



UNIVERSITAS AHMAD DAHLAN

JURNAL BIOEDUKATIKA

<http://journal.uad.ac.id/index.php/BIOEDUKATIKA>
 2338-6630 (Print)


Development Of A Quick Response Encyclopedia (QR Code) Of Fish Catches Of Fishermen In Air Nusa Serasan Village Natuna Regency

Erlianti^{a, 1, *}, Anandita Eka Setiadi^{a, 2}, Ari Sunandar^{a, 3}

^a Biology Education Study program, Faculty of Teacher Training and Education, Universitas Muhammadiyah Pontianak, Indonesia

¹ erliantisrn01@gmail.com; ² anandita.eka@unmuhpnk.ac.id *; ³ arisunandar@unmuhpnk.ac.id

* Corresponding author

ARTICLE INFO

Article history
 Submission August 11, 2024
 Revision September 07, 2024
 Accepted October 28, 2024

Keyword:

Biodiversity
 Local Potential
 Development Research

ABSTRACT

The learning resources used at SMAN 1 Serasan have not used the local potential found in the Natuna Regency. Therefore, a learning resource is needed to provide a real picture of the biodiversity material students know. Based on a QR Code, this study aimed to measure the feasibility and analyze student responses to the Encyclopedia of Fish Catches of Air Nusa Serasan Village Fishermen of Natuna Regency. This research uses the research and development method with the 4D development model, namely define, design, develop, and disseminate. The dissemination stage was not carried out due to limited time and cost. The results showed that the feasibility of the encyclopedia was very feasible in the language aspect (85.6%), material aspect (89.13%), and media aspect (89.31%). Student responses showed a positive response with a small-scale value of 79,68% and a large-scale value of 87.92%. It is concluded that the QR Code-Based Fishermen's Catch Encyclopedia Media in Air Nusa Serasan Village, Natuna Regency, is suitable for student biology learning.



This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license



Introduction

Natuna is in a very strategic position from an economic point of view, because of its position in the North Natuna Sea area and Indonesian shipping lanes. The potential of Natuna's abundant marine natural resources, directly adjacent to the South China Sea, is very potential to be developed. Natuna's potential fish resources based on the Riau Islands marine and fisheries resource identification study reached 504,212.85 tons/year. The dominant type of fish is tuna, which includes krai tuna (*Auxis thazard*), and komo tuna (*Euthynnus affinis*), and gray tuna (*Thunnus tongol*) (Nurani, et al.

2020: 148). Other types of fish are mackerel, mackerel, tembang fish, bamboo leaf fish, yellowtail fish. The high potential of fish caught by fishermen in Air Nusa village can be utilized as a biology learning resource. These learning resources can provide more meaningful learning in science and biology subjects. Fish caught by fishermen in Air Nusa Village can be developed into an encyclopedia learning media that can be used to deliver biodiversity material.

Based on the results of interviews with biology teachers at SMAN 1 Serasan, the learning resources currently used in the biology learning process are package books. Teachers at SMAN 1 Serasan have not utilized local potential as a source of learning

biology there are still many shortcomings including book content that is not based on local potential. The examples contained in the book only use plants and animals from other regions or countries. Based on the results of interviews with students, it is known that there are still many who do not know the biodiversity found in the surrounding environment. So that learning media is needed that can present real knowledge that is potential in their own area so that students understand the material.

Encyclopedia is a list of subjects accompanied by information about the definition, background, and bibliographic data arranged alphabetically and systematically. Encyclopedia is one of the learning resources that is more suitable to be used as a student handbook. This suitability can be seen from each explanation of the material which is equipped with pictures. Material that is directly given a picture will make learning more contextual. Encyclopedia is a complete source of information and can broaden the horizons of its readers (Jahidin, *et al.* 2023: 47). Encyclopedia in a learning process can be a subject matter conveyed by educators to students, encyclopedias can make students better understand the material discussed (Nurdiansyah, *et al.* 2021).

To achieve effective learning objectives in the learning process, a way is needed, one of which is by using learning media that can steal students' attention. In addition, the use of an additional tool in the form of a QR Code makes the material more accessible to students and is also quite easy to use, namely by scanning the barcode using a cellphone in the play store. Quick Response Code is used as a media complement because it has a simple image but is able to store various information, making it easier for students to understand the subject matter (Rosyidah and Setyawati, 2023: 21).

