



## Android-based KKO Dictionary as a Tool in Formulating Indicators and Learning Objectives

Maxsel Koro<sup>1\*</sup>, Markus Sampe<sup>2</sup>, Sofia G. Un Lala<sup>3</sup>, Sumardi W. Ndolu<sup>4</sup>, Marfelano Bessie<sup>5</sup> 

<sup>1,2,3,4,5</sup> Elementary School Teacher Education, Universitas Nusa Cendana, Kupang, Indonesia

\*Corresponding author: [Maxselkoro18@gmail.com](mailto:Maxselkoro18@gmail.com)

### Abstrak

Teknologi yang berkembang pesat di masa ini menjadi jalan keluar untuk mengatasi berbagai persoalan pada semua aspek kehidupan, salah satunya pada dunia pendidikan. Perumusan tujuan pembelajaran yang berangkat dari kompetensi dasar dan indikator, berpedoman pada penggunaan kata kerja operasional (KKO), dapat meningkatkan kualitas pembelajaran menjadi lebih maksimal. Permasalahan utama yang dihadapi oleh guru dalam mengembangkan indikator dan tujuan pembelajaran yakni penentuan KKO yang relevan dengan level dari setiap ranah, yang mana KKO yang tersebar di dunia maya sangatlah banyak dan bervariasi; untuk itu penelitian ini berfokus pada pengembangan aplikasi kamus kata kerja operasional (KKO) yang bertujuan untuk membantu guru saat merancang dan mengembangkan perangkat pembelajaran terutama dalam merumuskan tujuan pembelajaran. Subjek penelitian ini berjumlah 12 orang guru kelas SDI Lasiana Kota Kupang. Produk hasil pengembangan akan diuji validitas, kepraktisan, dan keefektivannya saat diimplementasikan oleh guru pada saat melakukan perancangan perangkat pembelajaran. Metode yang digunakan yaitu *research and development* dengan model pengembangan yaitu ADDIE. Hasil validasi dari ahli menunjukkan tingkat kelayakan sebesar 92% dari ahli materi dan 91,25% dari ahli media. Jika dikualifikasikan memiliki kategori sangat layak. Hasil uji coba lapangan menunjukkan bahwa guru merasa tertarik dan terbantu dengan kehadiran aplikasi kamus KKO dalam mempersiapkan rancangan pembelajaran dengan kualitas yang maksimal dengan skor penilaian 86,37% yang dapat diartikan bahwa produk sangat layak digunakan guru dalam mengembangkan indikator dan tujuan pembelajaran secara efektif dan efisien.

**Kata Kunci:** Aplikasi Kamus KKO, Android, Tujuan Pembelajaran

### Abstract

Technology, which is developing rapidly at this time is a way out to overcome various problems in all aspects of life, one of which is the world of education. Formulating learning objectives based on basic competencies and indicators, guided by the use of operational verbs (KKO), can improve the quality of learning to the maximum. The main problem faced by teachers in developing indicators and learning objectives is determining KKO that are relevant to the level of each domain, of which the KKO spread across cyberspace are numerous and varied. For this reason, this research focuses on developing an operational verb dictionary (KKO) application which aims to help teachers when designing and developing learning tools, especially in formulating learning objectives. The subjects of this research were 12 teachers at SDI Lasiana, Kupang City. The resulting product will be tested for validity, practicality, and effectiveness when implemented by teachers when designing learning tools. The method used is *research and development* with a development model ADDIE. Validation results from experts show a feasibility level of 92% from material experts and 91.25% from media experts. If qualified it has a very worthy category. The results of the field trial showed that teachers felt interested and helped by the presence of the KKO dictionary application in preparing learning designs with maximum quality with an assessment score of 86.37% which can be interpreted as meaning that the product is very suitable for teachers to use in developing indicators and learning objectives effectively and efficiently.

