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THE USE OF SMARTPHONE TECHNOLOGY AS AN INNOVATIVE LEARNING STRATEGY TO IMPROVE CONCEPT UNDERSTANDING AND PROBLEM SOLVING

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Abstract: Innovative learning strategies can be defined as approaches that encourage students to apply learning materials to themselves using a variety of engaging and interactive methods and media. The development of digital technology provides significant opportunities to enhance innovative learning methods, thereby helping students better understand concepts and improve their problem-solving skills. Learning motivation is crucial for students in schools because it influences their learning outcomes. The purpose of this article is to discuss innovative learning strategies that can enhance student learning motivation. This article was written using a literature review method by collecting data or sources related to the topic being discussed in the research. The result of this paper is a discussion of innovative learning strategies that can enhance student learning motivation. This study highlights the importance of learning motivation in influencing student learning outcomes and demonstrates that innovative methods such as flipped learning, blended learning, and e-learning can improve the quality of education.

Keywords: Utilization of Technology, Innovative Learning Strategies, Concept Understanding, Problem Solving.

INTRODUCTION

The use of technology in learning is an important strategy in creating innovative learning that is able to improve students' understanding of concepts and problem-solving skills. Technology integration allows for the presentation of learning materials visually, interactively, and contextually, helping students understand abstract concepts better. In addition, technology also encourages active involvement of students in the learning process through digital-based discussions, exploration, and problem-solving. Therefore, the use of technology as an innovative learning strategy is relevant to be studied in depth to improve the quality of the learning process and outcomes.

In line with the latest education policies, the Independent Curriculum has evolved into an Impactful Curriculum that emphasizes meaningful, reflective, and impact-oriented learning for students. This curriculum requires teachers to design learning that is student-centered, adaptive to learning needs, and utilizes technology as the main support for innovative learning (Ministry of Education, Culture, Research, and Technology, 2024). In this context, the use of technology not only serves as a medium for delivering materials, but also as a means to develop in-depth understanding of concepts and problem-solving skills through project-based learning, problem-solving, and digital collaboration.

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The main challenge in the learning process is that teachers can ensure that students must be able to understand strong concepts and be able to apply students' knowledge in solving problems. Traditional learning approaches are also one-way, often considered less effective in the development of higher *order thinking skills* (HOTS). (Keller, 2016) reveals that the main factors that affect student participation, resilience, and learning success. However, the facts show that there are still many learners who feel boredom, lack of enthusiasm for learning, and low engagement in traditional learning methods. Conventional learning that tends to be boring and prioritizes lectures usually cannot meet the learning needs of creative and innovative students, one of which is through the use of digital technology. The use of interactive multimedia, gamification, digital platforms, and digital project-based learning has been proven to be able to increase student motivation and learning outcomes (Nurcahyo et al., 2025).

The research aims to examine the use of technology as an innovative learning strategy in improving the quality of the learning process based on literature review. In particular, this study focuses on analyzing the role of technology-based innovative learning strategies in improving students' understanding of concepts and problem-solving skills, especially in abstract learning materials. In addition, this research aims to examine the use of technology as an innovative learning strategy in improving students' understanding of concepts and problem-solving skills based on literature review. Various previous studies have shown that the integration of technology in learning is able to significantly improve the quality of learning. Rahmawati et al. (2024) stated that digital technology is effective in improving the understanding of mathematics concepts of elementary school students. Research by Anggriyani et al. (2024) shows that the use of educational technology supports students' critical thinking skills and learning motivation. Meanwhile, Said (2024) emphasized that innovative technology-based learning strategies have a positive impact on student engagement and understanding of concepts. Therefore, this research focuses on the analysis of innovative technology-based learning models that are effective in improving students' understanding of concepts and problem-solving skills.

The research also aims to identify various innovative technology-based learning models, such as *Problem Based Learning, Project Based Learning, Inquiry Learning, STEM, Blended Learning, Flipped Classroom, Gamification,* and the use of interactive technologies such as *Augmented Reality,* which have been proven effective in increasing student motivation and learning engagement. Through the *Systematic Literature Review* (SLR) approach, this study also aims to examine and analyze trends in the use of technology as an innovative learning strategy in improving students' understanding of concepts and problem-solving skills, through synthesis, and systematic review of relevant scientific literature in the last five years.

