Indonesian Journal of Educational Science
ISSN 2662-6197 (online)
Volume 7 No 2, March 2025
ISSN 2655-4402 (print)

The Effectiveness of Project-Based Learning in Enhancing Sasak Medicinal Plant Literacy Among Pharmacy Students

Nora Listantia[1,2*], Aliefman Hakim[1,2], A Wahab Jufri[1,3], Gunawan[1,4], AA Sukarsa[1,3], Joni Rokhmat[1,4], Nisaul Ainiyah[5]

[1]Doctoral Program of Science Education, Postgraduate, Mataram University, Indonesia
[2]Chemistry Education, Faculty of Teacher Training and Education, University of Mataram, Indonesia
[3]Biology Education, Faculty of Teacher Training and Education, University of Mataram, Indonesia
[4]Physics education study program, Faculty of Teacher Training and Education, Mataram University,Indonesia
[5]Science and Technology Education, Institute for Innovative Learning, Mahidol University, Thailand
[*]Corresponding author: noralistantia@staff.unram.ac.id

(Received: 1 December 2024; Accepted: 10 January 2025)

Abstract

The Indonesian people are familiar with traditional medicines that function as anti-inflammatory agents and can strengthen the immune system, with at least 163 types of medicinal plants found on Lombok Island. This study aims to increase students' literacy about Sasak medicinal plants used by the local community through Project-Based Learning assignments. The outcome of this research is a pocket guide on Sasak medicinal plants produced by each student group as part of an inventory effort of active Sasak medicinal plants still used by the community. This research is a descriptive-exploratory qualitative study and a quantitative cross-sectional study. The sample consists of 45 students. The exploratory assessment of qualitative data is based on the students' ability to complete the project and produce the pocket guide, while the quantitative data analysis uses univariate and bivariate analysis in SPSS 25. The Project-Based Learning assignment effectively improved students' literacy on Sasak medicinal plants, resulting in 15 pocket guides. There was a notable improvement in knowledge levels before and after the project assignment, with the percentage of students in the “good knowledge” category increasing from 22.2% to 82.2%. The group of students with the most significant improvement was Group 6, with a 95% score in the "good knowledge" category. There was a significant increase in knowledge with a p-value of 0.009 < 0.05, indicating an influence of improved knowledge among Pharmacy students at Universitas Qamarul Huda Badarudin Bagu regarding the use of Sasak medicinal plants in the community after participating in the phytochemistry practice and being given assignments through Project-Based Learning (PBL).

Keywords:, Project Based Learning, Literacy, Sasak Medicinal Plants, Ethnoscience

Abstrak

Masyarakat Indonesia mengenal obat tradisional yang berfungsi sebagai antiinflamasi dan dapat memperkuat imunitas tubuh dan terdapat setidaknya terdapat 163 jenis tanaman obat yang tersebar di Pulau Lombok. Penelitian ini bertujuan untuk meningkatkan literasi mahasiswa terhadap tanaman obat Sasak yang digunakan masyarakat melalui metode pembelajaran berbasis proyek atau *Project-Based Learning* (PBL). Luaran penelitian ini berupa buku saku tentang tanaman obat Sasak yang dihasilkan oleh setiap kelompok mahasiswa sebagai upaya pendataan tanaman obat Sasak yang masih aktif dimanfaatkan oleh masyarakat. Penelitian ini merupakan penelitian gabungan, yaitu kualitatif deskriptif eksploratif dan kuantitatif dengan pendekatan *cross-sectional*. Sampel penelitian berjumlah 45 mahasiswa. Penilaian eksploratif terhadap data kualitatif dilakukan berdasarkan kemampuan mahasiswa dalam menyelesaikan proyek dan kualitas buku saku yang dihasilkan. Sementara itu, analisis data kuantitatif dilakukan dengan menggunakan analisis univariat dan bivariat melalui program SPSS versi 25. Penugasan berbasis *Project-Based Learning* terbukti efektif dalam meningkatkan literasi mahasiswa terhadap tanaman obat Sasak. Hal ini ditunjukkan dengan dihasilkannya 15 buku saku. Selain itu, terdapat peningkatan tingkat pengetahuan mahasiswa sebelum dan setelah penugasan berbasis proyek, yaitu dari kategori tingkat pengetahuan "baik" sebesar 22,2% menjadi 82,2%. Kelompok mahasiswa yang menunjukkan peningkatan paling signifikan adalah kelompok 6 dengan nilai rata-rata 95% pada kategori tingkat pengetahuan "baik". Terdapat peningkatan pengetahuan yang signifikan, dengan nilai *p-value* sebesar 0,009 (< 0,05), yang menunjukkan adanya pengaruh positif dari penugasan PBL terhadap peningkatan pengetahuan mahasiswa Farmasi Universitas Qamarul Huda Badarudin Bagu terhadap penggunaan tanaman obat