**Keywords:** KKO Dictionary Application, Android, Learning Objectives

## 1. INTRODUCTION

The massive development of technology and information currently brings various conveniences to human life (Almarwani, 2020; Setiawansyah et al., 2020). These conveniences are also felt in the world of education, especially in learning conditions, which were previously monotonous and limited in terms of resources, media, and supporting infrastructure, but are now made easier by developing technology so that implementation is more innovative and varied (Aeni et al., 2022; Chomunorwa & Mugobo, 2023; Makmuri et

#### History:

Received : July 21, 2023

Revised : July 24, 2023

Accepted : October 02, 2023

Published : October 25, 2023

Publisher: Undiksha Press

Licensed: This work is licensed under

a Creative Commons Attribution-ShareAlike 4.0 International License



al., 2021). One form of applying technology in learning is the integration of digital literacy, which allows teachers to develop learning with the help of technology as a supporting tool, both as media, sources, and reference materials (Ahsani et al., 2021; Rahayu et al., 2019). Teachers, in carrying out their functions as teachers and educators, certainly need to plan the implementation of learning well (Alawiyah, 2013; Lailatussaadah, 2015). Planning in learning cannot be separated from the preparation of learning tools, which consist of several components, namely lesson plans, teaching materials, learning media, LKPD, and evaluation instruments (Hamonangan & Sudarma, 2017; Styawati et al., 2020). Learning development and design begin with the formulation of indicators and learning objectives that are appropriate to the verb level of basic competencies (Dolong, 2016; Said & Muslimah, 2021). This is because indicators and learning objectives are benchmarks for implementing learning to achieve a competency.

Formulating indicators and learning objectives requires adequate knowledge and understanding regarding operational verbs (KKO) from each domain, be it cognitive, psychomotor, or affective (Alhikmah et al., 2021; Fatmawati & Pd, 2013). Operational verbs that refer to the competencies that students must have are numerous and spread across levels from the lowest to the highest, so teachers often have difficulty remembering and determining the appropriate KKO to use. The many variations of KKO spread across the internet make it increasingly difficult for teachers to determine the right KKO in formulating indicators and learning objectives based on the basic competencies that have been determined (Alhikmah et al., 2021; Aprilianti et al., 2022). This has an impact on the quality of the design of learning tools prepared by the teacher, so that it also influences the implementation of the learning process.

This condition is experienced and felt by many teachers, as happened at SDI Lasiana, Kupang City, NTT. A snapshot of the results of the initial study conducted: the references used by teachers in determining operational verbs are very dependent on the Google search engine, so they tend not to accurately describe the competencies to be achieved. Another obstacle is limited internet access, and some teachers are unable to determine the right keywords in search engines, so the results displayed are not appropriate. Based on these conditions, teachers at SDI Lasiana really hope for a technology-based innovation that can make it easier for teachers to determine operational verbs, where the innovation is practical and easy to use.

To answer this problem, it is necessary to present an innovation in the form of a practical tool that can be used offline and online. Android application-based tools are an innovation that is considered practical considering that all teachers have Android cellphones. Apart from that, the applications developed can operate offline or online. Applications themselves are defined as applied tools in the form of software created by computer companies with specific and integrated functions according to their operations (Azis et al., 2020; Pentury et al., 2019). Applications or software can now be easily installed on cellphones running Android, a Linux-based mobile device operating system that includes middleware and provides an open platform for application developers (Firdaus et al., 2022; Setiadi et al., 2018). Various applications have been developed and can be operated via cellphone with the aim of overcoming problems and making work easier, including helping carry out activities or learning processes (Rambe, 2019; Styawati et al., 2020).

The KKO Dictionary is a breakthrough for teachers in formulating indicators and learning objectives. This application was developed based on Android and can be operated offline or online. This application contains KKO distributions from the affective, cognitive, and psychometric domains, along with examples of indicators and learning objectives for each level. This application is a very effective, efficient, and targeted solution to overcome problems experienced by teachers when there are obstacles in developing indicators and

learning objectives. The KKO *Kamus* application is an innovation that has never been developed before and is the only digital pocket book innovation packaged in dictionary form. This research aims to help teachers find it easier to determine verbs and formulate indicators and learning objectives with the help of the *KKO Kamus* application, with the hope of being able to answer the needs and problems experienced by teachers so far.