METHOD

This study uses *the Systematic Literature Review* (SLR) method by adopting the SLR *Preferred* method, *Systematic Literature Review and Meta-Analysis method*
(PRISMA) This study uses the Systematic Literature Review (SLR) method with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines

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developed by Moher et al. (2020) to examine innovative learning strategies. The method was chosen because it is most suitable for recognizing, categorizing, and evaluating students' mastery of concepts and learning interests in a structured way and strict selection (Muis, 2025). The research method with the SLR approach is divided into several steps as follows: 1) *Identification*, 2) *Screening*, 3) *Eligibility*, and 4) *Included* (Simamora 2024). The scheme of the research steps can be seen in the image below.

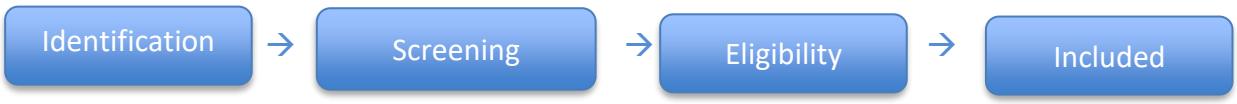

Figure 1. PRISMA Research Steps

Identification

Problem identification is a stage in finding research issues that are original, relevant, and have a theoretical basis and valid evidence through literature review and context research (Creswell & Creswell 2021). The data in this study was taken from the Google Scholar app, Consensus.

Screening

Screening is an activity of assessing the title, summary, and entire content of each literary work to identify the extent of its relevance and suitability with the research question (Booth, Sutton & Papaioannou 2021).

Eligibility

Eligibility is an evaluation process based on a reading of the full text to ensure that the research complies with all the inclusion criteria that have been determined in the SLR (Moher et al. 2020).

Included

Included research refers to research that meets the relevance, methodological quality, and inclusion criteria required by the review protocol (Gough, Oliver & Thomas (2021).

The determination of the feasibility of articles in this study is carried out based on inclusion and exclusion criteria that are systematically compiled. An article is declared feasible if it meets all inclusion criteria, which is published in the last five years, is relevant to the topic of the use of technology in innovative learning, uses clear research methods, and is available in full text form. Articles that do not meet one or more of these criteria are declared unsuitable and excluded from the analysis process. The eligibility criteria for articles included in this study are as follows: Table 1:

Criteria	Inclusions	Exclusion
Year of Publication	Articles published in the last 5 years (2020-2024)	Articles published before 2020
Publication Type	Journal articles, conference proceedings, and research reports that have been academically reviewed.	An opinion piece, general review, or editorial

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Language	Articles in English or Indonesian	Articles written in languages other than English and Indonesian
Research Subjects	Focus on students, both primary and secondary levels	Focus on populations other than learners (e.g. teachers or parents)
Results Research	Articles that discuss the influence of AR on students' understanding of concepts and/or learning interests.	Articles that do not directly discuss the impact of AR on students' understanding of concepts or learning interests.
Accessibility	Full-text articles.	Articles that have only abstracts or are not available in full text.

RESULTS AND DISCUSSION

The process of selecting articles in this study was carried out systematically using *the Systematic Literature Review* (SLR) method. At the *identification* stage, the researcher identified 60 articles relevant to the topic of using technology as an innovative learning strategy through *the Google Scholar* and *Census* databases. These articles are obtained using keywords related to innovative learning, educational technology, concept understanding, learning motivation, and problem-solving.

At *the screening stage,* an initial screening of the title, abstract, and keywords of the article is carried out to assess the suitability of the research focus. This process aims to ensure that only articles that are truly relevant to the purpose of the research are further considered. The next stage is *eligibility*, which is the evaluation of eligibility through the reading of the full text. At this stage, articles are selected based on the inclusion criteria that have been set, such as the year of publication in the range of 2015-2024, the type of publication in the form of scientific articles that have gone through the process of academic review, Indonesian or English, focus on students, and discussions that directly examine the impact of innovative technology-based learning on concept understanding, learning motivation, and/or solving abilityproblem. Articles that are not available in full text, do not meet methodological criteria, or do not explicitly address research variables are excluded from the study.