Sasak di masyarakat. Penugasan ini dilakukan setelah praktikum mata kuliah Fitokimia, sehingga efektif dalam meningkatkan literasi mahasiswa
Kata kunci: *Project Based Learning*, Literasi, Tanaman obat Sasak, Etnosains

INTRODUCTION

Indonesia is renowned for its abundant natural resources and one of the largest biodiversities in Asia. With 17,058 islands scattered across the archipelago, the country exhibits unique ecological characteristics and diverse biodiversity (Djarwaningsih, 2011). It is estimated that around 30,000 plant species in Indonesia have the potential to be used as medicinal plants. Much of this natural wealth has been utilized in various industrial sectors, including healthcare. The use of certain plants believed to enhance immunity and assist in the treatment of various diseases has been steadily increasing. This aligns with the WHO's recommendation to promote the use of traditional medicine, including herbal remedies, to improve public health, especially for degenerative diseases, cancer, and other chronic illnesses (Ariastuti et al., 2019).

The Indonesian population is familiar with traditional medicine derived from TOGA (Tanaman Obat Keluarga or Family Medicinal Plants), which can easily grow in home gardens. The medicinal properties of these plants come from their chemical compounds, specifically secondary metabolites, which possess anti-inflammatory properties and help boost the immune system (Hakim et al., 2015). Common secondary metabolites include flavonoids, alkaloids, terpenoids, steroids, and polyketides (Hakim et al., 2010). These compounds are believed to have significant health benefits in combating various diseases. The growing trend of using medicinal plants as a preventive measure is part of the "back-to-nature" movement, which emphasizes the utilization of natural ingredients for health remedies (Kemenkes RI, 2013).

In West Nusa Tenggara, medicinal plants thrive abundantly and are well-recognized by the local community. Various species of medicinal plants are distributed across the islands of Lombok, Sumbawa, Bima, and Dompu (collectively known as Sasambo) and are actively used by the local population. According to data collected by the provincial health department in 2017, there are 290 species of medicinal plants in Bima and Dompu (Dinkes NTB, 2017). Meanwhile, Lombok Island has at least 163 species commonly used by the community as alternative treatments for diseases or as herbal remedies (Yamin et al., 2018). This utilization is rooted in cultural knowledge passed down through generations, as ancestors first discovered their benefits. Many believe these medicinal plants are highly effective in curing illnesses and have relatively minimal side effects (Kariman, 2014).

Community knowledge about the benefits of medicinal plants is often inherited but gains more value when supported by scientific data specifying the chemical contents and their efficacy. Research has shown that 49% of the population has good knowledge of using medicinal plants as alternative remedies (Dewi Agustini et al., 2023). This knowledge is influenced by educational attainment and occupational background, which impact decision-making (Wati, 2009). Additionally, the use of medicinal plants can serve as a primary alternative before resorting to generic pharmaceutical drugs, which are often costly (Junaedi & Gaffar, 2024; Nurjanah et al., 2019).