## 2. METHODS

The type of research used is development research with the ADDIE development model, which includes: (1) analysis phase, (2) design phase, (3) development phase, (4) implementation phase, and (5) evaluation phase (Branch, 2010). The selection of this development model was based on consideration of stages that were systematic and easy to apply, especially in the process of developing tools and learning media. The end of this research is the result of the feasibility and effectiveness of the product being developed. The feasibility test aims to determine the accuracy of the content in the product, the practicality of its use, and the attractiveness of its appearance, while the product effectiveness test aims to determine whether or not the product is effective in determining operational verbs in formulating indicators and learning objectives. The research subjects involved in this development are experts, in this case lecturers with professorship degrees who have special skills according to needs, namely material experts and design or graphic experts as validators of the products being developed. The material expert in question is an expert in learning design and curriculum development, while a design or graphics expert is an expert in learning technology. Apart from that, other research subjects were teachers at SDI Lasiana, Kupang City. The small group trial was carried out on 6 SDI Lasiana class teachers in Kupang City, while the field trial subjects consisted of 12 SDI Lasiana class teachers in Kupang City. Teachers involved in the trial process have Strata I qualifications with a minimum teaching experience of 5 years. Data collection in this research was carried out using validation sheet instruments and product assessment sheets by validators and teachers as practitioners. Table 1 describing the research instruments used.

**Table 1. Research Instrument Table**

No.	Aspect	Instrument	Observed Data	Respondent
1	Validity	Validation Sheet/Questionnaire	Validity level of content, material, language and design appearance	Material/Content Expert, Design/Graphics Expert
2	Effectiveness and Feasibility	Validation Sheet/Questionnaire	Teacher's response to the feasibility and effectiveness of the product	Teacher/Homeroom teacher, grades 1-6

The data analysis used in this research is qualitative and quantitative. Qualitative analysis was carried out based on suggestions and input obtained from expert test subjects and teachers as practitioners. Quantitative analysis was carried out on the results of filling out questionnaires by experts and teachers, where the questionnaire was prepared using a 1-4 *Likert* scale (for TV experts: Invalid (1), KV: Not Valid (2), V: Valid (3), and SV: Very Valid (4); for TE teachers: Not Effective (1), KE: Less Effective (2), E: Effective (3), and SE: Very Effective (4).

### 3. RESULTS AND DISCUSSION

#### Results

The trial is carried out by consulting and testing the product, the test subjects include; (1) validators; and (2) teachers /homeroom teachers for grades 1–6. Materials expert determining content or material experts is carried out by considering educational qualifications, namely a doctoral degree, and length of service, namely more than ten years, as well as experience in the field. Content or material experts are given a validation sheet to validate the content or material as well as the language of the material. The validation results in the form of criticism and suggestions are used to revise the application in the material aspect. The considerations in determining a design expert include an educational technology expert with a doctoral education qualification in learning technology and experience in the field of learning application design. Design experts validated the design of the *Kamus KKO*. The validation results are taken into consideration by researchers for testing.

The criteria for determining a teacher or homeroom teacher as a research subject include having a minimum qualification of S1 PGSD as well as experience teaching and being a homeroom teacher for at least 5 years. The teacher provides an assessment on aspects of product convenience and effectiveness. Assessment activities use instruments prepared by researchers in the form of questionnaires about product effectiveness.

#### *Material Expert Validation*

Validators test the level of validation of application products using validation instruments that have been prepared by researchers. In the material validation instrument there are aspects that are validated, namely; (1) suitability of the KKO material with the revised version of *Bloom's Taxonomy* ; (2) Correctness of the KKO with the three main aspects of learning (Attitude, Knowledge and Skills) (3) suitability of the Indicator formulation with the existing KKO ; (4) suitability of the formulation of learning objectives with indicators ; ( 5 ) the accuracy of the use of terms in the formulation of indicators ; ( 6 ) presentation of KKO content that is easily accessible ; ( 7 ) clarity of text supporting KKO and indicator framework ; ( 8 ) the ability of KKO materials to guide teachers in making tools; and ( 9 ) appropriate use of non-provocative language (SARA). (10) appropriateness of language use in accordance with PUEBI. The results obtained from the material validation process were a total percentage score given of 92.

#### *Design/Graphics Expert Validation*

In the design aspect, the validator validates aspects such as: (1) a capable application interface display reflects filling out the application; (2) the application has a contrasting color scheme and a harmonious combination that is comfortable for the reader; (3) the layout and contents of the application are consistent between the front sections, and the menu between chapters is consistent; (4) navigation buttons on the application are easy to operate; (5) the type of font used in the application makes it easier for users. Input in the form of suggestions and criticism from validators is used to improve the product. The results obtained from the design validation process had a score of 91.25.