Based on these stages, only 20 Articles met all the inclusion criteria and were declared eligible at the *Included* stage. These articles are then analyzed in depth because they have high relevance, adequate methodological quality, and are able to provide strong empirical and conceptual evidence in answering the research objectives. The selection of these 20 articles aims to maintain the validity, reliability, and sharpness of the analysis of research results so that the conclusions produced are more accurate and can be scientifically accountable.

Tabel 2. Hasil Analisis Artikel

No	Nama Penulis	Metode	Jenjang/Materi	Aspek yang diukur	Hasil Penilain
1	(Putra, 2020)	Systematic literature Review (SLR)	Kesulitan siswa dalam pembelajaran	1. Kesulitan belajar matematika tentang	Masih banyak siswa mengalami kesulitan dalam memahami

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			matematika secara daring	pemahan konsep prosedur dan logika 2. Kesulitan dalam pembelajaran daring 3. Faktor penyebabnya	konsep matematika ketika belajar secara dari, kesulitan utamanya biasanya pemahaman konsep, penyelesaian prosedur, penggunaan rumus, kemampuan analisis data, dan pemecahan masalah. Kendalnya pembeljaran daring sepesrti kurangnya interaksi guru-siswa, lemahnya sinyal internet, siswa kurang motivasi, kurang inisiatif belajar mandiri. Namun juga memberikan manfaat seperti akses materi lebih fleksibel, siswa dapat mengulang materi kapan saja. Tetap mempunyai potensi meningkatkan pemahaman jika didukung model pembelajaran dan media yang tepat
2	(Yuliana et al., 2020)	Metode penelitian yang digunakan dalam penelitian ini yaitu metode deskriptif dengan pendekatan kualitatif.	1. Perguruan Tinggi (Mahasiswa Semester VII) 2. Program Studi Pendidikan Teknologi Informasi	Pemahaman mahasiswa terhadap materi Riset Operasi Informatika, keaktifan mahasiswa dengan diskusi dan kerja kelompok, motivasi dan antusiasme belajar, kemampuan bekerja sama/kolaborasi,	Implementasi *collaborative learning* terbukti meningkatkan pemaham mahasiswa terhadap meteri riset, operasi informatika, proses pembelajaran menjadi lebih aktif, mudah, dan menyenangkan,

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			3. Mata Kuliah : Riset Operasi Informatika 4. Cara pembuatan model dalam riset operasi	kepercayaan diri dan keberanian mengemukakan pendapat	mahasiswa menunjukkan peningkatan keaktifan, motivasi, dan semangat belajar, terjadi peningkatan interaksi sosial akademik.
3	(Suwardi, 2021)	metode kajian literatur	(1) pembelajaran STEM berhasil diterapkan di dalam maupun luar negeri; (2) Pembelajaran STEM dapat meningkatkan kemampuan berpikir kritis siswa dan menumbuhkan kreativitas siswa; (3) Pembelajaran STEM dapat guru menyiapkan pembelajaran yang lebih menarik dan menantang;	pembelajaran berbasis STEM (Science, Technology, Engineering, and Mathematics)	Penelitian STEM sudah banyak dilakukan di dalam negeri maupun di luar negeri dimana hasilnya sangat baik. Dalam penelitian yang berjudul Introducing STEM Education: Implication for Educating Our Teacher for the Age of Inovation, hasil penelitiannya bahwa Pembelajaran STEM dapat mengubah konsep model pengajaran baku menjadi pembelajaran yang kreatif, inovatif dan menekankan pada pemecahan masalah (Corlu & Capraro, 2014).
4	(Yesi Arikarani & Amirudin, 2021)	metode yang digunakan yaitu kajian literatur yang merujuk pada kajian teoritis dan referensi lain yang	pembelajaran digital di era pandemi covid 19	media pembelajaran yang mampu mengangkat nilai-nilai kemanusiaan dengan terciptanya layanan pendidikan yang lebih bermutu, efisien dan berkompetitif	hasil dari penelitian ini memberikan sebuah bentuk analisis pemanfaatan media dan teknologi digital yang memahami kondisi pembelajaran online/digital baik

