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Meta-Analysis: Validity and Practicality of Developing Biology Practicum Guidebook on Independent Curriculum

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Abstract

Kurikulum Merdeka is a government program aimed at optimizing education and preparing for the challenges of the Society 5.0 era, which emphasizes the learning process of character building, critical thinking, and project assignments that make students more challenged in learning. One important aspect of learning biology is practicum activities. Practical activities can help students think, analyze, solve problems, prove, and draw conclusions about things related to specific subjects. Practical activities require a guide in the form of a practicum guide to facilitate students in carrying out experimental steps. This study aims to analyze the validity and practicality of the independent curriculum biology practicum guide. This study uses a meta-analysis technique by collecting

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data through collecting articles or journals via the Internet. The sample used was 10 articles related to biology lab manuals. The results of the study found the validity level of the use of practicum guides to be at an average of 89.6% and the level of practicality of using practicum guides to be at an average of 87.7%. Thus, practicum guides can be categorized as valid and practical, so an biology practicum guide for Independent curriculum can be developed.

Keywords

Independent curriculum, Meta-analysis, Practicum guide

Introduction

1.1 Introduction

Independent learning or *Merdeka Belajar* is part of the Indonesian government's new curriculum policy, which aims to optimize education to achieve happiness and welfare for society. Implementing Independent curriculum in learning is part of preparing to face the challenges of the Society 5.0 era (Marisa, 2021). Implementing the independent curriculum tries to realize that a learning system that was previously focused in the classroom will be given a different atmosphere, namely, learning outside the classroom. In addition, the learning process emphasizes the character-building of students. The advantage of implementing Independent curriculum is that teachers can be creative and innovative in learning, and students are given project assignments that can make them more challenged in the learning process (Angga, 2022). One of them is in biology learning.

Biology learning requires students to have basic skills in conducting experiments and reasoning in biological science. Biology learning cannot be separated from practicum activities that can help students learn to think critically, analyze, synthesize, and evaluate biological problems from experimental results (Almuslim *et al.*, 2017). Learning with practicum aims so that

students can prove the truth of the theories of concepts that apply and so that students. Practical activities allow alternative learners to think, analyze, solve problems, and prove and draw conclusions about the material they learn.

Practicum provides considerable benefits and experiences for students in all three areas of the learning domain. Practicum in the cognitive (knowledge) and affective (attitude) fields can help understand and train scientific attitudes. Practicum in the psychomotor field (skills) can help students master using tools and materials (Litasari et al., 2014). Practical activities are a form of implementing the theory of the material obtained by students (Mirawati & Royani, 2019). This activity requires a guide in the form of a practicum guidebook to help students carry out the steps.

A practicum guidebook is an instruction for a practicum that utilizes the environment as a learning resource. The practicum guidebook should include science activities or processes such as observing, interpreting observations, classifying, predicting, communicating, formulating hypotheses, and others (Sari & Anantyarta, 2018).

The practicum guide includes experimental instructions, objectives, theoretical basis, tools and materials, and some questions related to the objectives. The practicum guide is also written according to the rules of scientific writing. Each practicum guide is created by considering the user's level of learning independence, level of thinking, and the skills they will learn.
The purpose of making practicum guides is so that users can learn independently in the learning process (Vitdiawati *et al.*, 2016).

From several explanations about practicum and practicum guidebooks, practicum can be defined as an activity that allows students to apply the theory they learn directly in the laboratory or the surrounding environment. Based on some of the descriptions above, the author raised the title "Meta-Analysis:

Validity and Practicality of the Development of Biology Practicum Guidebooks for the Independent Curriculum."

Research Methodology

This study uses the meta-analysis method. Meta-analysis is a research technique that assists researchers in obtaining definite facts by combining similar research results to have conclusions that can be used as recommendations (Harahap & Mukhaiyar, 2020). The data collection technique is to access similar articles related to practicum manuals via the Internet. Articles were accessed through Google Scholar with the keywords "Validity and Practicality of Biology Practicum Handbook". The author limits the selected articles to the publication year of the last 10 years (2013-2023), which examines practicum manuals in biology learning. From the search results conducted on Google Scholar, 1,010 articles were found. Of these 1,010 articles, the selection was made according to the article's title with the aim of meta-analysis, so that the article became 26 articles, then screening according to the research abstract that was by biological material, then 10 articles were selected for analysis. From the articles that have been collected, there are different data from one article to another. This different data is then calculated to conclude. The mechanism used to obtain this conclusion is through meta-analysis.