Once the validation value or score is known, to describe the validation results, it can be measured based on the validation criteria in [Table 2](#). Based on [Table 2](#) the application validity criteria and the results or scores obtained from the validator, it can be stated that the product is very valid both in terms of material and design because it obtained scores of 92% and 91.25%, which are classified as very valid criteria (85.01%-100%)

**Table 2.** Validity Criteria for the KKO Dictionary Application

No.	Validation Criteria	Validation Level Category	Information
1	85.01%-100%	Very Valid	Can be used without revision
2	70.01% - 85.00%	Valid	Can be used with minor revisions
3	50.01% - 70.00%	Invalid	It is recommended not to use
4	01.00% - 50.00%	Invalid	Not for use

**Small Group Trials**

In this small group testing phase, the researcher chose teachers heterogeneously, with a total of 6 teachers at SD Inpres Lasiana, based on the considerations of low- and high-grade teachers for product trials by providing applications and instruments in the form of questionnaires containing attractiveness indicators to find out the response from the main users, namely teachers. The results of this user response are used by researchers to evaluate the attractiveness of the product.

**Field Trials**

The field trial was conducted to obtain data on the effectiveness of the application for teachers at SD Inpres Lasiana (a total of 12 teachers). Data on the effectiveness of the application was collected through response questionnaires from all class teachers who were the subjects of the field trial. The results of the effectiveness level test are analyzed, and the level of product effectiveness in learning activities is determined. Effectiveness Test Results for the dictionary KKO is show in [Table 3](#).

**Table 3.** Effectiveness Test Results for the Dictionary KKO

No.	Name	Total Score	Average	Percentage
1	Respondent 1	69	4.058823529	81.17647059
2	Respondent 2	72	4.235294118	84.70588235
3	Respondent 3	78	4.588235294	91.76470588
4	Respondent 4	73	4.294117647	85.88235294
5	Respondent 5	79	4.647058824	92.94117647
6	Respondent 6	72	4.235294118	84.70588235
7	Respondent 7	69	4.058823529	81.17647059
8	Respondent 8	77	4.529411765	90.58823529
9	Respondent 9	68	4	80
10	Respondent 10	71	4.176470588	83.52941176
11	Respondent 11	78	4.588235294	91.76470588
12	Respondent 12	75	4.411764706	88.23529412
<b>Amount</b>		<b>73.41666667</b>	<b>4.318627451</b>	<b>86.37254902</b>

The criteria for measuring the effectiveness of the product after being tested on teachers or homeroom teachers are explained in [Table 4](#). The criteria in [Table 4](#) explain that dictionary KKO application product is said to be very effective and can be used because it obtains an average percentage score of 86.37254902%, which is between 70.01% and 85.00% with very effective criteria.

**Table 4.** Effectiveness Criteria Table Product

No.	Validation Criteria	Validation Level Category	Information
1	85.01%-100%	Very Effective	Can be used without revision
2	70.01% - 85.00%	Effective	Can be used with minor revisions
3	50.01% - 70.00%	Less Effective	It is recommended not to use
4	01.00% - 50.00%	Not Effective	Not for use

## Discussion

Application development is a trend that is currently present in the world of education, especially in the implementation of the learning process. Many innovations present applications in the learning process to overcome the problems experienced, such as the development of mobile learning media, the development of learning applications that are integrated with digital games, the development of digital materials and textbooks, and the development of learning management systems to regulate management (Cahyono, 2013; Suryadi, 2015). Activities both in class and at school (Febrianti & Harahap, 2021; Mustikawati, 2019). Many of these application developments have been tested to see validity, practicality, and effectiveness during the testing process and use (Fuady, 2016; Nazar et al., 2020; Styawati et al., 2020). All of these application developments have obtained positive results when tested and were able to overcome problems.

In contrast to other research that develops applications to overcome student learning problems (Arifah et al., 2019), this research aims to overcome problems experienced by teachers, namely that teachers still often make mistakes in formulating indicators and objectives. This is because teachers are still very lacking in the vocabulary of operational verbs and the levels of operational verbs. According to another thing that makes teachers less than optimal in formulating indicators and learning objectives is that there are too many verbs available on the internet, and their accuracy and truth are not guaranteed (Suparmi, 2023). Therefore, this condition is the background for innovation and development of the KKO Dictionary application to make it easier for teachers to formulate indicators and learning objectives correctly.