Pharmacy students must develop literacy about local herbs and traditional medicines because this knowledge is essential for integrating cultural practices with modern healthcare, particularly in a country as biodiverse as Indonesia. Understanding the therapeutic potential of local plants, such as those used in traditional medicine, enables future pharmacists to bridge the gap between ancestral knowledge and evidence-based practice. This literacy supports the preservation of cultural heritage, equips students to offer alternative or complementary treatments, and fosters innovation in developing new drugs derived from natural resources. Additionally, as advocates for

affordable and accessible healthcare, pharmacists with expertise in local medicinal plants can play a crucial role in providing sustainable solutions for communities, particularly in regions with limited access to conventional pharmaceuticals.

Project-Based Learning (PBL) is an educational approach where students actively engage in learning by exploring real-world problems and challenges through hands-on projects. Unlike traditional methods, PBL emphasizes inquiry, critical thinking, collaboration, and creativity as students work toward solving complex issues or producing tangible outputs. In the context of pharmacy education, PBL allows students to delve deeply into topics such as local medicinal plants, guiding them to independently research, analyze, and synthesize information into practical solutions, like creating herbal remedy guides or conducting community outreach programs. This experiential learning method helps students connect theoretical knowledge with practical applications, fostering a deeper understanding and retention of the material.

PBL is particularly effective in improving literacy and critical thinking because it requires students to actively research, evaluate sources, and present their findings in meaningful ways. For pharmacy students, investigating local herbs demands a critical evaluation of traditional uses, chemical properties, and scientific validation, thus sharpening their analytical skills. Additionally, the collaborative nature of PBL encourages peer learning and discussion, helping students to view problems from multiple perspectives and develop innovative solutions. By engaging in projects that have real-world relevance, such as documenting and assessing the use of local herbs, students not only enhance their subject-specific literacy but also develop the ability to critically appraise information, solve problems, and communicate their findings effectively—skills that are vital for their future roles as healthcare professionals.

This study aims to enhance students' literacy on Sasak medicinal plants, commonly used by the local community, through Project-Based Learning (PBL). PBL is a student-centered learning method that emphasizes concept exploration, problem identification, and independent problem-solving through assigned projects (Astriani, 2020). It aims to foster creative thinking and assess pharmacy students' knowledge at Universitas Qamarul Huda Badaruddin Bagu regarding Sasak medicinal plants. The study's output includes pocketbooks on Sasak medicinal plants, created by each student group, as part of documenting the medicinal plants still actively used by the community.

METHOD

This study employs a qualitative descriptive-exploratory and quantitative cross-sectional approach. The qualitative descriptive-exploratory method is used to provide an in-depth understanding of a phenomenon by exploring participants' experiences and perspectives in their natural context. Meanwhile, the quantitative cross-sectional design involves collecting and analyzing data at a single point in time to identify patterns, relationships, or prevalence within the study population. By combining these methods, the research aims to integrate detailed qualitative insights with quantitative measurements, offering a comprehensive perspective on the topic of interest.

Sample of this research is selected based on purposive sampling method, also known as judgmental sampling, is a non-probability sampling technique commonly used in qualitative dan quantitative research. In this approach, researchers deliberately select participants, groups, or cases based on specific characteristics or criteria relevant to the research question. The aim is to gather rich, in-depth data from a sample that is most likely to provide valuable insights. This study selected 45 pharmacy students from a university in Indonesia. They are currently in their second

year with a proportional number of male and female students. The university is private university in suburban area in a province of Indonesia with moderate quality in terms of facilities and teaching qualities.

In the current study, Project-Based Learning (PBL) was used to help students to increase their literacy. In general, the learning processes (as shown in Figure 1) consists of identifying a driving question or problem, encouraging students to explore real-world challenges. Next, students engage in planning and research, collaboratively or individually, to gather information and develop solutions. The process includes creating a tangible product, where students apply their learning creatively. Regular reflection and feedback are integral, enabling students to assess their progress and refine their work. Their products for this study are pocket books.

