



USDB
SANATA DHARMA BERBAGI



PROSIDING SEMINAR NASIONAL SANATA DHARMA BERBAGI

"PENGEMBANGAN, PENERAPAN DAN PENDIDIKAN
'SAINS DAN TEKNOLOGI' PASCA PANDEMI"

Diselenggarakan oleh:

Lembaga Penelitian dan Pengabdian Kepada Masyarakat
Universitas Sanata Dharma Yogyakarta

Bekerjasama dengan:

IndoCEISS
Indonesian Computer, Electronics and Instrumentation Support Society
D.I.Yogyakarta

26 NOVEMBER 2022

UNIVERSITAS SANATA DHARMA
YOGYAKARTA

**PROSIDING SEMINAR NASIONAL SANATA
DHARMA BERBAGI**

**"Pengembangan, Penerapan Dan Pendidikan
'Sains Dan Teknologi' Pasca Pandemi"**

26 November 2022

Universitas Sanata Dharma Yogyakarta



Sanata Dharma University Press

**PROSIDING SEMINAR NASIONAL SANATA DHARMA BERBAGI
"Pengembangan, Penerapan Dan Pendidikan 'Sains Dan Teknologi' Pasca Pandemi"**

Copyright © 2022

Universitas Sanata Dharma, Yogyakarta

DEWAN EDITOR & REVIEWER

Dr. Eng. I Made Wicaksana Ekaputra
Barli Bram, Ph.D.
Dr. Eng. Gunawan Dwi Haryadi
Dr. Eng. Rando Tungga Dewa, S.T., M.Eng.
Dr. Ir. Anastasia Rita Widiarti
Dr. Ir. Budi Sugiharto
Drs. Haris Sriwindono M.Kom, Ph.D.
Dr. Lusia Krismiyati Budiasih
Dr. Ir. I Gusti Ketut Puja
Ir. Damar Widjaja Ph.D.
Dr. rer. nat. Herry Pribawanto Suryawan
Dr. Ir. Yohanes Baptista Lukiyanto
Dr. R. Kunjana Rahardi, M.Hum.
Dr. Marcellinus Andy Rudhito, S.Pd.
Vittalis Ayu, S.T., M.Cs.

KOORDINATOR DEWAN EDITOR:

Dr. Eng. I Made Wicaksana Ekaputra
Barli Bram, M.Ed., Ph.D.

BUKU ELEKTRONIK (e-BOOK):

ISBN: 978-623-6103-96-8 (PDF)

EAN: 9-786236-103968

Cetakan Pertama, Desember 2022
xii+1097 hlm.; 21x27,9 Cm.

ILUSTRASI & TATA LETAK:

Sang Condro Nugroho
Elizabeth Fenny Handayani
Thomas Aquino Hermawan Martanto
SAMPUL & LAYOUT AKHIR BUKU
Sang Condro Nugroho
Thomas Aquino Hermawan Martanto

DITERBITKAN OLEH



SANATA DHARMA UNIVERSITY PRESS
Lantai 1 Gedung Perpustakaan USD
Jl. Affandi (Gejayan) Mrican, Yogyakarta 55281
Telp. (0274) 513301, 515253; Ext. 51513; Fax (0274) 562383
Website: www.sduipress.usd.ac.id / e-Mail: publisher@sud.ac.id



Sanata Dharma University Press anggota APPTI
(Afiliasi Penerbit Perguruan Tinggi Indonesia)
No. Anggota APPTI: 003.028.1.03.2018

KEPANITIAAN

Pengarah & Penanggung Jawab:

Prof. Ir. Sudi Mungkasi, Ph.D.

Ketua Panitia: Dr. apt. Yustina Sri Hartini

Wakil Ketua: Dr. Gabriel Fajar Sasmita Aji

Sekretaris: Maria Dwi Budi Jumpowati

Bendahara: M.I. Rini Hendriningsih

Pengarah Acara:

Ir. Drs. Haris Sriwindono, M.Kom, Ph.D.

Ir. Damar Widjaja, Ph.D.

Drs. Tarsisius Sarkim, M.Ed., Ph.D.

Dr. Hongki Julie, M.Si.

Sie Acara:

Rosalia Arum Kumalasanti, M.T.

Maria Vincentia Eka Mulatsih, S.S., M.A.

Sie Publikasi Dekorasi Dokumentasi:

Elizabeth Fenny Handayani

Gutomo Windu Wratsongko

Sang Condro Nugroho

Yanuaris Joko Nugroho

Sie Humas: Antonius Febri Harsanto

Pemrosesan Buku & ISBN:

Thomas Aquino Hermawan Martanto

Veronika Margiyanti

Tim Live Streaming:

Sandi Alexius Sandi Atmoko

Bartolomeus Sigit Yogyantoro

Stephanus Christiono Eka Putra

Yohannes Rio Falmy

Sie E. Sertifikat: F.X. Made Setianto

INSTITUSI PENDUKUNG/KERJA SAMA

Lembaga Penelitian dan Pengabdian Kepada Masyarakat
Universitas Sanata Dharma Yogyakarta

IndoCEISS Indonesian Computer, Electronics
and Instrumentation Support Society
D.I.Yogyakarta

Hak Cipta Dilindungi Undang-Undang.

Dilarang memperbanyak karya tulis ini dalam bentuk dan dengan cara apa pun, termasuk fotokopi,
tanpa izin tertulis dari penerbit.

KATA PENGANTAR

Universitas Sanata Dharma berupaya menyediakan 'wadah' untuk menampung dan mendeseminasikan karya ilmiah dosen dan mahasiswa serta meningkatkan kuantitas dan kualitas karya ilmiah dosen dan mahasiswa baik dari USD maupun pihak lain dari luar USD.