The KKO Dictionary application was developed through the ADDIE development research model. This development model includes five stages, namely the analysis stage, design stage, development stage, implementation stage, and evaluation stage (Pujiastuti et al., 2020; Soesilo & Munthe, 2020). At the analysis stage, the results of interviews with teachers and school principals obtained information that all learning administration tools were available at the school. It is also known that there are complaints from teachers regarding a lack of knowledge in compiling learning tools; apart from that, problems also occur due to the limited time needed to prepare lesson plans. One of the obstacles felt by teachers is when formulating indicators and learning objectives due to a lack of knowledge of operational verbs, which are spread across three realms or domains and their levels. In fact, one of the characteristics of a teacher who has competence is seen in the teacher's ability to prepare teaching tools (Uhl et al., 2021; Wang & Liu, 2020).

Based on the results of the needs analysis conducted through interviews with SDI Lasiana teachers in Kupang City, the teachers are very enthusiastic and expect strategies or innovations to facilitate and assist in the formulation of indicators and learning objectives, which will have an impact on other components in compiling learning tools, for example, learning activities and assessment. According to previous study learning objectives are closely related to the expected learning outcomes. Mistakes or errors in formulating indicators and learning objectives will affect the smoothness and success of the learning process (Budiastuti et al., 2021).

Namely, (1) a collection of operational verbs (KKO) in three aspects: affective, cognitive, and psychomotor; (2) the editing of learning indicator sentences; and (3) the editing of learning objective sentences. KKO content and editorial indicator sentences, as well as learning objectives in the application, will be arranged based on the KKO table of Bloom's taxonomy and the Condition, Audience, Behavior, Degree (CABD) framework. Audience refers to students as subjects in learning; behavior refers to the achievement of attitudes and behaviors contained in basic competencies; conditions relate to learning activities that help shape students' behavior in accordance with basic competencies; and degree relates to the quality standards of student learning, whether quantitative or qualitative (Aprilianti et al., 2022; Budiastuti et al., 2021). A navigation menu feature is also provided in the form of a search button to search for indicator formulations and learning objectives. The development of the KKO Dictionary application is truly on target and answers the problems experienced, namely making it easier for teachers to plan and design learning with maximum quality.

The final stage in the application development process is evaluation. Evaluation is carried out on the entire process, especially the results of field trials (Priantini & Manu, 2020; Rustandi & Rismayanti, 2021). These results show that the product developed has been effective, as can be seen from the teachers' responses to using the KKO Dictionary application. It can be seen that teachers find it easier and faster to formulate indicators and learning objectives. So far, it has been said that teachers find it difficult to formulate indicators and learning objectives because they still rely on the Google search engine, where the results found contain a lot of information that must be selected again for truth and accuracy. So by using the KKO dictionary application, teachers feel that it is made easier by the clarity and accuracy of the information available, which is very helpful and speeds up the process of formulating indicators and learning objectives (Alhikmah et al., 2021; Aprilianti et al., 2022).

The KKO Dictionary application is a new innovation that has never been developed in previous research. This KKO dictionary application can be installed on an Android cellphone, making it very easy for teachers because when they arrange learning tools, they can be accessed quickly. The KKO dictionary application is designed to be simple so that teachers of all ages can access and operate it. This KKO dictionary application has an attractive design so that it adds a special impression and motivation when operating it, and what is no less important is that the KKO dictionary application can be operated with and without an internet network, or, in other words, offline or online, so the application can be used anywhere.

This research is new and innovative, so it is inspiring for future research. The research and results obtained are able to stimulate future researchers to see and overcome the problems that have been felt not only by students but also by teachers in preparing the design for maximum execution or implementation of the learning process. The use of advances in technology and digital tools as a means of developing applications in this research can also be a brilliant idea that can be developed further in other research because, with current technological developments, it is felt that this is the right step to maximize and overcome existing problems, especially problems in the world of education.