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		berhubungan dengan nilai, sosial budaya dan norma yang berkembang pada situasi sosial yang diteliti.			peserta pembelajar/peserta didik maupun pengajar/pendidik sehingga dengan memahami menjadi kenal, mengakrabkan diri dengan pembelajaran daring. dan terlatih dalam menggunakan media pembelajaran online.
5	(Karmiati et al., 2022)	Penelitian ini merupakan penelitian jenis penelitian kuantitatif. Dalam Penelitian ini peneliti menggunakan rancangan penelitian *ex post facto*.	1. Perguruan Tinggi 2. Mahasiswa STKIP PGRI Situbondo semester 2,4, dan 6 3. Pendidikan Ekonomi dan pendidikan matematika 4. Penugasan pembelajaran daring	1. Aktivitas belajar mahasiswa, yang diklasifikasikan dalam kriteria baik, cukup, kurang 2. Aktivitas belajar ditijau dari keterlibatan fisik dan mental mahasiswa dalam proses pembelajaran	Penugasan pembelajaran daring berprngaruh signifikan terhadap aktivitas belajar mahasiswa, penugasan pembelajaran luring juga berpengaruh signifikan terhadap aktivitas belajar mahasiswa.
6.	(Hasriadi, 2022)	Metode pustaka (library research)	1. Metode Pembelajaran inovatif 2. Peran guru dalam meningkatkan kreativitas dan keaktifan peserta didik 3. Pemanfaatan teknologi dalam proses pembelajaran	1. Kognitif 2. Afektif 3. Psikomotorik 4. Keaktifan	Metode inovatif meningkatkan partisipasi dan keaktifan siswa. Guru perlu kreatif agar pembelajaran menarik dan efektif. Flipped, blended, dan e-learning meningkatkan kualitas proses dan hasil belajar, teknologi mempermudah akses materi dan meningkatkan

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			4. Dampak positif dan negatif penggunaan teknologi dalam pembelajaran		motivasi. Ada tantangan seperti koneksi internet & evaluasi aspek efektif
7.	(Melanie Surya & Moramowati, 2023)	studi pustaka	1.kualitatif untuk mengidentifikasi tren 2 tantangan, dan solusi yang relevan dalam konteks penggunaan teknologi dalam pembelajaran	berkembang menuju lingkungan pembelajaran yang inklusif, inovatif, dan berorientasi pada teknologi, sehingga membantu menciptakan generasi yang lebih siap menghadapi tantangan masa depan dan memperkuat fondasi pembelajaran bagi masyarakat yang lebih maju	Data dianalisis secara kualitatif untuk mengidentifikasi tren, tantangan, dan solusi yang relevan dalam konteks penggunaan teknologi dalam pembelajaran. Penggunaan teknologi dalam pendidikan memiliki dampak yang signifikan dalam meningkatkan efektivitas pembelajaran dan memperkaya pengalaman belajar siswa.
8.					Aplikasi AR dalam simulasi bisnis dan perencanaan keuangan memungkinkan siswa mengambil keputusan dalam lingkungan virtual, Penggunaan AR dalam visualisasi data ekonomi memperkuat pemahaman siswa terhadap tren dan pola data.
9.					Salah satu alasan utama mengapa model pembelajaran penting

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					adalah kemampuannya untuk meningkatkan keterlibatan siswa. Dengan menggunakan model pembelajaran yang tepat, siswa dapat berpartisipasi lebih aktif dalam kegiatan belajar, dan memiliki minat yang lebih besar terhadap materi yang diajarkan
10.	(Melanie Surya & Moramowati, 2023)	studi pustaka	1.kualitatif untuk mengidentifikasi tren 2 tantangan, dan solusi yang relevan dalam konteks penggunaan teknologi dalam pembelajaran	berkembang menuju lingkungan pembelajaran yang inklusif, inovatif, dan berorientasi pada teknologi, sehingga membantu menciptakan generasi yang lebih siap menghadapi tantangan masa depan dan memperkuat fondasi pembelajaran bagi masyarakat yang lebih maju	Data dianalisis secara kualitatif untuk mengidentifikasi tren, tantangan, dan solusi yang relevan dalam konteks penggunaan teknologi dalam pembelajaran. Penggunaan teknologi dalam pendidikan memiliki dampak yang signifikan dalam meningkatkan efektivitas pembelajaran dan memperkaya pengalaman belajar siswa.
11	(Rahmawati et al., 2024)	Metode penelitian menggunakan strategi *Systematic Literature Review*	Pembelajaran matematika di tingkat SD / konsep pecahan, bangun datar	Pemahaman konsep matematika siswa, hasil belajar siswa, motivasi dan minat belajar siswa, keatifan siswa dalam pembelajaran, efektivitas penggunaan teknologi digital	Dapat meningkatkan pemahaman konsep matematika siswa sekolah dasar khususnya pada materi yang bersifat abstrak, hasil belajar matematika siswa mengalami