Method

The research used is Research and Development (R&D) modifying the 4-D development model recommended by Thiagrajan (Mulyatiningsih, 2012: 195). The development procedures according to Thiagrajan are Define, Design, Develop, and

Disseminate. The development model used in this study only reached the development stage while the dissemination stage was not carried out due to time and cost constraints.

This research was conducted at SMA Negeri 1 Serasan. The research subjects were high school class X students. In the small-scale trial, there were 9 students and the large-scale trial amounted to 22 students. The object of the research is the Quick Response Encyclopedia (QR Code) of Fish Caught by Fishermen in Air Nusa Village, Serasan, Natuna Regency. Based on the assumption that QR Code has not been implemented in SMAN 1 Serasan, the author attempts to develop QR Code-based teaching materials that are easy to learn, easy and fast to access. The purpose of this study is to produce QR Code-based teaching materials to measure the feasibility of learning media and analyze student responses to QR Code-based encyclopedia learning media. Data collection was done through interviews, observations, and questionnaires. The interview in this study was a fisherman to find out the types of fish that will be made into an encyclopedia, and continued with direct interviews with teachers and students. This interview was conducted to find out the media used in schools, Observations in this study were in the form of non-participant observations, aimed at analyzing learning media in the form of textbooks at school and the types of fish caught by fishermen, and The questionnaire used in this study aims to obtain data on student responses to encyclopedia learning media using a Likert scale with aspects of material quality, display quality and learning media quality. The data obtained in this study are in the form of product validation questionnaire scores by material expert validators, language expert validators, and media expert validators to assess the validity of the products developed. In addition, data from student response questionnaires were analyzed to assess the practicality of the encyclopedia developed. The questionnaire included questions that were analyzed using a Likert scale with scores of 4, 3, 2, and 1. The categories are shown in table 1 and table 2.

Table 1. Validation Assessment Categories

Percentage (%)	Category
0-20	Invalid
41-60	Less Valid
61-80	Valid
81-100	Very Valid

Based on the assessment criteria table above, the feasibility level of the QR Code-based encyclopedia developed can be described. The standard used by researchers regarding the feasibility that the QR Code-based encyclopedia is declared theoretically feasible if the average assessment is $\geq 70\%$. After analyzing, you get results that have been validated by experts. From these results, it will then be calculated using the following formula:

$$\text{Eligibility Percentage\%} = \frac{\text{Total score}}{\text{Total score}} \times 100\%$$

Table 2. Learning Media Validity Statement Score

Score In Percent (%)	Category Eligibility
1-20%	Very Unworthy
21-40%	Not Feasible
41-60%	Quite Decent
61-80%	Worthy
81-100%	Very Worthy

Analysis of learner response questionnaires will be carried out with small-scale trials and large-scale trials. Therefore, students are given a questionnaire sheet, which is useful for filling out the assessment after using and operating the product. The results of the questionnaire that has been filled out by students are analyzed using the following steps (Abidin,2015):

a. Score each answer using a Likert scale

Table 3. Statement Score Student Response

No	Assessment Criteria	Score	
		Positive Statement	Negative Statement
1	Strongly Agree (SS)	5	1
2	Agree (S)	4	2
3	Disagree (KS)	3	3
4	Disagree (TS)	2	4
5	Strongly Disagree (STS)	1	5

Furthermore, after knowing the student's response, it can be calculated in the following way:

$$\text{Response \%} = \frac{\sum \text{Total score}}{\sum \text{Score obtained}} \times 100\%$$

Interpreting the percentage of respondents' responses with the following criteria

Table 4. Learner Interpretation Criteria

No.	Percentage (%)	Interpretation Criteria
1	84 % < score ≤ 100 %	Very Positive
2	68 % < score ≤ 84 %	Positive
3	52 % < score ≤ 68 %	Regular
4	36 % < score ≤ 52 %	Negative
5	20 % < score ≤ 36 %	Very Negative