Seminar Nasional Sanata Dharma Berbagi dengan tema ""Pengembangan, Penerapan, dan Pendidikan 'Sains dan Teknologi' Pasca Pandemi" menghadirkan empat pembicara utama yakni Dr. Rosa Delima, S.Kom., M.Kom. (topik: MODEL OTOMATIS UNTUK ANALISIS, SPESIFIKASI, DAN VALIDASI KEBUTUHAN PERANGKAT LUNAK), Dr. L. N. Harnaningrum, S.Si., M.T. (topik: MODEL PENYIMPANAN DATA KREDENSIAL DI SMARTPHONE UNTUK MENDUKUNG TRANSAKSI MOBILE YANG AMAN), Dr. Iwan Binanto, S.Si., M.Cs. (topik: MODEL PENGENALAN SENYAWA KIMIA PADA LUARAN LIQUID CHROMATOGRAPY MASS SPECTROMETRY (LCMS) TANAMAN KELADI TIKUS), dan Dr. Ridowati Gunawan, S.Kom., M.T. (topik: PENINGKATAN KUALITAS HIGH-UTILITY ITEMSET MENGGUNAKAN PENDEKATAN SWARM INTELLIGENCE PADA KASUS ANALISIS KERANJANG BELANJA).

Prosiding Seminar Nasional Sanata Dharma Berbagi dengan tema ""Pengembangan, Penerapan, dan Pendidikan 'Sains dan Teknologi' Pasca Pandemi" memuat 80 makalah yang telah diseleksi oleh tim editor. Delapan puluh naskah ini merupakan hasil seleksi dari total 101 makalah yang diterima oleh panitia melalui Open Conference Sysyems (OCS) Seminar Nasional Sanata Dharma Berbagi (USDB) 2022. Semoga prosiding ini bermanfaat bagi kita semua.

Terima kasih

Yogyakarta, November 2022
Ketua Panitia Seminar USDB
Dr. apt. Yustina Sri Hartini

DAFTAR ISI

KATA PENGANTAR	iii
DAFTAR ISI	v
AKTIVITAS ANTIBAKTERI LIDAH BUAYA (<i>Aloe vera</i> L.) SEBAGAI BIOZANITISER TERHADAP <i>Stahylococcus aureus</i> : STUDI LITERATUR.....	1
Antonia Brigita Putri Lefanska, Yustina Sri Hartini	
ANALISIS BERPIKIR KRITIS PESERTA DIDIK KELAS VII DALAM MENYELESAIKAN SOAL AKM MATERI GEOMETRI DAN PENGUKURAN.....	7
Amellya Anastasya Ursia, Dominikus Arif Budi Prasetyo	
ANALISIS GAYA SILINDER <i>LIFT ARM WHEEL LOADER</i> MENGGUNAKAN <i>FEA</i>	17
Pankrasius Surya Tonapa, Budi Sugiharto	
ANALISIS KESALAHAN DALAM MENYELESAIKAN SOAL RELASI PADA SISWA KELAS VIII SMPN 1 LOURA	28
Susanti Kadi, Yulius Keremata Ledo, Samuel Rex M. Making	
ANALISIS KESULITAN DALAM MENYELESAIKAN SOAL PADA MATERI PERSAMAAN NILAI MUTLAK UNTUK SISWA KELAS X SMK NEGERI 2 KOTA TAMBOLAKA	36
Mersiana S. K. Lende, Yulius Keremata Ledo, Samuel Rex M. Making	
ANALISIS KONDISI PERENCANAAN PEMBELAJARAN MATA KULIAH PENDIDIKAN KEWARGANEGARAAN BERBASIS E-LEARNING.....	47
Delfiyan Widiyanto, Annisa Istiqomah	
ANALISIS PENALARAN MATEMATIS SISWA DALAM MENYELESAIKAN SOAL AKM KELAS X SMAK ST. DOMINIKUS TAMBOLAKA.....	58
Nopliana Bili, Yulius Keremata Ledo, Samuel Rex M. Making	
ANALISIS PERSEPSI MAHASISWA TERHADAP PELAKSANAAN PRINSIP PEMBELAJARAN HIBRID DI PRODI PENDIDIKAN MATEMATIKA UNIVERSITAS SANATA DHARMA	64
Dominikus Arif Budi Prasetyo, Chatarina Enny Murwaningtyas, Margaretha Madha Melissa	
ANALISIS SENTIMEN BANTUAN LANGSUNG TUNAI COVID-19 MENGGUNAKAN ALGORITMA SUPPORT VECTOR MACHINE	72
Dian Putra Anugrah S.B., Hari Suparwito	