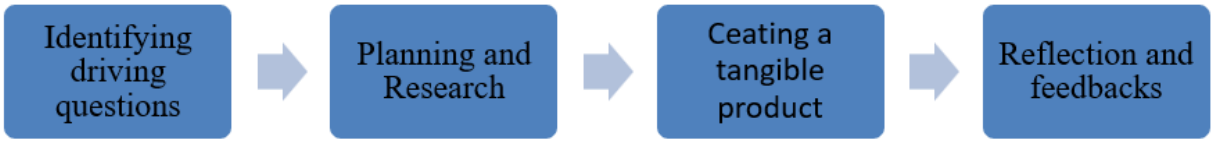

Figure 1. Project-based learning processes

The exploratory assessment of qualitative data in this study focuses on evaluating students' ability to complete their projects and the pocketbooks they produced as a key output. Indicators for assessment include project completion accuracy, depth of analysis, and the quality of fieldwork engagement (Arviani, 2024). In terms of the pocketbook, the evaluation considers content clarity, comprehensiveness, and creativity in presentation. Reflective aspects such as student self-reflection and problem-solving skills are also assessed. To ensure validity, content validity is maintained by aligning the assessment with learning objectives, while expert reviews and triangulation with multiple data sources provide a more accurate evaluation. To ensure reliability, inter-rater reliability is achieved by having multiple evaluators assess the students' work using standardized rubrics. Pilot testing of the assessment tools further enhances consistency and fairness. These steps ensure that the assessment effectively captures students' knowledge and skills in medicinal plant literacy.

The quantitative data in this study is based on the results of cognitive tests conducted. The instruments used for the assessment were developed by the researcher and underwent thorough validity and reliability testing. These tests were designed to ensure that the instrument is appropriate for measuring students' knowledge regarding medicinal plant literacy. Validity was assessed to ensure that the instrument accurately measures what it is intended to, in this case, the level of medicinal plant literacy among students (Hidayat, Hermandra, Zetriuslita, Lestari, and Qudratuddarsi, 2022). This process involved evaluating whether the questions included in the test covered all relevant aspects of the subject matter and whether they provided an accurate representation of students' understanding of medicinal plants. Reliability was also tested to ensure that the instrument consistently produces stable and consistent results over time and across different groups of students. The reliability testing aimed to verify that the cognitive test could be trusted to provide consistent data when applied under similar conditions (Qudratuddarsi, Ramadhana, Indriyanti and Ismail, 2024). Once the validity and reliability of the instrument were confirmed, it was deemed suitable for use in assessing the students' knowledge of medicinal plants. The results obtained from the test provided quantitative data that could be analyzed to draw conclusions about the effectiveness of the intervention in enhancing medicinal plant literacy among the students.

The quantitative data analysis in this study was performed using univariate and bivariate analysis through SPSS 25 software to assess the students' knowledge regarding the use of Sasak medicinal plants. Univariate analysis was used to examine the distribution of students' knowledge levels, while bivariate analysis explored the relationship between different variables, such as demographic factors and knowledge scores (Tawil, 2024). The students' level of knowledge was categorized into three groups: Good, Moderate, and Poor, based on their test scores. This categorization provided a clear overview of the students' understanding of Sasak medicinal plants and the effectiveness of the learning intervention.

RESULT

The Sasak Medicinal Plants refer to several types of plants traditionally utilized by the Sasak people residing in the West Nusa Tenggara Province (Hakim et al., 2018). These plants are believed to possess preventive medicinal properties due to the activity of secondary metabolites in the body, which function as anti-inflammatory and antimicrobial agents (Nurniswati, 2015). The activity of these secondary metabolites generally originates from compounds such as flavonoids, alkaloids, terpenoids, steroids, and polyketides (Hakim et al., 2010). An inventory by the provincial health office and research reports indicate that there are at least 453 Sasak medicinal plants in West Nusa Tenggara. Of these, 163 are distributed on Lombok Island among the Sasak people, while 290 are found on Sumbawa Island, among the Samawa and Mbojo ethnic groups (Dinkes NTB, 2017; Yamin et al., 2018). This data may increase over time if further, more detailed documentation is conducted.

