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READABILITY ANALYSIS OF ECOLOGY LABORATORY MANUAL: EVALUATION AND RECOMMENDATIONS

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ABSTRACT: This study aims to describe or analyze the readability of ecology laboratory manuals, evaluate their effectiveness, and provide recommendations for improvement. This research is descriptive. The data collection technique employed readability tests, while data analysis utilized percentage techniques. The research findings indicate an average readability test score of 74.66%, categorized as valid. These results suggest that the laboratory manual is valid and does not require revision, making it suitable for use by students.

Keywords: Analysis, Ecology, Evaluation, Laboratory Manual, Readability, Recommendations.

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INTRODUCTION

Practical sessions in ecology play a crucial role in expanding students' knowledge of ecological concepts and providing direct experience in scientific research methods (Sholikah et al., 2020). However, the success of these practicals is not solely determined by students' proficiency in conducting experiments but also by their ease in comprehending the provided laboratory manuals. Well-written laboratory manuals enhance clarity, reduce confusion, and improve the efficiency of practical sessions (Azizah, 2023; Ferisandi et al., 2018). Therefore, a comprehensive analysis of the readability of current ecology laboratory manuals is necessary.

Previous studies indicate that the readability of instructional materials often does not align with students' comprehension levels. Factors such as sentence complexity, the use of difficult scientific terminology, and a less systematic structure can pose significant barriers to understanding laboratory manuals (Rahmah et al., 2020). Therefore, readability analysis serves as a crucial initial step in ensuring instructional materials are accessible and well-understood by all students, without compromising the accuracy and depth of the content.

This study adopts a proven readability analysis method, such as the percentage technique, to evaluate ecology laboratory manuals. This evaluation involves measuring the text's difficulty level based on sentence structure, word length, and the use of technical phrases (Haryanto, 2020). The analysis results will

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provide a clear overview of the readability level of the laboratory manuals and identify areas where improvements are needed.

Furthermore, recommendations based on the findings of the readability analysis are developed to enhance the quality of ecology laboratory manuals. These recommendations may include simplifying sentences, using clearer definitions, or adding illustrations or examples to explain complex concepts (Nagari et al., 2019; Siregar, 2017). The primary goal of these recommendations is to ensure that the laboratory manuals not only meet academic standards in terms of scientific accuracy but also are accessible and comprehensible to students from various educational backgrounds.

Ultimately, the implementation of these recommendations is expected to enhance the effectiveness of ecology practical sessions in supporting students' learning processes. Thus, this study not only contributes theoretically to the literature on readability and instructional materials but also has significant practical implications in the context of higher education. Additionally, these findings provide valuable insights for educators aiming to optimize student engagement and comprehension in ecology education through improved instructional practices.

In recent years, the readability of instructional materials has become increasingly important in enhancing comprehension and learning outcomes (Sihombing, 2023). This research focuses on the readability analysis of ecology laboratory manuals, aiming to evaluate their effectiveness and provide recommendations for improvement. The objective of this study is to make a practical contribution towards improving the quality of ecology laboratory manuals, ensuring they are accessible and well-understood by students without compromising the accuracy and depth of scientific content.

METHOD

Type of Research

This research is descriptive. Descriptive research adopts tested readability analysis methods, such as percentage techniques to assess text difficulty based on sentence structure, word length, and use of technical phrases. The analysis results are used to provide a clear picture of the readability level of laboratory manual instructions and to identify areas where improvements are needed. The prepared laboratory instructions are tested for readability by students. Subsequently, the feedback from students on the tested laboratory instructions offers practical guidance for refining and enhancing the clarity and accessibility of educational materials in ecology practical sessions. Moreover, this approach underscores the importance of ensuring that instructional materials in ecology practical sessions are both comprehensible and conducive to effective student learning experiences.

Research Approach

The approach used in this research is quantitative. A quantitative approach involves data collected in numerical form (Mukhtar, 2010). In this study, the quantitative approach pertains to data obtained from readability tests of ecology laboratory manual instructions. Furthermore, the quantitative approach enables the study to rigorously analyze and compare readability metrics across different

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versions of ecology laboratory manual instructions, providing empirical evidence to support recommendations for enhancing instructional clarity and effectiveness.

Research Population

The population in this study comprises all students enrolled in the Department of Biology Education, Faculty of Science, Technology, and Applied Sciences, Mandalika University of Education.

Research Sample

The sample for this development study consists of 15 third-semester students enrolled in the Department of Biology Education, Faculty of Science, Technology, and Applied Sciences, Mandalika University of Education.

Research Instrument

The instrument used in this study is a readability assessment sheet. The readability assessment sheet utilized in this study serves as a structured tool for evaluating the complexity and accessibility of ecology laboratory manual instructions. This instrument likely includes criteria such as sentence length, vocabulary difficulty, and the presence of technical jargon, all of which are crucial factors in determining the readability level of educational texts. By systematically applying this assessment sheet to various versions of laboratory instructions, researchers can quantitatively measure and compare readability scores. These scores provide valuable insights into areas where the text may be too challenging for students, thereby guiding revisions aimed at improving clarity and comprehension.