Data tabulation was carried out by following the following steps: (1) identifying research variables, then after being found, they are entered into the appropriate variable column; (2) identifying the average validity of the practicum guide in the analyzed articles; (3) identifying the average practicality of the

practicum guide in the analyzed articles; (4) calculating the final average of validity and the final average of practicality.

The results of the validity and practicality of the practicum guide in the analyzed articles are seen from the results obtained in each article, then analyzed based on the validity test criteria and practicality test as follows.

Table 1. Criteria For Validity Test Score

Validity Percentage (%)	Validity Criteria
86 - 100	Very valid and can be used without revision
71- 85	Moderately valid and can be used with minor revisions
51- 70	Less valid and recommended not to be used because it needs major revisions
0 - 50	Invalid and should not be used

Source: (Akbar, 2017)

The validity criteria are reviewed from technical aspects consisting of content, language, presentation and graphics, and practicum guides by material and media experts.

Table 2. Practicality Test Score Criteria

Practicality Percentage (%)	Practicality Criteria
81 - 100	Very practical
61 - 80	Practical
41 - 60	Quite practical
21 - 40	Less practical
0 - 20	Impractical

Source: (Isharyadi & Ario, 2019)

Practicality is the ease of use of the product when used. Teachers and students can carry out practicality tests in a school. Practicality criteria are reviewed from the responses of teachers and students.

Result and Discussion

Based on the analysis of 10 articles from national and international journals on the development of biology practicum manuals, the characteristics of each article were found as follows.

Table 3. Validation and Practicality Data of Biology Practicum Guide

No	Title of Article	Validity (%)	Practicality (%)
1	Development of Biology Practicum Instructions Based on the Scientific Approach for High School Students in Class XI Even Semester in the 2013/2014 Academic Year (Budiarti & Oka, 2014)	86,49	85,71
2	Development of Biology Practicum Instructions Based on Guided Inquiry on Digestive System Material (Mislia, Mahwar Qurbaniah, 2017)	-	85,18
3	Validity of Biology Practicum Guide Based on the Scientific Approach for Class XI High School Semester I (Ulandari, *et al.*, 2022)	84,86	92,7
4	Development of Problem Solving-Based General Biology Practicum Guide using 3D Pageflip to Foster Biology Students' Scientific Work Skills (Putri *et al.*, 2018)	95	97
5	Development of General Biology Practicum Manual for Undergraduate Program Students of Biology Tadris Prodi UIN Sayyid Ali Rahmatullah (Fauziah & Fahrudin, 2022)	82,5	73,3

No	Title of Article	Validity (%)	Practicality (%)
6	Development of Protista Practicum Manual for Class X Sma Ma'arif Nu Pandaan (Hariyanto, 2018)	98,75	-
7	Biology Development of Practicum Instructions on Fungal Material with Thinking Empowerment Patterns through Questions (Case Study in Class X.3 SMA Muhammadiyah 1 Metro Year of Lessons (2013/2014) (Anggraini, 2016)	100	100
8	Development of Biology Practicum Instructions and Practicum Performance Assessment Instruments Based on Cooperative Learning Models and Their Effectiveness on the Critical Thinking Skills of High School / MA Class XI Students (Rahmadani *et al.*, 2017)	89,1	83
9	Development of Biology Practicum Manual for Independent Curriculum in Phase E at SMAN 6 Madiun (Prastiwi *et al.*, 2023)	83,5	-
10	Validity and Practicality of Guided Inquiry-Based Science Learning Practicum Handbook for At-Thayyibah Semurup Junior High School Students (Setiawan *et al.*, 2021)	86	85
Average		**89,6**	**87,7**