In this study, Project-Based Learning (PBL) assignments were implemented to enhance Pharmacy students' literacy regarding Sasak medicinal plants. Through practical assignments, students were tasked with completing a project involving fieldwork to document the use of Sasak medicinal plants in the community. The students were also required to create pocketbooks containing information about the history of the medicinal plants, the origins of their use, their chemical content and benefits, notable users or figures, methods for obtaining and preparing the plants into medicines, the selection of medicinal use, and dosage information, based on direct interviews with users. The pocketbooks served as the students' practical course reports for the Phytochemistry subject.

Data analysis of the sample or student characteristics revealed 27 female students (60%) and 18 male students (40%). For this research, students were divided into 15 groups, each consisting of three members, to conduct independent observations. The results showed that the students were able to complete their projects, as evidenced by the timely submission of the pocketbooks, which were deemed satisfactory. The study identified 15 types of Sasak medicinal plants documented in the students' pocketbooks, including mangosteen peel, betel leaves, castor leaves, single clove garlic, soursop leaves, bay leaves, banten leaves, gotu kola leaves, tamarind leaves, butterfly pea flowers, ginger, cat's whiskers, ferns, andrographis, and turmeric. These findings are presented as the research outcomes, as listed in Table 1.

Table 1. List of Pocketbooks and Project Completion Details

Group	The name of sasak medicinal plants	Benefits	Observation site (Village, regency)	Project completion details
1.	Bunga Telang (*Clitoria ternatae L.*)	Controlling blood pressure and blood sugar levels	Bonjeruk, Central Lombok	passed
2.	Daun Sirih (*Piper Betle Linn*)	Antiseptic, antioxidant, wound healer, inflammation, improves blood circulation	Kawo, Central Lombok	passed
3.	Daun Pegagan (*Centella asiatica*)	Inflammation, improves blood circulation	Telabah Baru, Central Lompok	passed
4.	Bawang Putih Tunggal (*Allium ativum var. Solo garlic*)	Reduces cholesterol, cancer, heart disease	Kelebuh, Central Lombok	passed
5.	Daun Jarak (*Jatropha Curcas L.*)	Treats constipation, fever, rheumatism, cough	Kebun Nyiuh West Lombok	passed
6.	Daun Asam Jawa (*Tamarindus indica)*	Treats constipation, fever, canker sores, blood sugar levels	Langko, Central Lombok	passed
7.	Kulit Manggis (*Garcinina mangostan*)	Reduces blood sugar levels, hypertension, cancer	Jembatan Kembar, West Lombok	passed
8.	Daun Banten (*Lannea coromandelicia*)	Reduces fever, inflammation, cancer	Tangsi, West Lombok	passed
9.	Daun Sirsak (*Annona murica*)	Rheumatism, cancer, boils, vaginal discharge	Tanak Beak, West Lombok	passed
10.	Daun salam	Prevents kidney stones, urinary system	Lembuak, West Lombok	passed
11.	Jahe (*Zingiber officinale*)	Cough, stomach pain, rheumatism	Krama Jaya, West Lombok	passed
12.	Kumis kucing (*Orthosiphon stamineus*)	Kidney stones, diabetes	Sikur, East Lombok	passed
13.	Pakis (*Cycas sp.*)	Tiwang (skin desease)	Kopang, Central Lombok	passed
14.	Sambiloto (*Andrographis paniculata*)	Cholesterol, diabetes, hemorrhoids, cancer, appetite	Masbagik, East Lombok	passed
15.	Temu lawak (*Curcuma xanthorrhiza*)	Flu, fever	Pejanggik, Central Lombok	passed

Based on the table above, it is evident that students were able to complete their project tasks in accordance with the practicum. This indicates that PBL (Project-Based Learning) is effective in enhancing students' critical thinking skills overall and enabling them to independently complete

their tasks as expected. Additionally, it resulted in the creation of a pocketbook on the use of Sasak medicinal plants in the Pharmacy Program at a private university in West Nusa Tenggara.