PENINGKATAN KUALITAS <i>HIGH-UTILITY ITEMSET</i> MENGGUNAKAN PENDEKATAN <i>SWARM INTELLIGENCE</i> PADA KASUS ANALISIS KERANJANG BELANJA.....	905
Ridowati Gunawan	
PERBANDINGAN PEMBACAAN DATA LAPORAN PENGGUNA LMS BELAJAR MENGGUNAKAN VISUALISASI GOOGLE ANALYTICS DAN GOOGLE DATA STUDIO.....	920
Stephanus Christiono Eka Putra	
PERBANDINGAN <i>PREPROCESSING</i> DENGAN BAHASA INDONESIA DAN INGGRIS DALAM ANALISIS SENTIMEN TERKAIT KULIAH DARING MENGGUNAKAN <i>MULTINOMIAL NAÏVE BAYES</i>	938
Bayu Restu Adji, J.B. Budi Darmawan	
PERBANDINGAN UNJUK KERJA TCP TAHOE, RENO, NEW RENO DAN SACK PADA JARINGAN KABEL	948
Agung Hernawan	
RANCANGAN DAN TANTANGAN PEMBELAJARAN MATEMATIKA TINGKAT SMA DALAM MEMPERSIAPKAN PEMBELAJARAN BERBASIS LITERASI DAN NUMERASI.....	962
Anung Wicaksono, Nor Annisa	
PROJECT-BASED LEARNING MODULE FOR 4 th GRADE ELEMENTARY SCHOOL STUDENT BASED ON VARK LEARNING STYLE	978
Ignatia Esti Sumarah, Rusmawan, Cipta Gilang Kencana, Kristophorus Divinanto Adi Yudono, Chrisnutajati Waninghiyu, Agata Mustika Kusuma Dewi	
PROSES BERPIKIR LATERAL SISWA DALAM MATEMATIKA DITINJAU BERDASARKAN PRESTASI BELAJAR MATEMATIKA	992
Kala Pandu, St. Suwarsono	
PROTOTIPE SMART HOME MENGGUNAKAN VOICE CONTROL DAN BLYNK.....	1007
Yoel Aldo Moga, Augustinus Bayu Primawan	
STUDI FENOMENOLOGI PEMBELAJARAN DARING SAAT PANDEMI COVID-19 PADA MAHASISWA DAN DOSEN PROGRAM STUDI PENDIDIKAN EKONOMI UNIVERSITAS SANATA DHARMA	1024
Syukur Rahmat Gulo, Catharina Wigati Retno Astuti	
PENGEMBANGAN BUKU AKTIVITAS BERBASIS BERPIKIR KOMPUTASIONAL DENGAN TOPIK PELAJAR PANCASILA PADA ANAK USIA 9-12 TAHUN.....	1034
Valerius Riko Hernawan, Christiyanti Aprinastuti, Kintan Limiansih	



**PROJECT-BASED LEARNING MODULE FOR 4th GRADE
ELEMENTARY SCHOOL STUDENT BASED ON VARK LEARNING
STYLE**

**Ignatia Esti Sumarah¹, Rusmawan², Cipta Gilang Kencana³, Kristophorus
Divinanto Adi Yudono⁴, Chrisnutajati Waninghiyu⁴, Agata Mustika Kusuma
Dewi⁵**

^{1,2,4,5}Universitas Sanata Dharma (Mrican Tromol Pos 29-Yogyakarta 51324)

³Santa Angela (Jl. Merdeka no.24-Bandung 40117)

⁴Unika Widya Mandala Surabaya Kampus Kota Madiun (Jl. Manggis No.15-17, Kejuron, Kec.
Taman, Kota Madiun, Jawa Timur 63131)

*Email: isumarah@gmail.com

Abstract

This research is motivated by the urgency of teachers to facilitate the learning process based on students' learning styles. The purpose is to develop a project-based learning model for 4th grade elementary school students with a VARK (Visual, Auditory, Read/write, and Kinaesthetic) learning style. The research conducted was a development research with the ADDIE model. The objects were 4th grade elementary school students, 25 students from St. Angela Bandung and 21 students from SDN Selang, Gunung Kidul Regency. Data were collected using a VARK questionnaire consisting of 16 multiple choice questions, to determine students' learning styles; and then were analysed by descriptive analysis. The results of the study showed that there were various student learning styles that need to be facilitated with project-based learning modules. The product developed was entitled "Project-Based Learning Module for 4th Grade Elementary School Students Based on VARK Learning Style". After validating by 3 experts, the module value was 3.4 which meant worth to be tested after revision. The limited trial was carried out by a 4th grade teacher at St. Angela's Elementary School, and showed that the module was effective to facilitate students with a VARK learning style.

Keywords: learning style, module, project-based learning

Introduction

Education is a process of knowledge transfer and character formation through a learning process between educators and students (Ambarini et al., 2013). The process must be able to facilitate the development of students' left and right brain abilities. If this balance is created, students' learning motivation will be formed because they understand the importance of education for life. Therefore, schools need to facilitate the learning process of students who have different abilities, to develop their intelligence. According to Howard Gardner (Phillips, 2010), every individual from birth has multiple intelligences. There are eight multiple intelligences, namely linguistic, mathematical or logical, spatial, kinesthetic, musical, interpersonal, intrapersonal, and naturalist. In addition, it is known that each student has varying intelligence, for example there are types who have the ability to count quickly, other students have accurate spatial-visual abilities and

enjoy participating in adventurous activities such as scouts, there are students who have multi-talents combined with some of the eight intelligences. Gardner also emphasized that teachers need to detect the intelligence of students who show certain characteristics and facilitate the learning process, in order to help the development of their intelligence.

One way for teachers to be able to detect the type of student intelligence is to understand their learning style. Learning style is a process of acquiring new knowledge and skills (Widharyanto, 2017). One of the learning style models developed to facilitate the development of students' intelligence is VARK which was created by Neil D. Fleming. Before VARK was created, Fleming had discovered the VAK learning style in 1987. The learning style of the VAK model consists of 3 styles, namely Visual (V), Aural (A), and Kinesthetic (K), while the VARK has an update in the form of differentiation of modality V. This visual modality is divided into a new modality called read/write (R), with the consideration that the preference for modality V with R "is not always found in a group of people with a similar learning style" (Widharyanto, 2017). The emergence of the read/write modality as a complement to the VAK learning style has added a new term to the Fleming learning style known as the VARK learning style or learning style which consists of four modalities including visual, aural, read/write and kinesthetic (Fleming & Bonwell, 2019). The VARK learning style has characteristics in each of its modalities. The selection of the VARK learning model in the study was based on the suitability of this model with the characteristics of learning activities in elementary schools involving four elements of the learning style model. The VARK learning style has characteristics in each of its modalities. The selection of the VARK learning model in the study was based on the suitability of the VARK model with the characteristics of learning activities in elementary schools, which involved four elements of the VARK learning style model.