Discussion

Table 3 shows the percentage of validity and practicality of the practicum guidebook that is the reference for this study. The

average results of validity in terms of technical elements, such as content components, language, presentation graphics, and practicum guides by material experts and media experts, obtained a result of 89.6%, so it is classified as very valid. Then, the average practicality results in terms of the teacher and student responses to the development of biology practicum guides were obtained at 87.7%. So, it is classified as very practical. Based on these results, it can be said that the practicum guidebook is suitable for development.

a. Validity of Using the Practicum Guide

The results of the validity test of the practicum guide are classified as very valid. If the data generated from a product is valid, it can be said that the developed product has described the development correctly by reality and actual circumstances (Fajarianingtyas & Hidayat, 2019).

The validity test also aims to check the suitability of the contents of the practicum guide with the applicable curriculum and the correctness of the concepts, grammar, form, and appearance of the practicum guide.

The validation of a product is reviewed from technical aspects consisting of content, language, presentation, and graphics, which are conducted by material and media experts. Material experts review the quality of the material in the developed product. Then, validation by media experts is carried out to provide input and evaluate the media developed (Wira, 2021).

b. Practicality of Using the Practicum Guide

The results of the practicality test of the practicum guide were classified as very practical. The practicality test is used as a consideration in developing a product, aiming to determine whether the product is easy to use and apply or vice versa. Practical guidance can be considered practical, as seen

from using the product in conducting field tests (Hardeli *et al.*, (2021).

Practical results show that the practicum guide developed can help teachers and students carry out practicum activities. Determining the value of practicality can be considered by looking at aspects such as (1) ease of use, easy to organize, store and can be used for a certain period, (2) efficient implementation time, (3) attractiveness, and (4) is easily interpreted by users (Amdayani, 2021).

c. *Use of Practicum Guides in Implementing the Independent Curriculum*

The independent curriculum allows teachers to create educational and interesting learning (Indarta *et al.*, 2022). Independent curriculum emphasizes interests and talents and allows students to become competent in their respective fields and develop according to current demands. (Khoirurrijal *et al.*, 2022).

Implementing Independent curriculum can provide progress, make learning more meaningful, give students freedom with their learning interests, and make them adaptive to the surrounding environment. In addition, Independent curriculum is expected to make it easier for teachers, produce active and creative students, make students more comfortable learning, cultivate character, have reliable life skills, and learn more collaboratively (Saryanto, 2020). With many expectations in implementing the independent curriculum, a strategy is carried out through the education unit's readiness stage (implementation at the right level) by paying attention to the situation, policy, and conditions. It needs to restore and improve the quality of learning (Anggraena *et al.*, 2021). One solution to implement in practicum activities is a practicum guidebook.

The use of lab manuals can be a teaching material that can direct students to learn according to scientific steps. Thus, students can become more active, develop process skills,

gain valuable knowledge, and reduce the role of the teacher (Ningsi *et al.*, 2021).

Practical manuals are needed for every school that has a laboratory so that practicum activities can run smoothly by learning objectives. The importance of a practicum guidebook, among others, can be a supporting learning resource when conducting experiments, increasing students' interest in practicum, knowing how to work to do practicum, and knowing the systematics in making practicum reports (Rasmiati *et al.*, 2018).

Conclusion

Conclusion

The results of the meta-analysis show that the development of biology practicum guides has met the very valid and practical categories. Thus, the practicum guide can be used to learn the biology of the independent curriculum. Developing this practicum guidebook is expected to reduce the limitations of practicum teaching materials available at school and produce more effective, interesting, and enjoyable learning.

Suggestion

From the study results, it is hoped that further research can conduct a meta-analysis of the validity and practicality of practicum manuals with a broader scope and better writing.

References

Angga, Cucu Suryana, Ima Nurwahidah, Asep Herry Hernawan, P. (2022). Komparasi Implementasi Kurikulum 2013 dan

Kurikulum Merdeka di Sekolah Dasar. *Jurnal Basicedu*, *6*(4), 7174–7187.