DISCUSSION

The measurement of the knowledge level of Pharmacy students regarding the use of Sasak medicinal plants, assessed through a questionnaire during the pre-test (before working on the project) and post-test (after completing the project), with a bivariate test, showed a change in knowledge level. Initially, only 10 students (22.2%) had a "good" knowledge level, which increased to 37 students (82.2%). In line with this study, the percentage of class mastery among Pharmacy students during the first cycle was only 51%, which then increased to 85% in the second cycle after the application of the PBL (Project-Based Learning) method (Khalid & Syafri, 2023).

Table 2. The measurement of students' knowledge regarding the use of Sasak medicinal plants in the community.

Knowladge	***Pre-Test***		***PostTest***		
Level	**n**	**%**	**n**	**%**	***P-Value***
Good	10	22.2	37	82.2	
Moderate	14	31.1	7	15.6	0.009
Poor	21	46.7	1	2.2	
Total	45	100%	45	100%	

From the table above, it is evident that there was a significant increase in students' knowledge, with a p-value of 0.009 < 0.05. This indicates a positive impact on the knowledge improvement of Pharmacy students at a private university in West Nusa Tenggara regarding the use of Sasak medicinal plants in the community after completing the Phytochemistry course practicum with assignments given through PBL (Project-Based Learning). In line with this study, PBL has also been shown to be effective in enhancing problem-solving skills in mathematics among students of the Mathematics Education program at faculty of education HKBP Nommensen University, with a mastery achievement rate of 92.91% in the high category, an ideal time achievement of 4.00 in the good category, and teaching ability rated at 4.25 in the good category (Sitepu, 2019).

This study differs from the results of the implementation of Student Work Training in the field, based on cognitive assessments of 34 students, with a pre-test score of 51.9 and a post-test score of 61.6. Statistical tests showed a significant difference between the pre-test and post-test scores, but the effectiveness of Student Work Training using PBL (Project-Based Learning) still fell into the moderate category (Lestari, 2018). This discrepancy may be due to the measurement tools used by each researcher and the level of difficulty of the instructional materials provided.

Next, the measurement of students' knowledge levels based on groups is presented in the data shown in Figure 2.

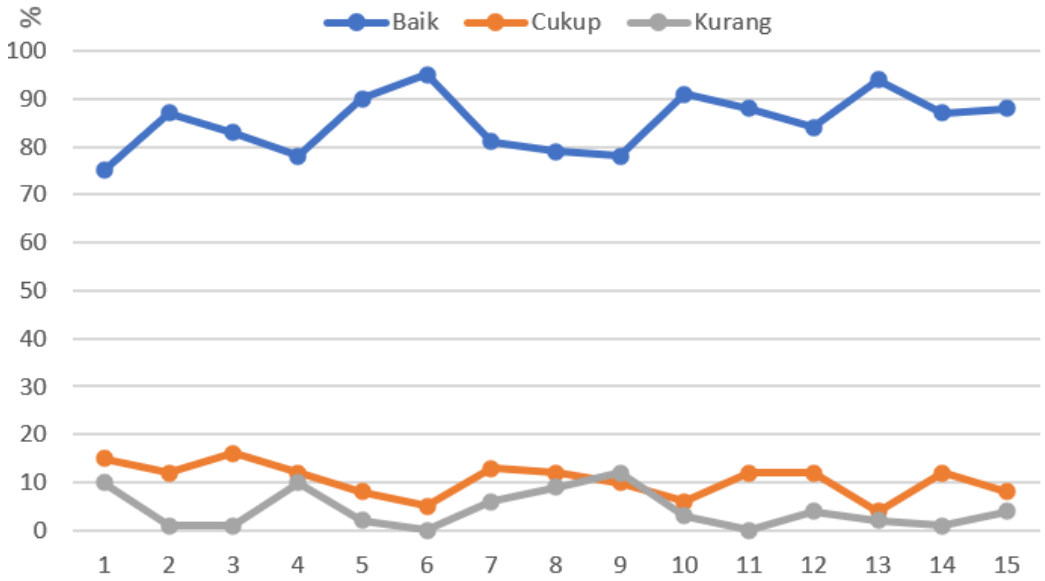

Figure 2. Student's knowledge Based on Group

It is known that the group of students with the highest improvement in knowledge in the "good" category is Group 6, with a score of 95%, while the lowest is Group 1, with a "good" knowledge category score of 75%. Thus, it can be concluded that assignments through PBL (Project-Based Learning) can enhance students' knowledge across all groups overall.