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					peningkatan, penggunaan teknologi digital mampu meningkatkan motivasi dan minat belajar s
12.	(Anggriyani et al., 2024)	Penelitian ini bertujuan untuk melakukan tinjauan literatur sistematis mengenai penggunaan teknologi pendidikan dalam pembelajaran matematika	1. Integrasi teknologi pendidikan dalam pembelajran matematika 2. Pendekatan pembelajaran berbasis masalah	Pemahaman, konsep matematika, Hasil belajar siswa, keterlibatan dan motivasi belajar siswa, aspek pedagogis dan kesiapan guru	Hasil dari penelitian ini meningkatkan pemahaman konsep matematika, teknologi mendukung pengembangan keterampilan abad ke-21 seperti berpikir kritis kreativitas, dan kolaborasi
13.	(Fajeriadi & Fitriani, 2024)	Penelitian ini menggunakan metode studi bibliometrik untuk mengidentifikasi trend penelitian. Studi bibliometrik adalah metode penelitian yang menggunakan teknik kuantitatif untuk menganalisis literatur ilmiah,	pembelajaran biologi di sekolah menenga	Penelitian ini bertujuan untuk mengidentifikasi tren penelitian dan peluang inovasi pembelajaran melalui analisis strategi pembelajaran biologi di sekolah menengah.	Berdasarkan hasil pencarian database ditemukan 579 dokumen dengan jumlah sitasi 5416. Rata-rata sitasi per tahun 1083,20, dan rata-rata sitasi per dokumen 9,35.
14.	(Said, 2024)	Peneliti menggunakan pendekatan kualitatif dengan jenis penelitian deskriptif eksploratif	Strategi pembelajaran inovatif berbasis teknologi di SD 182 Angin-angin	Bentuk startegi pembelajaran inovatif berbasis teknologi, peran dan kreativitas guru milenial, faktor pendukung penerapan teknologi,	

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15.	(Arine Ellen Rose et al., 2024)	Metode penelitian menggunakan pendekatan studi literatur dan metode kualitatif untuk mengeksplorasi strategi inovatif dalam pembelajaran biologi di abad ke-21	Pendidikan biologi	Menghadapi tantangan dan peluang yang belum pernah terbayangkan sebelunya seiring dengan kemajuan teknologi dan perubahan dinamika pembelajaran	Hasil penelitian ini memberikan wawasan mendalam tentang berbagai model pembelajaran, seperti Project Based Learning, Problem Based Learning, Cooperative Learning, Discovery Learning, dan Inquiry Learning, serta mengidentifikasi tantangan dan peluang dalam menerapkan strategi inovatif ini.
16.	(Jaya et al., 2024)	penelitian kualitatif dengan Studi Pustaka	mengeksplorasi penggunaan teknologi sebagai alat untuk meningkatkan keterlibatan siswa, personalisasi pembelajaran, dan akses terhadap sumber daya pendidikan yang beragam	menyelidiki dampak integrasi model pembelajaran berbasis teknologi dalam meningkatkan minat dan prestasi belajar siswa. Obyek penelitian ini adalah siswa di berbagai tingkatan pendidikan yang terlibat dalam proses pembelajaran dengan pendekatan berbasis teknologi	menunjukkan peningkatan yang signifikan dalam minat belajar siswa, tercermin dari tingkat partisipasi yang lebih aktif dan responsif terhadap materi pembelajaran. Selain itu, prestasi belajar siswa juga mengalami peningkatan, diukur melalui hasil evaluasi dan tes pembelajaran. Simpulan dari penelitian ini adalah bahwa integrasi model pembelajaran berbasis teknologi dapat menjadi pendekatan yang efektif untuk meningkatkan kualitas pendidikan dengan memanfaatkan potensi teknologi
17.	(Asy'arie et al., 2025)	jenis kepustakaan (library research),	(1)model "inquiry learning" menekankan proses eksplorasi dan	1.Trend Model Pembelajaran "Inquiry Learning"	Salah satu alasan utama mengapa model pembelajaran penting adalah kemampuannya