#### **4. CONCLUSION**

The KKO Dictionary is a new innovation that is present in the world of education and offers convenience in accessing operational verbs as a basis for formulating indicators and learning objectives. The KKO dictionary application is a solution and answer to teachers' problems and needs. The KKO Dictionary can be accessed easily and quickly wherever it is

used because it is an application that can be operated offline and online. The KKO Dictionary has been proven valid, practical, and effective based on the results of research carried out. Validation results from experts show a feasibility level of 92% from material experts and 91.25%, which can be categorized as very feasible. The results of the field trial show that the teachers gave an average score of 86.37%, which means that the product is very suitable for use to help teachers formulate indicators and learning objectives.

## 5. REFERENCES

- Aeni, A. N., Djuanda, D., Maulana, M., Nursaadah, R., & Sopian, S. B. P. (2022). Pengembangan Aplikasi Games Edukatif Wordwall Sebagai Media Pembelajaran Untuk Memahami Mater Pendidikan Agama Islam Bagi Siswa Sd. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 11(6), 1835. <https://doi.org/10.33578/jpfkip.v11i6.9313>.
- Ahsani, E. L. F., Romadhoni, N. W., Layyiatussyifa, E. L., Ningsih, W. N. A., Lusiana, P., & Roichanah, N. N. (2021). Penguatan Literasi Digital Dalam Pembelajaran Di Sekolah Dasar Indonesia Den Haag. *Elementary School*, 8(2), 228–236. <https://es.upy.ac.id/index.php/es/article/view/1115>.
- Alawiyah, F. (2013). Peran Guru Dalam Pengembangan Kurikulum 2013. *Aspirasi*, 4(1), 65–74. <https://doi.org/10.46807/aspirasi.v4i1.480>.
- Alhikmah, R. N., Roza, Y., & Maimunah, M. (2021). Analisis Kesulitan Guru Matematika SMP dalam Menyusun Rencana Pelaksanaan Pembelajaran (RPP) Berdasarkan Kurikulum 2013. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 5(1), 655–669. <https://doi.org/10.31004/cendekia.v5i1.433>.
- Almarwani, M. (2020). Acceptance and Use of Mobile Technologies in Learning and Teaching of EFL: An Economic Perspective. *The EuroCALL Review*, 28(2), 39. <https://doi.org/10.4995/eurocall.2020.12388>.
- Aprilianti, W., Hamdu, G., & Mulyadiprana, A. (2022). Kemampuan Guru Sekolah Dasar dalam Mengembangkan Soal Tes Literasi Numerasi Berbasis Education for Sustainable Development. *Edukatif: Jurnal Ilmu Pendidikan*, 4(1), 1408–1416. <https://doi.org/10.31004/edukatif.v4i1.2139>.
- Arifah, R. E. N., Sukirman, S., & Sujalwo, S. (2019). Pengembangan Game Edukasi Bilomatika untuk Meningkatkan Hasil Belajar Siswa pada Mata Pelajaran Matematika Kelas 1 SD. *Jurnal Teknologi Informasi Dan Ilmu Komputer*.(2019, 6(6), 617. <https://doi.org/10.25126/jtiik.2019661310>.
- Azis, N., Pribadi, G., & Nurcahya, M. (2020). Analisis Dan Perancangan Aplikasi Pembelajaran Bahasa Inggris Comma Berbasis Android. *Tekmapro: Journal of Industrial Engineering and Management*, 4(3), 97–107. <https://doi.org/10.33005/tekmapro.v18i1.332>.
- Branch, R. M. (2010). Instructional design: The ADDIE approach. In *Instructional Design: The ADDIE Approach*. <https://doi.org/10.1007/978-0-387-09506-6>.
- Budiastuti, P., Soenarto, S., Muchlas, M., & Ramndani, H. W. (2021). Analisis Tujuan Pembelajaran Dengan Kompetensi Dasar Pada Rencana Pelaksanaan Pembelajaran Dasar Listrik Dan Elektronika Di Sekolah Menengah Kejuruan. *Jurnal Edukasi Elektro*, 5(1), 39–48. <https://doi.org/10.21831/jee.v5i1.37776>.
- Cahyono, B. (2013). Penggunaan Software Matrix Laboratory (Matlab) Dalam Pembelajaran Aljabar Linier. *Phenomenon: Jurnal Pendidikan MIPA*, 3(1), 45–62. <https://doi.org/10.21580/phen.2013.3.1.174>.
- Chomunorwa, S., & Mugobo, V. V. (2023). Challenges of e-learning adoption in South African public schools: Learners' perspectives. *Journal of Education and E-Learning*