CONCLUSION

The Project-Based Learning (PBL) assignment effectively enhanced students' literacy on Sasak medicinal plants, resulting in the production of 15 pocketbooks. A significant improvement was observed in the category of good knowledge levels, increasing from 22.2% before the PBL assignment to 82.2% afterward. There was a statistically significant increase in knowledge, with a value of $0.009 < 0.05$, indicating a positive impact on the knowledge of Pharmacy students at a university in Lombok regarding the use of Sasak medicinal plants in the community. The student group with the most significant improvement was Group 6, achieving a 95% score in the good knowledge category. This study serves as a foundation for future research that could focus more on identifying medicinal plants with specific compounds and proven efficacy in treating particular diseases. Such findings could be developed into educational materials for Pharmacy students, enhancing their understanding of phytochemistry and its practical applications.

ACKNOWLEDGMENT

The author extends heartfelt gratitude to the promoters and mentors in the scientific publication course and all parties who have supported the successful publication of this research.

REFERENCES

Ariastuti, R., Dyah Herawati, V., Studi Farmasi, P., Sains Teknologi Kesehatan, F., Sahid Surakarta, U., & Peningkatan Kesehatan Masyarakat Kecamatan Banyudono, U. (2019). Utilization of Family Medicinal Plants (TOGA) in Efforts to Improve Community Health in Banyudono District, Boyolali Asuhan Mandiri Tanaman Obat Keluarga (TOGA) dalam.

Journal of Pharmaceutical and Medicinal Sciences, *4*(2), 30–37.

Arviani, L. K. (2024). Peningkatan Kualitas Pembelajaran melalui Lesson Study Pembelajaran Matematika pada Materi Matriks. *Indonesian Journal of Educational Science (IJES)*, *6*(2).

Astriani, M. M. (2020). Upaya Mengembangkan Kreativitas Mahasiswa Melalui Pembelajaran Model P*roject Based Learning. Jurnal Petik*, *6*(1), 36–40. https://doi.org/10.31980/jpetik.v6i1.738

Dewi Agustini, N. P., Megawati, F., Juliadi, D., & Widiari, N. N. S. (2023). Tingkat Pengetahuan Penggunaan Tanaman Obat Tradisional Sebagai Alternatif Pengobatan Pada Masyarakat Desa Wisata Bindu. *Usadha*, *2*(3), 9–14. https://doi.org/10.36733/usadha.v2i3.7145

DinkesNTB. (2017). Riset Tumbuhan Obat dan Jamu (RISTOJA). *Https://Dinkes.Ntbprov.Go.Id/Berita/Riset-Tumbuhan-Obat-Dan-Jamu-Ristoja/*.

Djarwaningsih, T. (2011). Pengajaran Biodiversitas Tumbuhan dan Sarana Pendukungnya di Perguruan Tinggi Indonesia. *Berk. Penel. Hayati*, *5*, 125–128.

Hakim. Aliefman, Liliasari, Kadarohman, A., & Syah, Y. M. (2015). Making a Natural Product Chemistry Course Meaningful with a Mini Project Laboratory. *Journal of Chemical Education*, *93*(1), 193–196.

