleman, one of the public schools in the province of Yogyakarta Indonesia. The sampling technique is done by random sampling technique and determined by SMAN 2 Sleman students as a place of research. At the school two classes were taken, one class as the experimental class and one other class designated as the control class, each class consisting of 32 students. Science class B is an experimental class given the treatment of disciplinary literacy instruction strategy and science class A is a control class given the treatment of expository learning strategy as traditional learning. This research begins by conducting interviews with several senior high schools in Sleman where interview results indicate that literacy in learning is still rare. Then do the sampling technique with the random sampling technique. At the school where samples were taken two classes, one class as an experimental class and another class designated as a control class.

In the laboratory work, the experimental class is given treatment by disciplining the literacy on the learning, while in the control class is applied expository learning strategy where expository learning is traditional learning that has been passed down in the class. Expository learning is centered on the teacher so that the teacher is the main informant. The application of disciplinary literacy instruction as a strategy is expected to affect the students' writing skills. How students show their writing skills in a laboratory work report in chemistry class. This strategy is helped by using articles that have been previously created and validated.

In the experimental class, there was discipline in reading articles. Reading is the main means of acquiring knowledge and vocabulary, it has a strong relationship with writing development (Faggella-Luby et al., 2020). Some of the articles used in this study include the implementation of electrolyte and nonelectrolyte solution materials with life. Through the articles, students are involved in discussions with the teacher regarding the grammatical arrangement in the article as well as the content of the article. A study that stated when the

relevance of explicit and implicit grammatical knowledge is challenged, one strong focus of the debate is supported by a discussion around the impact of teaching grammar on students' language use (McCormack-Colbert et al., 2018). Students are invited to gain insight and think critically about the concept of electrolyte and non-electrolyte solutions about solving problems in life. A set of instruments such as interview sheets, syllabus, learning implementation plan, and observation sheet, articles and students, a set of practical reports validated constructs and contents on two experts. Then at the end of the meeting, each class is required to write a scientific paper in the form of a laboratory work report written by hand. As a study conducted by Pham (2021) All written papers are conducted in class in their handwritten style. This is to ensure that students carry out writing activities under the control of the lecturer.

The two classes used in this study looked at the initial assumption of the equality of cognitive ability through daily reactions in the previous chapter. The analysis was performed using one-way ANOVA analysis of the SPSS.22 program. Before the ANOVA test, the

examination data of basic competence 1 tested its normality and homogeneity and the data showed normal and homogeneous data. The results of ANOVA analysis in the first examination data can be seen in the following table:

Table 2. One-way ANOVA test result of the first material

Test	Sum of Squares	d f	Mean Square	F	Sig.
Between Groups	0.063	1	0.063	0.002	0.968
Within Groups	2356.375	62	38.006	-	-
Total	2356.438	63	38.069	-	-

The above table shows the value of significance is greater than 0.05, namely 0.968. Then to get more accurate data that both classes have the same ability then analyzed in the second test of the previous chapter. As the first daily test analysis, the data were tested for normality and homogeneity using SPSS 22 and then proceed ANOVA analysis of one way. Results of ANOVA analysis on second previous chapter can be seen in the following table:

Table 3. One-way ANOVA test result of the second material

Test	Sum of Squares	d f	Mean Square	F	Sig.
Between Groups	20.816	1	20.816	0.498	0.483

Within Groups	2590.93 0	6 2	41.789	-	-
Total	2611.74 6	6 3	62.615	-	-

Both of the previous tests in this study obtained values of significance > 0.05 that is 0,483. Both tests showed a significant value above 0.05 which indicates that both classes have the same ability in cognitive learning outcomes. Then the research was done by giving the treatment in the experimental class. The study was conducted during four meetings with the three stages of learning. Each meeting in the learning phase students read the article, understand and discuss together in the classroom, guided by the teacher. Then at the last meeting of the two classes doing the practice by observing various electrolyte and non-electrolyte solutions, it was assisted by students worksheet to train students ability to solve problems and making a practice report as an authentic assessment.

Guidelines for the assessment of scientific writing skills through a practice report that contains the correct writing procedures and substances on electrolyte and nonelectrolyte solutions that should be reported in each chapter. The written

practice procedures assessed include the use of scientific writing systems such as lowercase and large letters, the use of punctuation, the writing of the correct bibliography, and the selection of good words in the preparation of sentences. Procedures of writing laboratory work which are assessed include the use of lowercase and large letters, the use of punctuation, the writing of the correct bibliography, and how students narrated ideas in writing such as choosing good words in sentence preparation. Here are the guidelines for the assessment of the scientific writing skills of chemistry laboratory work:

Table 4. Guidelines for the assessment

No	Components of the Report	Description of the Assessment
1	The title of the laboratory work,	It contains the correct identification of electrolyte and nonelectrolyte solutions.
2	The purpose of the laboratory work	It should be to include the intent of laboratory work implementation
3	Theoretical basis	It should include the material of electrolyte and nonelectrolyte solutions
4	Tools and materials	Containing the tools and materials used in the lab
5	Work procedures	It contains the management of tools and materials in laboratory work

6	Data and observation result	It contains the data of the lamp and bubble flame generated from each solution. One of the letters of the learner can be seen in the following figure.
7	Discussion	Containing the discussion of the data generated, learners are also expected to reflect the observation data generated by the theory obtained previously. One of the writing discussion of learners can be seen in the following picture
8	Conclusion	It contains the conclusions of the results of identification and electrolyte and nonelectrolyte solutions
9	References	Students are required to write a list of libraries according to the correct rules.