Researchers are interested in Kristophorus Divinanto Adi Yudono's research, entitled "Learning Activities Based on the Diversity of Each Student's Learning Styles", based on Fleming's ideas. The VARK questionnaire was prepared by emphasizing the four VARK letters that represent each learning style, namely V for visual, A for aural, R read/write, and K for kinesthetic (Robertson et al, 2011). Each alphabet represents a learning style that has its own character in the application of learning activities (Divinanto, 2021). VARK questionnaires were distributed to 21 3rd grade students of private elementary schools in Purworejo Regency, Central Java, on 12 and 13 March 2021. The result was 10 students had learning style V, 5 students had learning style A and K, and 1 student had learning style R. The data obtained motivates researchers to conduct further research.

The researcher then collaborated with Divinanto to distribute VARK instruments to 4th grade elementary school students, namely 25 for St. Angela Elementary School students in Bandung and 21 for State Elementary School students in Gunung Kidul Regency. As a result, at St. Angela Elementary School: 58% of students had a learning style of V, 23% A, 15% R and 4% K. Meanwhile at Selang State Elementary School: 37% A, 31% V, 16% R and 16% K. From the results of interviews with 4th grade teachers at St. Angela's Elementary School, the researchers obtained information that the teacher was willing to work together in making learning modules to facilitate students, the majority of whom had learning styles V and A. The aimed was to assist students in gaining knowledge by

experiential learning; learn through experiences that were in accordance with the learning style.

In applying learning with an experiential learning model, teachers do need to understand students' learning styles (Sugiyanto, 2012). Variations in presenting materials and assignments that are adapted to learning styles can motivate students in learning. This idea is in line with the results of a study by Zagoto, et al. (2019) entitled "Individual differences from their learning styles and their implications in learning", which explains the importance of teachers carrying out a learning process that is in accordance with student learning styles. Video media and picture books are known to help students who have a V learning style to absorb the subject matter easily. To help students who have an A learning style, teachers can invite them to read the lesson materials in a voiced manner. Teachers facilitate students who have an R learning style by letting them take notes or tell stories during the learning process. The teacher invites students to learn by exploring the environment, making it easier for them with the K learning style to understand the teaching material. Based on this research, it is known that teachers must be able to design learning activities that suit with various student learning styles. As described above, there are several dimensions of learning styles that can be used as a basis by teachers in making variations in their teaching. One of the routes is to include Visual, Aural, Read/write, and Kinesthetic modalities. Therefore, teachers need to use learning models to be able to enter VARK modalities during the learning process (Arends, 2013).

Researchers then chose a project-based learning model (PjBL) to apply thematic learning that suits students' learning styles. This is because the learning model can increase student creativity to get a learning experience that matches their competencies (Rusman, 2016). In addition, the results of Kusuma's research (2018) on "Application of the PjBL model assisted by audiovisual media to improve science learning outcomes", recommend that project-based learning with audiovisual media can be an alternative to apply thematic learning models innovatively. The research of Handayani, et al. (2021) entitled "Application of Project based learning model assisted by learning videos to increase creativity of artwork in 2nd grade students of SDN 2 Sungapan", underlines the importance of teachers using the PjBL model in online learning to improve student artwork. The research of Dani, et al. (2021) "Development of integrated thematic teaching materials based on life skills with Project based learning in elementary schools", proves that the development of thematic teaching materials based on the "Project Based Learning" learning model has been effectively implemented because it is able to increase learning activities that have an impact on good learning outcomes.

From some of these studies know that project-based learning can facilitate students to collect information to produce something (product). The products it produces will be useful for their own lives or for others, as well as remain related to the basic competencies (KD) taught by teachers (Kosasih, 2014). During the learning process, students are given the opportunity to work independently and produce valuable and realistic work; which can improve learning achievement. Therefore, researchers were inspired to conduct development research to create a product in the form of "Project-based learning modules for 4th grade elementary school students with the VARK model."

Modules are teaching materials that are arranged systematically in simple language so that students understand, so that with the guidance of teachers they can learn independently (Abidin, 2017). According to the Directorate General of PMPTK (2008), modules are printed teaching materials designed for students to learn independently. Modules are also learning media so that students can learn independently, because the module has been equipped with instructions for students to do themselves. The content of the module is a set of teaching materials that are presented systematically so that its users can learn independently or without a facilitator. The characteristics of the module are: 1) contains guidelines so that students are able to learn alone or not depending on other parties, 2) the material in the module consists of learning from a unit of competence or sub-competence, 3) modules adapted to the development of technology, 4) each instruction and description of information contained in the module uses simple language that makes it easier for students to do the tasks in the module. Research by Siska & Kristiawan (2021) "Development of learning modules on the learning outcomes of aqidah subjects in elementary schools", explains that learning modules in comic format as a learning medium have an influence that builds students' understanding to live and practice Islamic teachings. Based on these ideas it can be concluded that the module contains a guide, so that students can learn on their own. The module that the researcher developed is related to the application of the PjBL model which facilitates the majority of students for 4th grade elementary school students, who have a VARK learning style.