Hakim, A., Jufri, A. W., & Loka, I. N. (2018). Pengembangan Wisata Tumbuhan Obat Sasak. *Prosiding Konferensi Nasional …*, *1*, 1665–1670. http://prosiding-pkmcsr.org/index.php/pkmcsr/article/view/75

Hakim, A., Junaidi, Ek., Sofia, B. F. D. R., & Anwar, Y. A. S. (2010). Aktivitas Antimalaria dan Skrining Fitokimia Metabolit Sekunder Kayu Batang dan Kulit Akar Artocarpus Camansi Blanco (Moraceae). In *Jurnal Ilmu Kefarmasian Indonesia* (Vol. 8, Issue 2, pp. 131–135). http://jifi.farmasi.univpancasila.ac.id/index.php/jifi/article/view/348

Hidayat, R., Hermandra, H., Zetriuslita, Z., Lestari, S., & Qudratuddarsi, H. (2022). Achievement goals, metacognition and horizontal mathematization: a mediational analysis. *TEM Journal*, *11*(04), 1537-1546.

Junaedi, M., & Gaffar, A. (2024). Intervensi Pemanfaatan Belimbing Wuluh (*Averroa bilimbi*) sebagai Alternatif Pertama Penanganan Batuk Pilek Bagi Masyarakat di Kabupaten Lombok Timur. *PREPOTIF : Jurnal Kesehatan Masyarakat*, *8*(3), 4954–4960.

Kariman. (2014). *Bebas penyakit dengan tanaman ajaib Kariman*.

KemenkesRI. (2013). Permenkes RI Nomor 88 Tahun 2013. *Permenkes*, *123*(10), 2176–2181. https://shodhganga.inflibnet.ac.in/jspui/handle/10603/7385

Khalid, I., & Syafri, R. A. (2023). Model Pembelajaran Problem Based Learning (PBL) Untuk Meningkatkan Keaktifan dan Hasil Belajar Mahasiswa Pada Mata Kuliah Manajemen Jasa. *Indonesian Educational Administration and Leadership Journal (IDEAL)*, *5*(2), 30–45. https://doi.org/10.22437/ideal.v5i2.28733

Lestari, N. (2018). Prosedural Mengadopsi Model 4D Dari Thiagarajan Suatu Studi Pengembangan Lkm Bioteknologi Menggunakan Model Pbl Bagi Mahasiswa. *Jurnal Ilmiah Teknologi FST Undana*, *12*(2), 56–65.

Nurjanah, S., Rahayu, N., N. N., Septiana, F., & Shalikhah. (2019). Peningkatan Kesehatan Masyarakat melalui Pemberdayaan Wanita dalam Pemanfaatan Lahan Pekarangan dengan Tanaman Obat Keluarga (TOGA) di Dusun Semawung. *Community Emprowernment*, *4*(1), 2–25.

Nurniswati, N. (2015). Tanaman Obat Keluarga. In *Parapemikir : Jurnal Ilmiah Farmasi* (Vol. 3, Issue 2). https://doi.org/10.30591/pjif.v3i2.216

Qudratuddarsi, H., Ramadhana, N., Indriyanti, N., & Ismail, A. I. (2024). Using Item Option

Characteristics Curve (IOCC) to Unfold Misconception on Chemical Reaction. *Journal of Tropical Chemistry Research and Education*, *6*(2), 105-118.

Tawil, M. (2024). Ektrapolasi Sikap Terhadap Sains dan Keterampilan Proses Sains Dikaitkan dengan Gender. *Indonesian Journal of Educational Science (IJES)*, *7*(1), 32-44.

Wati, W. E. (2009). Beberapa Faktor Yang Berhubungan Dengan Kejadian Demam Berdarah Dengue (DBD) di Kelurahan Ploso Kecamatan Pacitan Tahun 2009 Factors Related To The Occurrence Of Dengue Hemorrhagic Fever (DHF). *Vektora*, *3*(1), 22–34. http://repository.helvetia.ac.id/id/eprint/1343/%0Ahttp://repository.helvetia.ac.id/id/eprint/1343/2/BAB I-III.pdf

Yamin, M., Burhanudin, Jamaluddin, & Nasrudin. (2018). Pengobatan Dan Obat Tradisional Suku Sasak Di Lombok. *Jurnal Biologi Tropis*, *18*(1), 1. https://doi.org/10.29303/jbt.v18i1.463.