- Research*, 10(1), 80–85. <https://doi.org/10.20448/jeelr.v10i1.4423>.
- Dolong, M. J. (2016). Sudut Pandang Perencanaan dalam Pengembangan Pembelajaran. *Jurnal Inspirasi Pendidikan*, 1(1), 69. <https://doi.org/10.24252/ip.v5i1.3213>.
- Fatmawati, S., & Pd, M. (2013). Fisika Formulation of Learning Objectives and Cognitive Problem in Bloom Taxonomy Revision Oriented in Learning Physics. *Jurnal EduSains*, 1(2), 1–16. <https://ejournal.unp.ac.id/students/index.php/pfis/article/view/12127>.
- Febrianti, T., & Harahap, E. (2021). Penggunaan Aplikasi MATLAB Dalam Pembelajaran Program Linear. *Jurnal Matematika*, 20(1), 1–7. <https://journals.unisba.ac.id/index.php/matematika/article/view/1109>.
- Firdaus, F., Suherman, S., & Fadlullah, F. (2022). Pengembangan Aplikasi Pembelajaran Berbasis Android dalam Pembelajaran Kontekstual Materi Kegiatan Ekonomi di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 4(4), 5176–5185. <https://doi.org/10.31004/edukatif.v4i4.3160>.
- Fuady, M. J. (2016). *Pengembangan Aplikasi Evaluasi Pembelajaran Online Untuk Pendidikan Jarak Jauh*. 26(September), 11. <http://journal.um.ac.id/index.php/tekno/article/view/8281>.
- Hamonangan, A. S., & Sudarma, I. K. (2017). Analisis Perangkat Pembelajaran Kurikulum 2013 Di Sekolah Dasar. *Journal of Education Technology*, 1(2), 149. <https://doi.org/10.23887/jet.v1i2.11777>.
- Lailatussaadah, L. (2015). Upaya Peningkatan Kinerja Guru. *Intelektualita*, 3(1), 243106. <https://jurnal.ar-raniry.ac.id/index.php/intel/article/view/196>.
- Makmuri, M., Wijayanti, D. A., Salsabila, E., & Nur Fadillah, R. (2021). Pengembangan Aplikasi Pembelajaran Matematika Berbasis Android Dengan Pendekatan Kontekstual Pada Materi Persamaan Garis Lurus Untuk Peserta Didik Kelas VIII. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 5(1), 643–654. <https://doi.org/10.31004/cendekia.v5i1.535>.
- Mustikawati, F. E. (2019). Fungsi Aplikasi Kahoot sebagai Media Pembelajaran Bahasa Indonesia. *Prosiding Seminar Nasional Bulan Bahasa (Semiba)*, 99–104. <https://ejournal.unib.ac.id/semiba/article/view/10281>.
- Nazar, M., Zulfadli, Z., Oktarina, A., & Puspita, K. (2020). Pengembangan Aplikasi Pembelajaran Interaktif Berbasis Android untuk Membantu Mahasiswa dalam Mempelajari Materi Larutan Elektrolit dan Nonelektrolit. *Jurnal Pendidikan Sains Indonesia*, 8(1), 39–54. <https://doi.org/10.24815/jpsi.v8i1.16047>.
- Pentury, H., Festiyed, Hamdi, & Yurnetti. (2019). Pembuatan Lembar Kerja Peserta Didik (LKPD) Berbasis Model Discovery Learning Pada Materi Gelombang Berbantuan Aplikasi Android Untuk Kelas XI SMA/MA. *Pillar of Physics Education*, 12(4), 617–624. <https://doi.org/10.24036/7144171074>.
- Priantini, O., & Manu, D. A. M. (2020). The Development Of Teaching Video Media Based On Tri Kaya Parisudha In Educational Psychology Courses. *Journal of Education Technology*, 4(4), 448. <https://doi.org/10.23887/jet.v4i4.29608>.
- Pujiastuti, H., Suvati, D. A., Haryadi, R., & Marethi, I. (2020). Development of mathmodule based on local wisdom and 21stcentury skills: Linear equation system. *Journal of Physics: Conference Series*, 1480(1). <https://doi.org/10.1088/1742-6596/1480/1/012052>.
- Rahayu, T., Mayasari, T., & Huriawati, F. (2019). Pengembangan Media Website Hybrid Learning berbasis Kemampuan Literasi Digital dalam Pembelajaran Fisika. *Jurnal Pendidikan Fisika*, 7(1), 130–142. <https://doi.org/10.24127/jpf.v7i1.1567>.
- Rambe, P. (2019). Pengembangan Aplikasi Pembelajaran Inovatif Dalam Pembelajaran Bahasa Arab Berbasis Web. *Arabi: Journal of Arabic Studies*, 4(1), 55.