Data Collection Technique

The data collection technique in this research involves conducting a readability test on ecology laboratory manual instructions.

Data Analysis Technique

The data analysis technique in this research utilizes the percentage technique.

Percentage Technique

The data regarding the validity of the prepared ecology laboratory instructions is obtained using the following formula.

$$\mathbf{P} = \frac{\sum \mathbf{X}}{\sum \mathbf{X1}} \boldsymbol{x}\mathbf{100\%}$$

Information:

P = Validity score in percentage form;
∑X = The total number of responses from all respondents in one aspect;
∑X1 = The ideal number of responses in one aspect; and
100% = Constant.

Table 1. Classification of Assessment.

Percentage	Suitability of Teaching Materials
81 - 100	Very Valid (No Revision Needed)
61 - 80	Valid (No Revision Needed)
41 - 60	Fairly Valid (Requires Revision)
21 - 40	Less Valid (Requires Revision)
0 -20	Very Not Valid (Requires Revision)

Source: Setyosari (2013).

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RESULTS AND DISCUSSION

Results

The readability test results by 15 students of the Department of Biology Education, Faculty of Science, Engineering, and Applied Sciences, Mandalika University of Education semester III can be seen in Table 2.

Table 2. Data of Students' Readability Test Results.

No.	Name (Initials)	Total Score	Maximum Score	Percentage
1	DEP	35	40	87.50%
2	NWEPA	29	40	72.50%
3	DS	29	40	72.50%
4	HF	31	40	77.50%
5	NR	28	40	70%
6	AB	30	40	75%
7	S	29	40	72.50%
8	Z	28	40	70%
9	S1	30	40	75%
10	FD	27	40	67.50%
11	AJ	28	40	70%
12	AM	28	40	70%
13	F	35	40	87.50%
14	RH	28	40	70%
15	Y	33	40	82.50%

The readability test results of the students can be presented in the form of a diagram as shown in Figure 1.

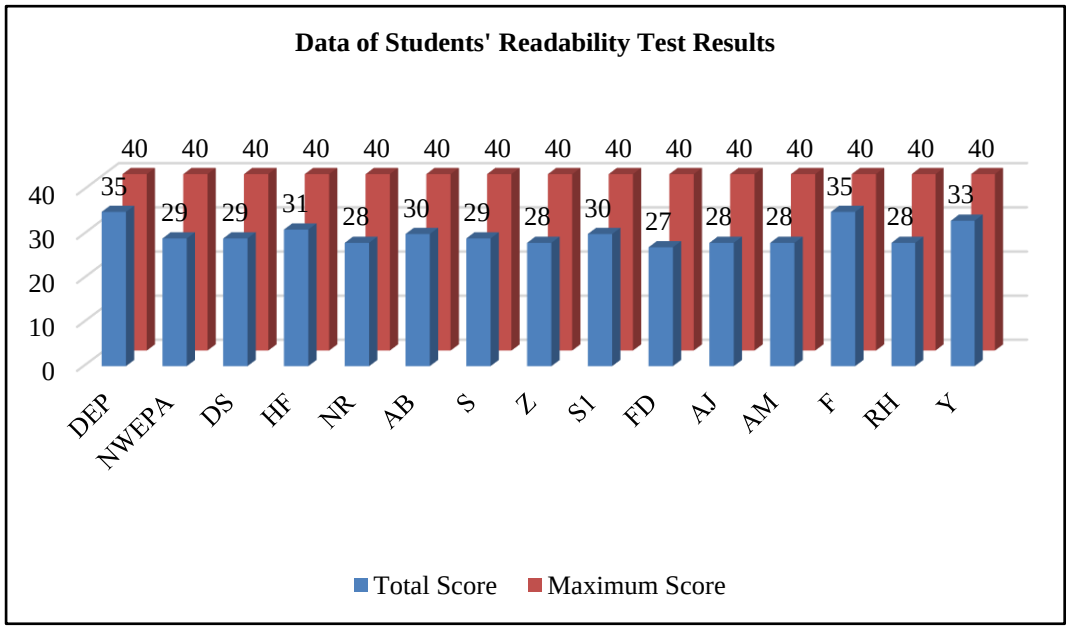

Figure 1. Diagram of Students' Readability Test Results.

Discussion

Based on the analysis of the ecology laboratory manual instructions conducted, the achievement level of readability test components by 15 students

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yielded an average result of 74.66%, which is categorized as valid and does not require revision. This result is lower than Masruroh (2023) study, which reported an average percentage score of 92.52% from a readability test conducted with 15 participants, categorized as very positive.