Results and Discussion

The results of this research are in the form of a Quick Response Encyclopedia (QR Code) of fish caught by fishermen in Air Nusa Serasan Village, Natuna Regency. This research uses the 4D development model, which consists of 4 stages: define, design, develop, and simulate. The dissemination stage was not carried out due to limited time and money. The defined stage consists of front-end analysis, student analysis, material

analysis, and learning media analysis. The define stage was conducted through interviews with the community, teachers, and students of class X SMA Negeri 1 Serasan, revealing that the media used, namely power point, was not enough to explore knowledge as a whole. The front-end analysis was conducted by interviewing fishermen to find out the types of fish in Air Nusa Village, then with teachers and students to find out the basic problems in biology teaching materials at SMA Negeri 1 Serasan School. Student analysis is carried out to determine the characteristics of students in terms of their abilities. Material analysis is used to determine the material by documenting the syllabus in encyclopedia learning media. And analysis of learning media. Researchers developed a Quick Response Encyclopedia (QR Code) of Fish Catching Fishermen in Air Nusa Serasan Village, Natuna Regency, with the topic of biodiversity material in class X SMA Negeri 1 Serasan. The analysis of fish caught by fishermen involved interviews with informants, including members of the local community. The characteristics of encyclopedia learning media include index, topics and subtopics, there are explanations of topics and general explanations, there are cross references or arrows which are used as references to things used as references, see more and further more.

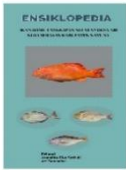
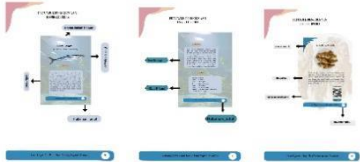




The design stage aims to design an encyclopedia of fish caught by fishermen, which is used to design encyclopedia products. Encyclopedia product design using Canva Canva has several diverse advantages so that it can produce attractive designs, make it easier to design learning media practically, and save time (Wulandari & Mudinillah, 2022; Zebua, 2023). The content of this encyclopedia comes from fish identification obtained from interviews with the people of Natuna Regency. The encyclopedia developed consists of three main parts: introduction, content, and conclusion.



Table 5. Components of the Fisherman's Fish Encyclopedia

No	Section	Description
1	Intial	Cover, Foreword, Table of Contents, Introduction, Instructions for Use of the Encyclopedia
2	Contents	Characteristics Description of fish, morphology, classification, utilization of fish as processed products, QR Code containing videos that domesticate the process of making special foods using various types of fish
3	Final	References, Glossary, and Bibliography

The development stage aims to produce learning media in the form of a fish encyclopedia used in Natuna Regency that is considered suitable for use based on input from experts (validators), development tests, and product improvement. Validation aims to obtain assessments and suggestions as a reference to improve the encyclopedia book to produce a better product (Wibowo et al., 2019). Learning media is said to be valid if it meets the validation assessment aspects. The validation of encyclopedia media was carried out by 9 validators consisting of 3 material experts (2 lecturers, 1 teacher), 3 media experts (2 lecturers, 1 teacher), and 3 linguists (1 lecturer, 2 teachers). Revisions were made based on input from media experts, material experts, and linguists. The revision in this step is a design revision before the product trial. The revision result is the initial product that has been validated. The encyclopedia was made according to ISO standards, with dimensions of 21x29.7 cm. Based on the results of the assessment given by experts, the visual presentation of the encyclopedia can be seen in Table 6.

Table 6. Components of the Fisherman's Fish Encyclopedia

Draft	Picture	Description
Front cover		Contains a title, accompanied by several pictures of fish caught by fishermen
Instructions for using the encyclopedia		Contains instructions related to the description of the encyclopedia section
Contents		Contains a description of the fish
Contents		Describes the morphology and classification of fish
Contents		Contains an explanation of the description of processed products and product processing videos
Bibliography		Contains the source of information obtained
Glossary		Contains the source of information obtained

Draft	Picture	Description
Compilar profile		Contains the author's biodata which usually contains the name, date of birth, and education history.
Encyclopedia Qr Code		Encyclopedia Qr Code

The resulting learning medium can be said to be very feasible if it meets the validity aspects. The results of material expert validation showed 89.13% (very feasible), media 89.31% (very feasible), and language 85.6% (very feasible), as shown in table 7.