- <https://doi.org/10.24865/ajas.v4i1.138>.
- Rustandi, A., & Rismayanti. (2021). Penerapan Model ADDIE dalam Pengembangan Media Pembelajaran di SMPN 22 Kota Samarinda. *Jurnal Fasilkom*, 11(2), 57–60. <https://doi.org/10.37859/jf.v11i2.2546>.
- Said, A., & Muslimah, M. (2021). Evaluation of Learning Outcomes of Moral Faith Subjects during Covid-19 Pandemic at MIN East Kotawaringin. *Bulletin of Science Education*, 1(1), 13–26. <https://doi.org/10.51278/bse.v1i1.99>.
- Setiadi, A., Yuliatmojo, P., & Nurhidayat, D. (2018). Pengembangan Aplikasi Android Untuk Pembelajaran Pneumatik. *Jurnal Pendidikan Vokasional Teknik Elektronika*, 1(1), 1–5. <https://doi.org/10.21009/jvote.v1i1.6886>.
- Setiawansyah, S., Sulistiani, H., & Saputra, V. H. (2020). Penerapan Codeigniter Dalam Pengembangan Sistem Pembelajaran Dalam Jaringan Di SMK 7 Bandar Lampung. *Jurnal CoreIT: Jurnal Hasil Penelitian Ilmu Komputer Dan Teknologi Informasi*, 6(2), 89. <https://doi.org/10.24014/coreit.v6i2.10679>.
- Soesilo, A., & Munthe, A. P. (2020). Pengembangan Buku Teks Matematika Kelas 8 Dengan Model ADDIE. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 10(3), 231–243. <https://doi.org/10.24246/j.js.2020.v10.i3.p231-243>.
- Styawati, S., Ariany, F., Alita, D., & Susanto, E. R. (2020). Pembelajaran Tradisional Menuju Milenial: Pengembangan Aplikasi Berbasis Web Sebagai Penunjang Pembelajaran E-Learning Pada Man 1 Pesawaran. *Journal of Social Sciences and Technology for Community Service (JSSTCS)*, 1(2), 10–16. <https://doi.org/10.33365/jsstcs.v1i2.816>.
- Suparmi. (2023). Peningkatan Minat dan Kemampuan Guru dalam Pengembangan Indikator dan Tujuan Pembelajaran Melalui Workshop Bimbingan Kelompok di SDN Sumurbatu 14 Pagi. *Ulumuddin: Jurnal Ilmu-Ilmu Keislaman*, 13, 65–74. <https://doi.org/10.47200/ulumuddin.v13i1.1422>.
- Suryadi, S. (2015). Peranan Perkembangan Teknologi Informasi Dan Komunikasi Dalam Kegiatan Pembelajaran Dan Perkembangan Dunia Pendidikan. *Jurnal Informatika*, 3(3), 9–19. <https://doi.org/10.36987/informatika.v3i3.219>.
- Uhl, J. D., Sripathi, K. N., Meir, E., Merrill, J., Urban-Lurain, M., & Haudek, K. C. (2021). Automated writing assessments measure undergraduate learning after completion of a computer-based cellular respiration tutorial. *CBE—Life Sciences Education*, 20(3), 1–13. <https://doi.org/10.1187/cbe.20-06-0122>.
- Wang, Y., & Liu, Q. (2020). Effects of online teaching presence on students' interactions and collaborative knowledge construction. *Journal of Computer Assisted Learning*, 36(3), 370–382. <https://doi.org/10.1111/jcal.12408>.