These results indicate that overall, the laboratory manual instructions have achieved a readability level considered valid and adequate for use without significant revisions. This assessment is based on generally accepted readability standards, which emphasize that text should be easily understandable by the majority of its target readers without significant difficulty. Furthermore, the validation of the laboratory manual instructions' readability level underscores their effectiveness in facilitating accessible learning experiences for students in ecology practical sessions, aligning with established standards of readability in educational materials.

However, despite the good average readability results, it is important to explore individual variability among the participating students in the study. Further analysis could focus on the distribution of readability scores, identifying whether there are specific students or groups experiencing difficulties in understanding the laboratory manual instructions. This is crucial to ensure that the instructions are accessible to the entire student population, including those with different language backgrounds or abilities.

Furthermore, although the analysis shows that overall the laboratory manual instructions have reached the desired readability standards, recommendations for further research could include improving specific aspects that can still be enhanced. For example, while the text may generally be understandable, there is still room for simplifying sentences or using clearer and more easily understandable terms without sacrificing its scientific accuracy.

CONCLUSION

Based on the results and discussion of the study, the author concludes that the readability test results of the laboratory manual instructions by students at 74.66% fall within the valid category and do not require revision.

SUGGESTION

Further exploration and development of readability analysis methods that are more specific and relevant in the context of ecology laboratory manuals are recommended. For instance, integrating additional factors such as the complexity of ecological concepts described in the laboratory instructions could be beneficial.

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REFERENCES

Azizah, N. (2023). Pengembangan Buku Petunjuk Praktikum Biologi Menggunakan Pendekatan Saintifik Berbasis Inkuiri Terbimbing untuk Siswa Kelas XI IPA Semester Genap di MAN 1 Banyuwangi Tahun

Pelajaran 2022/2023. *Skripsi*. Universitas Islam Negeri Kiai Haji Achmad Siddiq Jember.

Ferisandi, R., Dharmawibawa, I. D., & Safnowandi, S. (2018). Keanekaragaman Jenis Gastropoda di Sungai Jangkok Kota Mataram sebagai Dasar Penyusunan Petunjuk Praktikum Ekologi. *Bioscientist: Jurnal Ilmiah Biologi, 6*(1), 80-90. https://doi.org/10.33394/bioscientist.v6i1.2368

Haryanto, H. (2020). *Evaluasi Pembelajaran (Konsep dan Manajemen)*. Yogyakarta: UNY Press.

Masruroh, S. (2023). Pengembangan LKPD Berbasis *Learning Cycle* 7E Bermuatan Keterampilan Abad 21 pada Konsep Sistem Imun Kelas XI SMA/MA. *Skripsi*. Universitas Islam Negeri Syarif Hidayatullah Jakarta.

Mukhtar. (2010). *Bimbingan Skipsi, Tesis dan Artikel Ilmiah*. Jakarta: Gaung Persada Press.

Nagari, S. S., Karlina, K., Sasmita, L. C., Mutiara, P. R., Azizah, R. N., Choirina, A. D., Novandhini, D. R., Restu, Y. E. M., Salsabila, T., Khoiroh, U., & Nurfirdaus, Y. (2019). *Laporan Praktik Kerja Lapangan (PKL)*. Surabaya: Universitas Airlangga.

Rahmah, N., Iswadi, I., Asiah, A., Hasanuddin, H., & Syafrianti, D. (2020). Faktor dan Solusi terhadap Kendala Praktikum Biologi di Sekolah Menengah Atas. *Jurnal Ilmiah Mahasiswa Keguruan dan Ilmu Pendidikan Unsyiah, 5*(4), 41-47.

Setyosari, P. (2013). *Metode Penelitian Pendidikan dan Pengembangan*. Jakarta: Kencana Prenadamedia Group.

Sholikah, T., Mardhotillah, A. F., Indriyani, L. A., Wulandari, V. A., Kuraesin, P. P. S., Al-Khotim, N. L. S. A., Irjiananto, M. Y., Fatmah, F., Ma'arif, M., Fadhillah, N., & Rachmawati, Y. (2020). Studi Eksplorasi Kegiatan Praktikum Sains saat Pandemi Covid-19. *Indonesian Journal of Science Learning (IJSL), 1*(2), 67-75. https://doi.org/10.15642/ijsl.v1i2.1006

Sihombing, N. A. (2023). Increasing the Effective Speed of Students Reading by Using the Clos Method. *Geram, 11*(1), 18-29. https://doi.org/10.25299/geram.2023.vol11(1).11971

Siregar, A. I. (2017). Implementasi Kurikulum Berbasis Sains pada MAS Unggulan Darul Mursyid Desa Sidapdap Simanosor Kecamatan Saipar Dolok Hole Kabupaten Tapanuli Selatan Sumatera Utara. *Tesis*. Institut Agama Islam Negeri Padangsidimpuan.