Table 7. Expert Validation Assessment Results

No.	Media Expert	Percentage%	Criteria
1	Material Expert	89,13%	Very Feasible
2	Media Expert	89,31%	Very Feasible
3	Linguist	85,6%	Very Feasible

The development stage aims to assess students' responses to the learning media developed in the form of an encyclopedia of fish caught by fishermen used in Natuna Regency. Student responses were evaluated through small-scale and large-scale trials. Small-scale and large-scale trials were conducted after validation by material experts, media experts, and linguists. The large-scale trial was conducted to assess the encyclopedia media with a larger number of students. The aspects assessed in the small-scale and large-scale trials included the suitability of the material, language, usability, and appearance. The overall assessment consisted of 16 statements. The results of the small-scale trial showed 79.68% (positive), and the results of the large-scale trial showed 87.92% (very positive) as shown in table 8.

Table 8. Student Response Assessment Category

No	Experiment	Percent	Description
1	Small Scale	79,68%	Positive
2	Large Scale	87,92%	Very Positive

The use of an encyclopedia of fish caught by fishermen can have an influence on student interest in learning and student success in understanding the learning taught by the teacher. The existence of learning media plays an important role in the quality of student learning because not only teachers are active in providing material to students, but students can also be active in learning (Lafifa et al., 2022). This can be seen from the results of small-scale trials obtained with an average of 79.68% (positive) and large-scale trials obtained with an average of 87.92% (very positive), which means that students are very interested in learning to use the encyclopedia of fish caught by fishermen. At the Disseminate stage, researchers did not conduct due to limited time and costs when conducting research.

Conclusion

Based on the results of the study, the development of an encyclopedia of fish caught by fishermen used in Natuna Regency has reached a level of suitability and can be used in learning. The results of the encyclopedia validation meet the predetermined assessment criteria for both the material aspect (89.13%), the media aspect (89.31%), and the language aspect (85.6%). The results of student responses showed very positive results both in the small-scale trial of 79.68% and the large-

scale trial of 87.92%. Thus, the encyclopedia of fish caught by fishermen used in Natuna Regency can be used as a learning medium.

Suggestions that can be submitted by researchers regarding development research, namely, the media encyclopedia of fish caught by fishermen used in class X SMA biodiversity material that has been developed can be tested for the effectiveness of its validity on improving student learning outcomes, student learning interest, and student learning motivation by other researchers.

Acknowledgment

The author would like to thank the community of Air Nusa village, and the head of SMA Negeri 1 Serasan for helping to obtain data for this research. Thank you to the lecturers, teachers, and students who have contributed to this research.