Anggraini, A. (2016). Pengembangan Petunjuk Praktikum Biologi Pada Materi Jamur Dengan Pola Pemberdayaan Berpikir Melalui Pertanyaan (Studi Kasus Di Kelas X.3 Sma Muhammadiyah 1 Metrotahun Pelajaran (2013/2014). *BIOEDUKASI (Jurnal Pendidikan Biologi)*, *7*(1), 73–80.

Anggraena, Y et al., (2021). *Kajian Akademik Kurikulum untuk Pemulihan Pembelajaran. Pusat Kurikulum dan Pembelajaran*. Badan Standar, Kurikulum, dan Asesmen Pendidikan. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Budiarti, W, & Oka, A.A. (2014). Pengembangan Petunjuk Praktikum Biologi Berbasis Pendekatan Ilmiah (Scientific Approach) Untuk Siswa SMA Kelas XI Semester Genap Tahun Pelajaran 2013/2014. *BIOEDUKASI: Jurnal Pendidikan Biologi*, *5*(2), 123-130.

Almuslim, J. P., Studi, P., Biologi, P., & Almuslim, U. (2017). Analisis Keterampilan Proses Sains dan Keterampilan pada Sub Materi Schizophyta dan Thallophyta. *Jurnal Pendidikan Almuslim,* V(1), 1–10.

Fauziah, A., & Fahrudin, A. (2022). Pengembangan Buku Petunjuk Praktikum Biologi Umum untuk Mahasiswa Program Sarjana Prodi Tadris Biologi UIN Sayyid Ali Rahmatullah Tulungagung. *Quagga: Jurnal Pendidikan Dan Biologi*, *14*(1), 1–8.

Fajarianingtyas, D.A., & Hidayat, J.N. (2019). Validitas Buku Petunjuk Praktikum Biologi Dasar Berbasis Pemecahan Masalah untuk Mahasiswa Pendidikan IPA di Universitas Wiraraja. L*ENSA (Lentera Sains): Jurnal Pendidikan IPA*, (*9*)2, 37-45.

Harahap, T. O., & Mukhaiyar, R. (2020). Meta Analisis Efektivitas Model Pembelajaran Project-Based Learning. *Jtev*, *06*(02), 433–441.

Hardeli., Fajriah, A., Suryelita., Bayharti., Yerimadesi., Andromeda., Nadya, U.P., & Shelvy, W.A. (2021). Pembuatan Penuntun Praktikum Kimia Sederhana dan Penerapannya. *Ekasakti Jurnal Penelitian dan Pengabdian (EJPP)*, *1*(2), 232-243.

Hariyanto, P. A. (2018). Pengembangan Petunjuk Praktikum Protista Kelas X Sma Ma'Arif Nu Pandaan. *Bioma : Jurnal Biologi Dan Pembelajaran Biologi*, *3*(1), 11–21.

Indarta, Y., Jalinus, N., Waskito, W., Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi Kurikulum Merdeka Belajar dengan Model Pembelajaran Abad 21 dalam Perkembangan Era Society 5.0. *Edukatif: Jurnal Ilmu Pendidikan*, *4*(2), 3011–3024.

Isharyadi, R., & Ario, M. (2019). Praktikalitas dan Efektivitas Modul Geometri Transformasi Berbantuan Geogebra bagi Mahasiswa Pendidikan Matematika. *Jurnal Absis: Jurnal Pendidikan Matematika Dan Matematika*, *1*(2), 86–93.

Khoirurrijal., Fadriati., Sofia., Makrufi, A.D., Gandi, S., Muin, A., Tajeri., Fajhrudin, A., Hamdani., & Suprapno. (2022). *Pengembangan Kurikulum Merdeka*. Malang: CV. Literasi Nusantara Abadi.

Marisa, M. (2021). Inovasi Kurikulum "Merdeka Belajar" di Era Society 5.0. *Santhet: Jurnal Sejarah, Pendidiikan Dan Humaniora*, *5*(1), 66-78.

Mirawati, B., & Royani, I. (2019). Pengembangan LKS Biologi SMA Berbasis Praktikum dengan Model Pembelajaran Langsung untuk Meningkatkan Keterampilan Proses Sains Siswa. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *3*(2), 88.