"Project-based learning module for 4th grade elementary school students with the VARK model" that the researcher developed consists of 4 parts. **Part 1** on "VARK learning styles", contains an explanation of VARK as one of the learning style models created by Neil D. Fleming. **Part 2** on "The PjBL model", briefly describes the peculiarities of the PjBL model that facilitate students to create products as a result of the learning experience. **Part 3** on "Application of PjBL, creating comics about force and motion", describes the application of the PjBL model in science thematic learning of force and movements associated with student activities such as cycling, jogging, and skipping from PJOK (physical education or PE). Furthermore, to facilitate 4th grade students of Santa Angela Elementary School, the majority of whom had a V learning style, then for learning IPA (natural science), PJOK and Indonesian were associated with SBdP material on comic making, as one of the 3-dimensional works. **Part 4** on "Application of PjBL: Project to create stories to maintain soil natural resources", contains an explanation of the application of the PjBL model for science thematic learning on efforts to balance and preserve natural resources in their environment. As for the natural resources in the environment are air, water, plants and soil. One way to conserve the natural resources of the soil is to make eco enzymes. How to make eco enzymes is explained in the form of an audio-visual story entitled "Flushing eco enzymes to fertilize earthworms and plants" (Indonesian material). The audio-visual story was created to facilitate the A and V learning styles that students predominantly have at SDN Selang.

Method

This research was a type of research and development or commonly referred to as Research and Development (R&D) with the ADDIE model (Tung, 2017)

which contains five steps, namely Analyze, Design, Development, Implementation, and Evaluation. R&D is a research process to develop a new product or improve an existing product, which accountable. In this context, the product developed was in the form of a "project-based learning module for 4th grade elementary school students with the VARK model", to continue previous research conducted by Divinanto.

Analyze

At this stage, researchers distributed the modified "VARK Instrument for elementary school students" to 4th grade students, 25 students of Santa Angela Bandung Elementary School and 21 students of SDN Selang, Gunung Kidul Regency. The instrument consists of 16 multiple-choice questions to find out the student's learning style. The contents of the VARK instrument distributed to students can be seen in Figure 1.

The result was, at Santa Angela Elementary School: students had a learning style of 58% V, 23% A, 15% R and 4% K; while in SDN Selang: 37% A, 31% V, 16% R and 16% K, as shows in Figure 2.



Figure 1. VARK Instruments

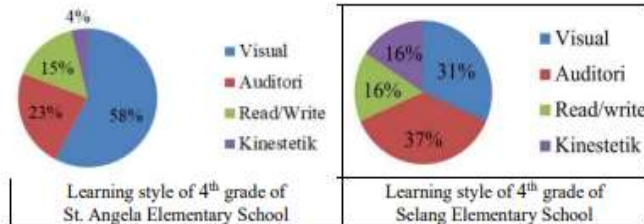


Figure 2. Student's Learning style

From the results of the instrument, it can be concluded that, the majority of students in the two schools had learning styles V and A. As for the interview results, it was known that, teachers need examples of applying project-based learning

models to create comics or stories related to the subject matter. The purpose is that it can be used as a learning medium to help students who have R and K learning styles.

Design

At this stage the researcher compiles a grid of module creations, as listed in Table 1.

Table 1. Module Content Outline

No	Bagian dalam Buku	Deskripsi
1.	Cover	Memuat judul, penulis dan ilustrasi gambar yang mendeskripsikan enam langkah PjBL.
2.	Kata pengantar Editor	Berisi latar belakang penulisan modul dan ucapan terimakasih kepada beberapa pihak yang telah membantu penyusunan modul.
3.	Isi	Modul memuat empat bagian, yaitu: Bagian 1 "Gaya belajar VARK" (ditulis Kristophorus Divinanto Adi). Bagian 2 "Model PjBL" (ditulis Rasmawan&Ignatia Esti Sumarah) Bagian 3 "Penerapan PjBL 1: Proyek membuat komik tentang gaya dan gerak" (ditulis Cipta Gilang Kencana). Bagian 4 tentang "Penerapan PjBL 2: Proyek membuat cerita untuk memelihara sumber daya alam tanah" (ditulis Ignatia Esti Sumarah, Chrisnutajati Waninghiyu, Agata Mustika Kusuma Dewi).
4	Kepustakaan	Memuat beberapa kepustakaan yang mendukung isi modul.
5	Biodata singkat penulis	Memuat biodata penulis modul

Development

Based on these grids, a "Project-based learning module for 4th grade elementary school students with the VARK model" was developed. The module was validated by three validators and scored 3.3 from the lecturer and the Elementary School Principal, while 3.6 from the 4th grade Elementary School teacher. So the average value of the module is 3.4 (value range 1-4), meaning "good" so it is worth testing after revision. One of the validators suggested that the image on the module cover should be related to the VARK model, so after revision the results could be seen in Figure 3.

After the module was validated and revised, it was then submitted to undergo an editing process so that it could be issued by the issuer electronically, as well as to obtain an IPR certificate.



Figure 3. Module Cover Before and After Revision

Implementation

The module trial was carried out on a limited basis by research members, as well as 4th grade teachers at SD St. Angela Bandung. The content of the piloted module is Part 3 of the module on "Application of PjBL: creating comics about force and motion." The meeting was held online (May 2022), because it was still a pandemic period which was attended by 25 students.

Because the results of the questionnaire showed: 58% (15 students) had a learning style V, 23% (6 students) A, 15% (4 students) R and 4% (1 student) K, the research members tried to create a comic project, while teaching the theme "8 Regions Where I Live" sub-theme "Proud of the Area Where I Live". The thematic learning of IPA, PJOK, and SBdP KD taken is an emergency KD, which is intended for teachers during the Covid-19 pandemic (2021-2022 school year period).