References

- Abidin, Yunus. 2015. *Pembelajaran Bahasa Berbasis Pendidikan Karakter*. Bandung: PT Refika Aditama.
- Azizah dan Alberida. 2021 Seperti Apa Permasalahan Pembelajaran Biologi Pada Siswa SMA. *Jurnal For Lesson and Learning Studies*. 4(3), 388-395.
- Cahyadi, A. 2019. *Pengembangan Media dan Sumber Belajar*. Penerbit Laksita Indonesia: Serang.
- De Pietro & Fronter. 2012. Mobile Tutoring For Situated Learning and Collaborative Learning In AIML Application Using QR-Code. 2012 Sixth International Conference On Complex, Intelligent and Software Intensive System (pp. 799-805). doi: 10.1109/CISIS. 2012. 154.
- De Pietro, O. 2013. Authentic and Situated Learning With The Use Of An Adaptive Search Engine and A QR-Code In Mobile Mode International. *Journal Of Digital Literacy and Digital Competence*. 4(3), 19-30.
- Ernawati dan Sukardiyanto. 2017. Uji Kelayakan Media Pembelajaran Interaktif Pada Mata Pelajaran Administrasi Server. *Jurnal Elinvo*. 2(2), 207.
- Febrianti, Karyadi, & Kasrina. 2018. Penerapan Model Kooperatif Tipe-Group Investigation (G) Pada Materi Sistem Ekskresi Manusia Untuk Meningkatkan Hasil Belajar Siswa Kelas XI IPA SMAN 8 Kota Bengkulu. *Jurnal Pendidikan dan Pembelajaran Biologi*. 2(1), 10-14.
- Febrianti, Harisandy, Nadhira, & Syahputra. 2022. Keanekaragaman dan Identifikasi Morfometrik Jenis Ikan Hasil Tangkapan Nelayan di TPI Kuala Langsa. *Jurnal JEUMPA*. 9(2), 758-766.
- Fitrah, Dewiyanti, & Rizwan. 2016. Identifikasi Jenis Ikan Di Perairan Laguna Gampoeng Pulot Kecamatan Leupung Aceh Besar. *Jurnal Ilmiah Mahasiswa Kelautan dan Perikanan Unsyiah*. 1(1), 66-81.
- Harahap, F., Nurliza, N., & Nasution, N. E. A. 2020. Pengembangan Ensiklopedia Perbanyak Tanaman Melalui Kultur Jaringan Sebagai Sumber Belajar Tambahan Untuk Siswa Sma. *Jurnal Pelita Pendidikan*, 8(1), 52-61. <https://doi.org/10.24114/jpp.v8i1.17301>
- Hidayat, A., & Saputro, S. 2015. Pengembangan Media Pembelajaran Ensiklopedia Hukum-Hukum Dasar Kimia Untuk Pembelajaran Kimia Kelas X SMAN 1 Boyolali dan SMAN 1 Teras. *Jurnal Pendidikan Kimia*. 4(2), 47-56.
- Jahidin, Agriansyah, & Sukeisi. 2023. Pengembangan Sumber Belajar Berbentuk Ensiklopedia Untuk Mendukung Materi Protista SMA Kelas X. *Jurnal Alumni Pendidikan Biologi*. 8(1), 46-53.
- Jailani dan Hamid. 2016. Pengembangan Sumber Belajar Berbasis Karakter Peserta Didik Ikhtiat Optimalisasi Proses Pembelajaran Pendidikan Agama Islam PAI. *Jurnal Pendidikan Islam*. 20(2), 177-178.
- Katarina, H. N., Kartika, W. D., & Wulandari, T. 2019. Keanekaragaman Jenis Ikan Hasil Tangkapan Nelayan Di Kelurahan Tanjung Solok Tanjung Jabung Timur Diversity of Fish Caught By Fisherman in Tanjung Solok Subdistrict Tanjung Jabung Timur. *Jurnal Biospecies*, 12(2), 28-34.