The result of the students' scientific writing skill data shows the homogeneous and normal data as seen in the following table:

Table 5. Normality of scientific writing skill test

One-Sample Kolmogorov-Smirnov Test		Test	Class
N		64	64
Normal Parameters ^b	Mean	80.86	1.50
	Std. Deviation	7.962	0.504
Most Extreme Differences	Absolute	0.129	0.339
	Positive	0.112	0.339
	Negative	-0.129	-0.339
Test Statistic		0.129	0.339
Asymp. Sig. (2-tailed)		0.010 ^c	0.000 ^c

a. Test distribution is normal

- b. Calculated from data
- c. Lilliefors significance correction

Table 6. Homogeneity test results of scientific writing skill tests

Levene Statistic	df1	df2	Sig.
0.222	1	62	0.640

The two tables above show that the data is homogeneous and normal so that the data analysis can be continued by using one-way ANOVA analysis to see the effect of the given treatment. The results of data analysis can be seen in the following table:

Table 7. ANOVA analysis of scientific writing skill tests

Test	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	669.516	1	669.516	0.002	0.968
Within Groups	3324.219	62	53.616	-	-
Total	3993.734	63	723.132	-	-

The table above shows the significance value below 0.05 which is 0,01 indicating that there is a significant effect from the implementation of disciplinary literacy instruction toward students' scientific writing skills on the material of electrolyte and nonelectrolyte solutions. Scientific writing skill can be seen as one of the learning processes and outcomes. In the skills of scientific

writing, students are required to write a sentence according to correct writing procedures but also required to be skilled in the selection of words. Good word selection requires knowledge of vocabulary.

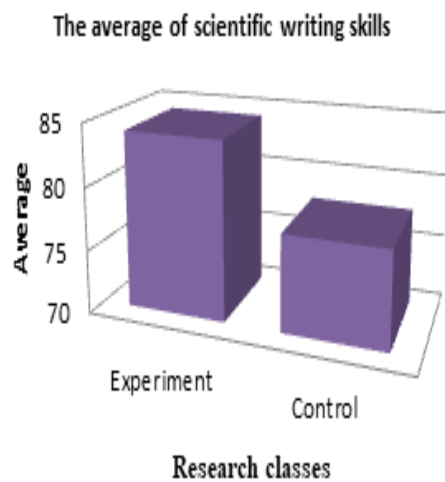


Figure 2. The average diagram of scientific writing skills

The diagram above shows the average value of scientific writing skills through reports made by each student. The average value of scientific writing skills in the experimental class looks much higher than in the control class. The data of scholarly writing skills of students is obtained by an authentic nontest instrument in the form of a practice report. Practical reports are done on the student just after practice. Although listening and speech skills are obtained from hearing for written language students enrich the vocabulary

of the language with various information captured then there is the process of thinking and reasoning.

The writing process, which ultimately resulted in quality writing was not easy. Such as having a good vocabulary and good critical reasoning. Students in school are naturally accustomed to having habits that make them literate such as reading, writing, and critical thinking through class discussions. The treatment given is to train students to be accustomed to thinking critically and solving problems through reading articles related to electrolyte and non-electrolyte solutions. Articles contain problems that exist in life so that is more contextual. Apart from the process of reading and critical thinking, discussion regarding the rules of writing scientific papers also needs to be given to students. With the habituation of literacy skills in the younger generation as part of educators' steps in educating the nation's life. As stated by Grysco and Zygoris Reading well and discussing scientific texts not only supports the development of students' knowledge in science but also helps them become more familiar with

scientific ways of communicating and the unique organizational features of nonfiction texts example tables of content, indexes, glossaries, captions, charts (Grysko & Zygoris-Coe, 2020). The process of reading articles in the experimental class is a literacy process, in this study the literacy process is very helpful in honing skills and has a positive effect on scientific writing skills.

The special meaning inherent in writing and learning is certainly brought together in assignments or assignments used in writing to study science (Gere et al., 2019). Through writing assignments, students are expected to get the inherent scientific meaning that is obtained in learning and manifested in writing. The data generated in the study showed that the class given the treatment to read the article showed better writing skills than the control class. However, at the end of the assessment, through writing a laboratory work report, all classes were still given feedback, including those in the control class. Feedback is done through writing each student's practicum report in all classes. A study has stated written feedback plays a key role in the acquisition of academic

writing skills (Schillings et al., 2018). The feedback given to each practicum report is in the form of writing that meets scientific principles technically and in substance in the form of narrative accuracy written with scholarship and electrolyte and nonelectrolyte solution theory. Through the feedback given, each student knows the side of the error and the sentence that needs to be corrected so that it becomes a provision for future authorship.

Conclusion

This study concludes that the application of instruction strategy with disciplinary literacy instruction affects students' scientific writing skills on electrolyte and non-electrolyte solution material in senior high school students. For the first senior high school level, it is important to train students to become literate students.

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