The KD IPA that was the focus of learning is 3.4 connecting force with motion in events in the surrounding environment and 4.4 presenting the results of experiments on the relationship between force and motion. Force is a pull or impulse that causes an object to move, move places and even change shape (Mayer and Rogers, 2013). Based on the teacher's book published by the Ministry of Education and Culture of the Republic of Indonesia (Subekti, 2016), the concept of force learned in class IV is touch force (contact style) and non-touch force (non-contact force). The touch force consists of muscle force, friction force, pulling force, and push force. The touchless force consists of gravitational force, electric force, and magnetic force. Motion is the change in the position of an object from the initial position to the final position.

The KD PJOK used in this learning is 4.5, practicing variations and combinations of various dominant motion patterns (resting, hanging, balance, moving/locomotor, repulsion, spin, swing, drifting, and landing) in floor gymnastics activities. The focus of PJOK learning facilitates students who had a K learning style to be able to understand material about force and motion.

The KD SBdP used in this lesson is 3.1 knowing how to create an image with three-dimensional coloring and 4.1 making an image using a three-dimensional coloring technique. In this context the intended three-dimensional image was comic. This activity aimed to facilitate students who had learning styles V, R and A.

The thematic learning was carried out using the PjBL model which consists of 6 steps. In the first week, teachers hold online meetings (because it was still a pandemic) to implement steps 1 to 3 of the PjBL model.

Step 1 ask, the teacher asked whether students liked conventional car play games or those using remote control? Also asked what kind of sports did students like? Furthermore, the teacher explored students' knowledge related to conventional car games and remote control cars, as well as jogging and riding bicycles; with electric force, magnetic force, muscle force, friction force and gravitational force.

Step 2 design project, the teacher invited students to do fun activities related to games as well as certain sports (to facilitate students who had a K learning style) and explained the force and movements contained in it (to facilitate students who had an A learning style). Furthermore, they were asked to write down their experiences in a storyline (to facilitate students who had R and V learning styles). As for students who had a V learning style, then they were asked to make the storyline in the form of comics. According to Muhira (2020), comics are a form of artwork using motionless images arranged in such a way in several panels, thus forming a story. Previously, the teacher gave an example of a comic that she had made as shown in Figure 4.

Step 3, create schedule, the teacher gave a one-week project creation worksheet on games or sports related to style and motion, as listed in Table 2.

Step 4, monitoring students and progress of projects was carried out by teachers to check the progress of the student activity process through WA chat.

In the following week, the teacher again conducted an online meeting to apply steps 5 and 6 of the PjBL model. Step 5 assessing the outcome, the teacher asked questions about the play or sports activities the students had done at home. The activity of playing or sports was related to any force. Furthermore, students who had the ability V were asked to present their comics. Figure 5 shows one example of a comic work of a student who had a V learning style.



Figure 4. Sample of Comic Made by Teachers

Table 2. Project Preparation Schedule

No.	Hari	Keterangan
1.	Hari pertama	Siswa memilih aktivitas permainan atau olah raga → berkaitan dengan materi PJOK dan UNTUK MEMFASILITASI SISWA YANG MEMILIKI GAYA BELAJAR K.
2.	Hari kedua	Siswa dapat menjelaskan gaya yang berpengaruh dalam aktivitas permainan dan kegiatan olah raga (berkaitan dengan materi IPA)
3.	Hari ketiga	Siswa menuliskan dialog tentang gaya yang berpengaruh dalam suatu permainan dan kegiatan olah raga menjadi suatu alur cerita → UNTUK MEMFASILITASI SISWA YANG MEMILIKI GAYA BELAJAR A dan R
4.	Hari keempat	
5.	Hari kelima	Siswa membuat alur cerita dan sketsa komik menggunakan pensil dan kertas A4 → UNTUK MEMFASILITASI SISWA YANG MEMILIKI GAYA BELAJAR V
6.	Hari keenam	Siswa mewarnai komik dengan pewarnaan tiga dimensi → UNTUK MEMFASILITASI SISWA YANG MEMILIKI GAYA BELAJAR V
7.	Hari ketujuh	Siswa mempresentasikan dan mengumpulkan hasil pekerjaannya

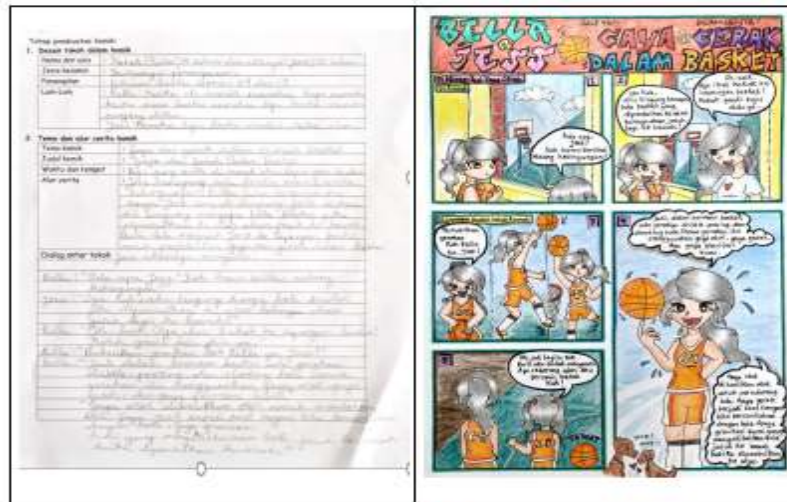


Figure 5. Sample of Student-made Comic

Furthermore, in step 6, evaluation of the experience, the teacher invited students to reflect on the learning process they had done. The majority of students answered that they become aware of the benefits of theories about force and motion in relation to gaming and sports activities.