- Komalasari, S. 2017. Ensiklopedia Buah-Buahan Lokal Berbasis Potensi Alam Jember. *Jurnal Biologi dan Pembelajaran Biologi*. 2(1):61-75.
- Kurniawan, D., Dewi, S. V., & Kerja, L. 2017. Pengembangan Perangkat Pembelajaran dengan Media Screencast- O-Matic. *Jurnal Siliwangi*, 3(1), 214-219.
- Mokodompit, Wahyuni, & Kumaji. 2022. Keanekaragaman Tumbuhan Suku Piperaceae di Kawasan Air Terjun Lombongo Provinsi Gorontalo. *Jurnal Biologi Makassar*. 7(1), 95-102.
- Mokodompit, Kandowangko, & Hamidun. 2022. Keanekaragaman Tumbuhan di Kampus Universitas Negeri Gorontalo Kecamatan Tilong Kabila Kabupaten Bone Bolango. *Jurnal BIOSFER*. 7(1), 75-80.
- Mulyatiningsih, Endang. 2012. Metode Penelitian Terapan Bidang Pendidikan. Bandung: Alfabeta.
- Munajah & Susilo. 2015. Potensi Sumber Belajar Biologi SMA Kelas X Materi Keanekaragaman Tumbuhan Tingkat Tinggi di Kebun Binatang Gembira Loka. *JUPEMASI-PBIO*. 1(2), 184-187
- Musthofa, N. A., Mutrofin, S., & Murtadho, M. A. 2016. Implementasi Quick Response (QR) Code Pada Aplikasi Validasi Dokumen Menggunakan Perancangan Unified Modelling Language (UML). *Jurnal Antivirus*. 10(1), 42-50.
- Nurani, Oktariza, Taryono, Trilaksani, Adrianto, Ahmad, Muawanah, & Pratama. 2020. Strategi Percepatan Fungsionalisasi Sentra Kelautan Perikanan Terpadu Natuna. *Jurnal Marine Fisheries*. 11(2), 147-160.
- Nurdiansyah, E., Faisal, E. El, & Sulkipani, S. 2021. Pengembangan Ensiklopedia Identitas Nasional Berbasis Kearifan Lokal. *Jurnal Civic Hukum*, 6(2), 112-123.
<https://doi.org/10.22219/jch.v6i2.14612>
- Nurfadillah, S., Rofiqoh Azhar, C., Aini, D. N., Apriansyah, F., Setiani, R., & Tangerang, U. M. 2021. Pengembangan Media Pembelajaran Berbasis Teknologi Untuk Meningkatkan Hasil Belajar Siswa Sd Negeri Pinang 1. *BINTANG : Jurnal Pendidikan Dan Sains*, 3(1), 153-163.
<https://ejournal.stitpn.ac.id/index.php/bintang>
- Nurhidayah, Firdaus, Amaliah, & Atirah. 2021. Pengembangan E-Modul Berbantuan QR Code Pada Pembelajaran Daring Mata Pelajaran Biologi Materi Sel Kelas XI MIA. *Jurnal Matematika, Sains, dan Pembelajarannya*. 7(21), 105-111.
- Perdana, W. A. 2015. Pengelolaan Sumber Daya Pesisir dan Laut Melalui Kearifan Lokal di Mukim Mane Kecamatan Muara Batu Kabupaten Aceh Utara. *Agrisep*. 17(1), 1-8.
- Prathivi, R. 2018. Analisa Sistem Qr Code Untuk Identifikasi Buku Perpustakaan. *Jurnal Pengembangan Rekayasa dan Teknologi*. 14(2), 37-40.
- Prayitno, TA. 2017. Pengembangan Petunjuk Praktikum Mikrobiologi Program Studi Pendidikan Biologi. *Jurnal Biota*, 3(1), 31-37.
- Ratnasari. 2019. Identifikasi Jenis Ikan Air Tawar di Pasar Masuka Sintang Kalimantan Barat. *Jurnal Keguruan dan Ilmu Pendidikan*. 3(2), 82-87.
- Ridwan . 2016. Skala Pengukuran Variabel-Variabel Penelitian. Alfabeta.
- Ritonga, A. P., Andini, N. P., & Iklimah, L. 2022. Pengembangan Bahan Ajaran Media. 1(3), 343-348.
- Rosnawati, V., & Kaharudin, L. ode. 2020. Pengembangan Ensiklopedia Berbasis Potensi Lokal Yang Terdapat Di Wakatobi Pada Materi Pokok Animalia Invertebrata (Mollusca Dan Echinodermata). *JIKAP PGSD: Jurnal Ilmiah Ilmu Kependidikan*, 4(1), 84.
<https://doi.org/10.26858/jkp.v4i1.12055>
- Rosyidah, P. N., & Setyawati, H. 2023. Pengembangan Media Pembelajaran Flipchart Dilengkapi Quick Response (Qr) Code Pada Materi Virus Untuk Siswa Kelas X Sma Negeri Umbulsari Jember. *VEKTOR :Jurnal Pendidikan IPA*, 4(1), 2-3.
<https://doi.org/10.35719/vektor.v4i01.76>
- Samsinar, S. 2019. Urgensi Learning Resources Sumber Belajar Dalam Meningkatkan Kualitas Pembelajaran. *Jurnal Kependidikan*. 13(2), 194-205.

- Saputri. 2020. Preferensi Konsumen Dalam Menggunakan Quick Response (Qris) Sebagai Alat Pembayaran Digital. *Jurnal Kinerja*. 17(2), 237-247.
- Sugiyono. 2015. Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D). Bandung: Alfabeta
- Sulistiyawati & Hediani. 2015. Pengembangan Ensiklopedia Peralatan Laboratorium Biologi Sebagai Sumber Belajar IPA Biologi Untuk Siswa Kelas VII SMP/MTS. Seminar Nasional XII Pendidikan Biologi FKIP UNS 2015.
- Widiyarsi, Astriyani, & Irawan. 2020. Pengembangan Perangkat Pembelajaran Matematika Dengan Bantuan Media Evaluasi Thatquiz. *Jurnal Pendidikan Matematika dan Matematika*. 6(2). 141-154.
- Zuliani, Heri, Bakara, Sammy, & Ariesta. 2023. Keanekaragaman Hayati Pengenalan Materi Untuk Pengembangan Kurikulum Merdeka dan Muatan Lokal Sekolah Dasar dan Sekolah Menengah Pertama di Kabupaten Kapuas Hulu. Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi: Jakarta.