Mislia, Mahwar Qurbaniah, A. P. K. (2017). Pengembangan Petunjuk Praktikum Biologi Berbasis Inkuiri Terbimbing Pada Materi Sistem Pencernaan. *Jurnal Bioeducation*. *4*(1), 13–17.

Ningsi,A.P., Purwaningsih, S., & Darmaji. (2021). Pengembangan Penuntun Praktikum Ekektronik Berbasis Keterampilan Proses Sains Materi Suhu dan Kalor untuk SMP/MTs. Edumaspul: Jurnal Pendidikan, *5*(1), 242-251.

Nor Litasari, K., Setiati, N., Herlina, L., & Raya Sekaran Gunungpati Semarang Indonesia, J. (2014). Profil Pembelajaran Biologi Berbasis Laboratorium dan Implikasinya Terhadap Hasil Belajar Siswa di SMA Negeri se-Kabupaten Semarang. *Unnes Journal of Biology Education*, *3*(2), 172–179.

Penuntun Praktikum Kimia Berbasis *Green Chemistry* untuk Semester Genap Kelas X IPA SMA. *SEJ (School Education Journal)*, *11*(2), 124-133.

Prastiwi, R., Yuhana, W. L., & Widianto, J. (2023). Pengembangan Buku Petunjuk Pratikum Biologi Kurikulum Merdeka Pada Fase E di Sma 6 N Madiun. *Seminar Nasional Pendidikan Dan Pembelajaran Ke 6*, *3*, 813–825.

Putri, Z.M., Hasnunidah, N., & Yolida, B. (2018). Pengembangan Buku Penuntun Praktikum Struktur dan Fungsi Tumbuhan dengan Model Argument-Driven Inquiry (ADI). *Jurnal Bioterdidik: Wahana Ekspresi Ilmiah*, *6*(3), 1–11.

Rahmadani, S., -, J., & Zulkifli, L. (2017). Pengembangan Petunjuk Praktikum Biologi Dan Instrumen Penilaian Kinerja Praktikum Berbasis Model Pembelajaran Kooperatif Dan Efektivitasnya Terhadap Kemampuan Berpikir Kritis Siswa Sma/Ma Kelas Xi. *Jurnal Penelitian Pendidikan IPA*, *1*(2), 0–12.

Rasmiati, R., Azizah, L. F., & Herowati, H. (2018). Pengembangan Petunjuk Praktikum IPA Berbasis Kultur Masyarakat Pesisir untuk Siswa Kelas VII SMPN 5 Sumenep. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, 8(1), 38 53.

Saryanto. (2020). *Inovasi Pembelajaran Merdeka Belajar*. Bandung: CV. Media Sains Indonesia.

Sari, N. K., & Anantyarta, P. (2018). Pengembangan Petunjuk Praktikum Histologi Program Studi Pendidikan Biologi. *Jurnal Biologi Dan PemBelajaran Biiologi*, *3*(2), 124–138.

Sa'dun Akbar, M. P. (2017). *Instrumen Perangkat Pembelajaran*. PT Remaja Rosdakarya..

Setiawan, M. E., Sastria, E., Monica, D. R., Januharmen, J., & Purnawati, W. (2021). Validitas Dan Praktikalitas Buku Penuntun Praktikum Pembelajaran Ipa Berbasis Inkuiri Terbimbing Untuk Siswa SMP At-Thayyibah Semurup. *Sainsmat : Jurnal Ilmiah Ilmu Pengetahuan Alam*, *10*(2), 224-234.

Vitdiawati, R., Nusantari, R., & Tyas, D. N. (2016). Pengembangan Petunjuk Praktikum Berbasis Geopark Dengan Pendekatan Inquiry Learning untuk Mata Kuliah Ekologi. *Prosiding Symbion (Symposium on Biology Education*, *Universitas Ahmad Dahlan*, 301–310.

Wira, A. (2021). Validitas dan Efektivitas Media Pembelajaran Berbasis Android Mata Pelajaran Komputer dan Jaringan Dasar. *Journal of Education Informatic Technology and Science (JeITS), 3*(1), 01-10.