Evaluation

Teachers provided assessments relating to VARK learning styles for each student as below:

- a. SBdP assessment results from 58% (15 students) who had a V learning style, as listed in Table 3.
- b. Assessment results of Indonesian for students who had a learning style of A 23% (6 students) and and 15% R (4 students), as listed in Table 4.
- c. PJOK assessment results from 4% (1 student) who had a K learning style, as listed in Table 5.
- d. The results of the IPA assessment for all students (25 persons), as listed in Table 6.

Table 3. SBdP Assessment Results for Students with V Learning Style

Aspek	Baik Sekali (4)	Baik (3)	Cukup (2)	Perlu Bimbingan (1)
Menuliskan gaya yang berpengaruh dalam permainan atau olahraga menjadi alur cerita untuk komik.	5 siswa	10 siswa		
Membuat komik berwarna tentang gaya yang berpengaruh dalam permainan atau olahraga.	8 siswa	7 siswa		

Table 4. Indonesian Assessment Results for Students with A and R Learning Styles

Aspek	Baik Sekali (4)	Baik (3)	Cukup (2)	Perlu Bimbingan (1)
Keterampilan penulisan dialog cerita tentang gaya yang berpengaruh dalam permainan atau olahraga menggunakan bahasa Indonesia yang efisien dan menarik	5 siswa	5 siswa		
Keterampilan dalam menyusun alur cerita secara runtut.	4 siswa	6 siswa		

Table 5. PJOK Assessment Results for Students with K Learning Style

Aspek	Baik Sekali (4)	Baik (3)	Cukup (2)	Perlu Bimbingan (1)
Menjelaskan praktik kebugaran jasmani sesuai dengan gerakan yang sudah diajarkan	-	1 siswa		
Menjelaskan gaya yang terdapat dalam salah satu gerakan praktik kebugaran jasmani(seperti sit-up, front jump, skipping, lari bolak-balik, kelenturan).	1 siswa	-		

Table 6. IPA Assessment Results for All Students

Aspek	Baik Sekali (4)	Baik (3)	Cukup (2)	Perlu Bimbingan (1)
Menjelaskan gaya yang berpengaruh dalam aktivitas permainan yang dilakukan.	10 siswa	10 siswa	5 siswa	
Menganalisis macam-macam gaya yang terapat dalam tiga kegiatan olah raga.	9 siswa	11 siswa	4 siswa	

From these data, it was known that:

- a. Students who had a V learning style with the category of "very good" create comics about influential force in games or sports were 7 students.
- b. Students who had A and R learning styles that could write story dialogues about influential force in games or sports with the category of "very good" were 5 students.
- c. Students who had a K learning style that could practice physical fitness with the category of "very good" was 1 student.
- d. Students who had a VARK learning style that can understand the subject matter of IPA, about force and motion with a grade of "very good" were 10 students.

Discussion

Pedagogic ability is the ability of teachers to understand the characteristics of students (Permendiknas No. 16 of 2007). Understanding the learning style of each student is one of the forms of implementation of pedagogic competence. Learning style is the method used by a person in learning new knowledge in a learning environment (Schunk, 2012). A teacher needs to organize learning activities that can support a variety of learning styles. Learning that only uses one learning style, can affect learning outcomes, motivation, and student participation (Widharyanto, 2017). One of the learning style models is Flemming's VARK model, which categorizes students based on four learning styles namely V, A, R and K.

The teacher's understanding of each student's learning style can be useful for the continuity and for designing learning activities. Then choosing and even creating media that support the student learning process. This activity can create more pleasant learning atmosphere for students. Based on the data of student's learning style at St. Angela Elementary School and Selang Elementary School, teachers will be able to create more learning innovation.

Researchers chose project-based learning models (PjBL) to apply VARK-based learning. PjBL is innovative student-centered learning and establishes teachers as motivators and facilitators, while students are given the opportunity to work autonomously constructing their learning (Trianto, 2014). The model is a learning model that uses projects or assignments to all students to be done individually. In this study, projects or activities given to students related to KD IPA, PJOK and SBDP that students can learn according to their learning style. The steps of the activities in the module can be carried out by students inside or outside of class hours to make it easier for them to get an interesting and meaningful learning experience, because it suits their different learning styles. Students can work on their projects individually by utilizing experience or main subject matter (IPA material on force and motion), which is associated with other information (PJOK material on playing and exercising activities, and SBDP making drawings in the form of comics). Learning assessment is carried out from the planning activities, the activity process, to the results, covering cognitive, psychomotor, and affection aspects of students. Mulyasa (2014) explained that PjBL is a learning model that aims to focus students on investigating and understanding complex problems. The problems in this study are closely related to students' daily lives. The accommodation of the VARK learning style in PjBL, presumably also corresponds to one of the characteristics of PjBL as stated by Hosnan (2014), namely that students are responsible for finding and managing the information they collect themselves.

Conclusion

Each student has a different learning style that serves to optimize learning activities. This learning style needs to be facilitated with project-based learning modules. The module developed's entitled "Project-Based Learning Modules for 4th Grade Elementary School Students Based on VARK Learning Style". The module was validated by 3 experts, who resulted in a score of 3.3 from the lecturer and the Elementary School Principal, and 3.6 from the 4th grade teacher. The average value of the module is 3.4 (value range 1-4), which means "good", so it is worth testing after the module is revised. The results of a limited trial conducted by a 4th grade teacher at St. Angela Elementary School on a project-based learning module that had been developed, had shown its effectiveness to facilitate students who have a VARK learning style. The implication results from this study showed that schools can implement modules like this in order to facilitate students' learning styles.