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		dengan menggunakan pendekatan kualitatif	investigasi mandiri oleh siswa, memungkinkan mereka mengembangkan keterampilan berpikir kritis dan pemecahan masalah. (2) model "problem-based learning" (PBL) menantang siswa untuk menyelesaikan masalah nyata, memfasilitasi pembelajaran berbasis pengalaman. (3) model "project-based learning" (PjBL) melibatkan siswa dalam proyek jangka panjang yang menghubungkan teori dan praktik, meningkatkan keterampilan kolaboratif dan kreatif. (4) model "blended learning" menggabungkan pembelajaran	2.Trend Model Pembelajaran "Problem-Based Learning" 3.Trend Model Pembelajaran "Project-Based Learning"	untuk meningkatkan keterlibatan siswa. Dengan menggunakan model pembelajaran yang tepat, siswa dapat berpartisipasi lebih aktif dalam kegiatan belajar, dan memiliki minat yang lebih besar terhadap materi yang diajarkan
18.	(Mailani et al., 2025)	Penelitian ini menggunakan pendekatan kualitatif deskriptif dengan metode kajian literatur (*literatur review*)	Sekolah Dasar (SD)/ Matematika Konsep Pecahan	Pemahaman konsep pecahan, keterampilan pemecahan masalah, keterlibatan dan notivasi belajar siswa.	Strategi pembelajaran yang bersifat konkret, kontekstual, visual, dan kolaboratif terbukti efektif meningkatkan pemahaman konsep pecahan siswa SD.
19.	(Wahyuni & Hasanuddin, 2025)	Data dalam penelitian ini dikumpulkan melalui pendekatan Systematic	Pembelajaran matematika meliputi aplikasi pembelajaran, platform e-learning,	Pemanfaatan teknologi digital dalam pembelajaran matematika, pemahaman konsep,	Hasil penilaian ini menunjukkan bahwa **p**eningkatan signifikan penelitian tentang teknologi digital dalam pembelajaran

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		Literature Review (SLR) dan dianalisis menggunakan metode bibliometrik, untuk mengidentifikasi tren, topik dominan, dan struktur pengetahuan dalam bidang kajia	dan perangkat lunak interaktif	dampak terhadap pemahaman konsep	matematika periode 2020-2025, memperkuat pemahaman konsep matematis siswa, membantu mengonkretkan konsep abstrak, meningkatkan motivasi keterlibatan, dan pembelajaran kolaboratif, pengembangan pendekatan pedagogis yang masih relatif kurang dieksplorasi
20.	(Syafira Amelia et al., 2025)	Metode yang digunakan adalah studi literatur dengan menganalisis berbagai pendekatan pembelajaran inovatif, seperti pembelajaran berbasis proyek (Project-Based Learning), flipped classroom, dan integrasi teknologi dalam proses pembelajaran.	SD, SMP, dan SMA/ Strategi pembelajaran inovatif	analisis strategi pembelajaran inovatif	Strategi pembelajaran inovatif terbukti mampu meningkatkan kompetensi siswa secara menyeluruh (kognitif, afektif, psikomotorik) serta mampu mengembangkan kompetensi abad 21. Implementasinya sangat bergantung pada kesiapan guru, dukungan fasilitas, dan pemanfaatan teknologi. Oleh karena itu, pengembangan profesional guru dan kurikulum berbasis inovasi harus menjadi prioritas untuk menciptakan generasi yang adaptif dan kompeten.

The article in the table above is analyzed thoroughly from abstract to conclusion so that the results are obtained as follows:

1. Data by level of Education

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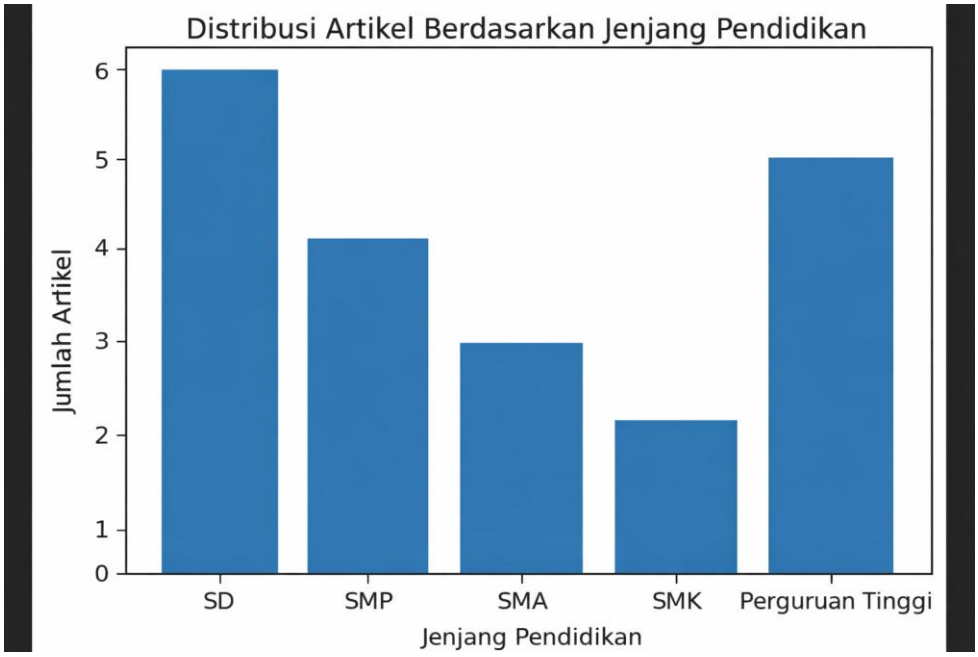

Figure 2. Data by School Level

Based on the Distribution of Articles by Education level, it is known that research on the use of technology in innovative learning is most widely carried out at the elementary school (SD) level, which is as many as 6 articles or 30% of the total articles analyzed. This shows that the basic education level is the main focus in the implementation of innovative technology-based learning, especially in supporting students' understanding of basic concepts.

Furthermore, articles that are of a university nature amount to 5 articles or 25%, which indicates that innovative technology-based learning strategies have wide relevance and can be applied to various levels of education. The Junior High School (SMP) level ranks next with 4 articles or 20%, followed by the Senior High School (SMA) level with 3 articles or 15%. The Vocational High School (SMK) level is the level with the least number of articles, namely 2 articles or 10%. This distribution shows that there is an imbalance in research focus between levels of education, thus opening up opportunities for further research, especially at the upper secondary and vocational education levels, to enrich empirical studies related to the implementation of innovative technology-based learning.

1. Data Based on Research Methods

In the research in the 20 articles above, there are various research methods used. The description is described in table 3 as follows :

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Tabel 3. Metode Penelitian

No	Inklusi	Jumlah
1	*Systematic Literature Review (SLR)*	2
2	*Study Literature*	2
3	Bibliometrik	3
4	Kualitatif	5
5	Kajian Literature.	2
6	*Comprehensive Literature Review (CLR)*	1
7	Studi Pustaka	2
8	*Library Research*	1
9	*Literatur Review*	1
10	Kuantitatif	1

Based on table 3 above, the most dominant research method used in the articles analyzed is the qualitative approach, which is as many as 5 articles or 25% of the total. The dominance of this approach shows that most of the research focuses on descriptive, interpretive, and in-depth analysis of the concepts and phenomena of technology-based innovative learning. The bibliometric method occupies the next position with 3 articles or 15%, which indicates an effort to map research trends and study developments in a systematic manner. Furthermore, the Systematic Literature Review (SLR), literature study, literature review, and literature study methods were each used in 2 articles or by 10%. These methods show a tendency for research that is conceptual and based on structured literature review.

Meanwhile, the Comprehensive Literature Review (CLR), library research, literature review, and quantitative methods were only found in 1 article or about 5% each. The low proportion of quantitative research indicates that statistical data-based measurement of the effectiveness of technology-based innovative learning is still relatively limited. Overall, the distribution of this research method shows that the study of innovative technology-based learning strategies is still dominated by qualitative approaches and literature reviews, thus opening up opportunities for further empirical and quantitative research to strengthen existing findings.

DISCUSSION

According to (Syafira Amelia et al., 2025) the results of a literature review show that innovative learning strategies such as *flipped learning*, *blended learning*, and *e-learning* play a significant role in changing the learning paradigm from teacher-centered to student-centered. In flipped learning, students obtain learning materials independently through digital media before face-to-face learning, so that time in class can be used for discussion, problem-solving, and concept deepening. Blended learning combines online and offline learning flexibly, allowing students to learn at their own pace and pace. Meanwhile, e-learning provides wider access to learning, is not limited by space and time, and encourages student learning independence. These three strategies have consistently been reported to increase student active engagement and build independent learning habits.