References

- Abidin, Z., Walida SE. (2017). Pengembangan e-modul interaktif berbasis CASE (creative, active, systematic, effective) sebagai alternatif media pembelajaran geometri transformasi untuk mendukung kemandirian belajar dan kompetensi mahasiswa. *Prosiding Seminar Nasional Matematika dan Aplikasinya*. Surabaya: Departemen matematika fakultas sains dan teknologi Universitas Surabaya. Hlm.197-202.
- Ambarini, N., Alvi R. & Joko A. (2013). Penerapan pembelajaran aktif card sort disertai mind mapping untuk meningkatkan minat belajar siswa dalam pembelajaran biologi siswa kelas VII-E SMP Negeri 5 Surakarta. *BIO-PEDAGOGI 2, 1*, 77-87.
- Arends, RI. (2013). *Belajar untuk mengajar (learning to teach) 1, edisi 9*. Jakarta: Salemba Humanika.
- Dani, NR., Farida, F., Fitria, Y. (2021). Pengembangan bahan ajar tematik terpadu berbasis life skill dengan Project based learning di sekolah dasar. *Jurnal Basicedu*, 5, 5, 3431-344. <https://jbasic.org/index.php/basicedu>
- Ditjen PMPTK. (2008). *Penulisan modul*. Jakarta: Depdiknas
- Divinanto, KAY. (2021). Kegiatan belajar berdasarkan keberagaman gaya belajar setiap peserta didik". [researchgate.net/publication/355149186](https://www.researchgate.net/publication/355149186)
- Fleming & Bonwell. (2019). *How do i learn best? A learner's guide to improved learning*. USA: Missouri.
- Handayani, AS., Sudaryanto., Dian. (2021). Penerapan model pembelajaran project based learning berbantuan video pembelajaran untuk meningkatkan kreativitas karya seni pada siswa kelas II SDN 2 Sungapan. *Prosiding Pendidikan Profesi Guru Fakultas Keguruan dan Ilmu Pendidikan Universitas Ahmad Dahlan*. 1293-1303.
- Hosnan, M. (2014). *Pendekatan saintifik dan kontekstual dalam pembelajaran abad 21*. Bogor: Ghalia Indonesia.
- Kosasih, E. (2014). *Strategi belajar dan pembelajaran implementasi kurikulum 2013*. Bandung: Yrama Widya

- Kusuma, IGAJ, Dkk. (2018, 1 April). Penerapan model PjBL berbantuan media audiovisual untuk meningkatkan hasil belajar IPA. *Jurnal Ilmiah Pendidikan Profesi Guru* 1, 1, 29-38. <https://doi.org/10.23887/jipppg.v1i1.14263>
- Mayer, L dan Rogers, S (2013). *Newton and me (arbordale collection) paperback – picture book*. United States: Arbordale Publishing.
- Muhira, R., Marlina, M. (2020). Pembuatan komik layanan perpustakaan kabupaten tanah datar. *Jurnal Ilmu Informasi Perpustakaan dan Kearsipan*, 8, 2, 67-71. <https://doi.org/10.24036/8163-0934>
- Mulyasa. (2014). *Pengembangan dan implementasi kurikulum 2013*. Bandung: Remaja Rosdakarya.
- Permendiknas No. 16 Tahun 2007 tentang Standar Kualifikasi Akademik dan Kompetensi Guru.
- Phillips, H. (2010). Multiple intelligences: theory and application. *Perspectives in Learning: A Journal of the College of Education & Health Professions Columbus State University*, 11, 1, 3-11. <https://csuepress.columbusstate.edu/pil/vol11/iss1/4/>
- Robertson, Linda., Tanie Smellie., Philpa Wilson., Lisa Cox. (2011). Learning style and fieldwork education: Students' perspectives. *New Zealand Journal of Occupational Therapy*. 58, 01, 36-40.
- Rusman. (2016). *Model-model pembelajaran*. Jakarta: Grafindo.
- Schunk, Dale H. (2012). *Learning theories an educational perspective sixth edition*. Boston: Pearson
- Siska, J & Kristiawan, M. (2021). Pengembangan modul pembelajaran terhadap hasil belajar mata pelajaran aqidah di sekolah dasar. *Jurnal Basicedu*, 5, 6, 5035-5042. DOI: <https://doi.org/10.31004/basicedu.v5i6.1570>
- Subekti, et al (2016). *Tema 8 daerah tempat tinggalku buku tematik terpadu kurikulum 2013: Buku Guru SD/MI Kelas 4*. Jakarta: Pusat Kurikulum dan Perbukuan Kemendikbud.
- Sugiyanto. (2013, Januari). Pengaruh gaya belajar experiential learning dalam peningkatan prestasi akademik dan penerapannya dalam pembelajaran. *Paradigma*, 15, *journal.uny.ac.id*, 43-64.
- Trianto. (2010). *Mengembangkan model pembelajaran tematik*. Jakarta: Prestasi Pustakarya
- Tung, KY. (2017). *Desain instruksional*. Yogyakarta: Penerbit andi offset
- Widharyanto, (2017). Gaya belajar model VARK dan implementasinya di dalam pembelajaran keterampilan berbahasa Indonesia. *Proceeding ICELA*.
- Zagoto, MM., Yarni, N, Dakhi, O. (2019). Perbedaan individu dari gaya belajarnya serta implikasinya dalam pembelajaran. *Jurnal Review Pendidikan dan Pengajaran*, 2, 2, 259-265. <https://doi.org/10.31004/jrpp.v2i2.481>