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The literature analyzed also showed a strong relationship between learning motivation and improved student learning outcomes. The use of interactive learning media such as learning videos, digital multimedia, gamification, and online learning platforms has been proven to increase students' interest, attention, and engagement in the learning process. This increased motivation has a direct impact on learning outcomes, both in cognitive, affective, and psychomotor aspects. Motivated students tend to be more active in asking questions, trying to solve problems, and being more persistent in facing learning difficulties, thus contributing to increased understanding of concepts and academic achievement.(Said, 2024).

According to (Yesi Arikarani & Amirudin, 2021) The use of technology in learning supports the occurrence of deeper cognitive processes. When students learn independently through technology, they engage in the process of exploration, elaboration, and reflection on the learning material. Visual media, digital simulations, and interactive technologies such as Augmented Reality help students concretize abstract concepts, especially in subjects such as math and science. In addition, the application of problem-based learning models and technology-supported projects allows students to apply the concepts learned in a real-world context, so that problem-solving skills develop more optimally.

Based on the synthesis of data from the 20 articles analyzed, it can be interpreted that educational technology not only functions as a learning tool, but also as a strategic means to create meaningful learning experiences. Literature findings consistently show that the integration of technology with innovative learning models contributes positively to improved concept understanding, learning motivation, and high-level thinking skills. Thus, the results of this study support the hypothesis that the use of technology as an innovative learning strategy is effective in improving the quality of learning (Sinaga et al., 2024).

The results of this review are in line with previous studies that confirm that technology-based learning can improve student engagement and learning outcomes. The consistency of the findings can be seen at various levels of education, ranging from elementary to secondary school. However, some studies have also shown variations in outcomes influenced by teacher readiness, learning design, and infrastructure availability. This difference shows that the effectiveness of educational technology is highly dependent on the context of implementation and the pedagogical approach used

Practically, the results of this study provide important implications for educators and education policy makers. Teachers are expected to utilize technology pedagogically through the application of innovative learning models that suit the characteristics of students. The integration of technology in the Independent Curriculum also needs to be supported through teacher training, the provision of infrastructure, and the development of contextual and interactive learning media. Thus, learning can take place more effectively, interestingly, and relevant to the demands of the 21st century (Anggriyani et al., 2024).

Although the results of the study show the positive impact of technology in learning, this study has limitations because it only relies on literature studies without involving direct empirical data. In addition, most of the articles analyzed used a qualitative approach, so generalization of results is still limited. In the field, the implementation of technology-based learning also faces

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obstacles such as limited internet access, teacher readiness, and differences in students' digital literacy skills.

Based on these findings and limitations, further research is recommended to develop empirical studies with quantitative or experimental approaches to measure more objectively the influence of technology on concept understanding and problem-solving skills. In addition, future research can explore other variables such as digital literacy, self-regulated learning, and teacher readiness, as well as examine the effectiveness of learning technologies in more diverse educational contexts.

CONCLUSION

Based on the results of *the Systematic Literature Review* (SLR) of the 20 articles analyzed, it can be concluded that the use of technology as an innovative learning strategy makes a positive contribution to improving students' understanding of concepts, problem-solving skills, and motivation to learn. Technology-based learning is able to transform the learning process that was originally teacher-centered to more interactive, collaborative, and student-centered, thereby supporting the development of higher-level thinking skills. The results of the study show that the application of various innovative learning models, such as *Problem Based Learning, Project Based Learning, Inquiry Learning, STEM, Blended Learning, Flipped Classroom, Gamification,* as well as the use of interactive technologies such as *Augmented Reality,* has proven to be effective in helping students understand abstract concepts and increase active engagement in learning. Technology plays a supporting role as a means of enrichment of the learning experience and facilitates more contextual learning.

However, the implementation of technology-based innovative learning still faces a number of obstacles, including the limitation of teachers' competence in integrating technology, the lack of supporting infrastructure, and the uneven implementation of innovative learning in educational units. Therefore, continuous support is needed through improving teacher competence, providing adequate equipment and infrastructure, and systematically integrating technology-based learning in the Independent Curriculum so that the goal of improving the quality of learning can be achieved optimally and sustainably.

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