



Self-Directed Learning in Indonesian Adult Education: A Systematic Review for Promoting Inclusive Quality Education

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Abstract: As new learning methods continue to emerge, Self-Directed Learning (SDL) remains a crucial element in the field of education, specifically for promoting inclusive quality education. This research is a Systematic Literature Review using the PRISMA framework to explore research trends, factors, and impacts of self-directed learning within Indonesian adult education, focusing on 25 Scopus-indexed publications from 2019 to 2024. The findings indicate a notable rise in related publications, particularly post-2022, with quantitative research methods being the most applied and undergraduate students serving as the primary subjects, which highlights a gap in representing broader adult learner populations. Thematic analysis reveals that SDL is effectively cultivated through structured antecedents, specifically gamified MOOCs, Learning Management Systems, and flipped classroom pedagogies, which causally link to enhanced digital literacy, creativity, and learner autonomy. Crucially, the study distinguishes that while purposeful educational technology fosters independence, uncontrolled social media usage acts as a potential hindrance to self-regulation. Based on these insights, the researchers recommend prioritizing guided technology integration and suggest that future studies diversify methodologies and broaden participant scopes beyond undergraduate students to better address the inclusive nature of adult education. Aligning with SDG 4 and SDG 10, this study positions SDL as a catalyst for inclusive quality education and reduced inequalities, empowering diverse learners, particularly marginalized groups, to achieve autonomy and lifelong growth.

Keywords: self-directed learning; learning methods; systematic literature.

Abstrak: Seiring dengan berkembangnya metode pembelajaran baru, pembelajaran mandiri (Self-Directed Learning, SDL) tetap menjadi elemen penting dalam bidang pendidikan. Penelitian ini merupakan systematic literature review menggunakan pendekatan PRISMA untuk mengeksplorasi tren penelitian, faktor-faktor, dan dampak dari pembelajaran mandiri sebagai tema utama dalam studi-studi yang dilakukan di Indonesia, dengan fokus pada publikasi yang terindeks dalam database Scopus dari tahun 2019 hingga 2024. Temuan menunjukkan adanya peningkatan signifikan dalam publikasi terkait selama tiga tahun terakhir, dengan metode penelitian kuantitatif yang

paling banyak diterapkan dan siswa sebagai subjek utama. Variabel utama yang erat kaitannya dengan SDL meliputi pembelajaran daring, pembelajaran campuran (blended learning), motivasi, dan pendidikan tinggi, yang semuanya menunjukkan hubungan yang kuat. Berdasarkan temuan ini, peneliti memberikan beberapa rekomendasi untuk penelitian di masa depan, seperti meningkatkan keragaman metodologi penelitian, memperluas cakupan peserta studi di luar siswa, dan meningkatkan jumlah studi yang dipublikasikan secara internasional dalam indeks Scopus. Penelitian ini sejalan dengan SDG 4 (pendidikan berkualitas), yang bertujuan untuk memastikan pendidikan berkualitas yang inklusif dan merata serta mempromosikan peluang pembelajaran sepanjang hayat bagi semua. SDL, sebagai strategi inti, memberdayakan individu untuk mengendalikan pembelajaran mereka sendiri, mendorong otonomi, pemikiran kritis, dan pertumbuhan pribadi. Dengan fokus pada pendidikan orang dewasa di Indonesia, studi ini berkontribusi pada SDG 10 (Mengurangi Ketimpangan), mempromosikan akses yang setara terhadap peluang pendidikan bagi berbagai peserta didik, khususnya bagi kelompok yang kurang terwakili dan terpinggirkan.

Kata kunci: *pembelajaran mandiri; metode pembelajaran; tinjauan literatur sistematis.*

A. Introduction

In recent years, the Indonesian education landscape has undergone significant changes, shifting toward a more student-centered and technology-integrated approach. One prominent learning approach receiving increasing attention is Self-Directed Learning (SDL), which refers to learners' ability to independently diagnose their learning needs, set goals, select strategies, and evaluate outcomes (Kartikasari & Nuryasana, 2022). The relevance of SDL became particularly relevant during the COVID-19 pandemic, when the abrupt shift from face-to-face learning required learners to assume greater responsibility for managing their learning (Irfandi et al., 2023; Widodo et al., 2021). The expansion of digital platforms and learning management systems further reinforced this shift, enabling adult learners to access a wide range of resources, learn at their own pace, and tailor their learning experiences to their needs and abilities. This shift supports the achievement of SDG 4 (quality education), particularly in fostering inclusive and equitable quality education and promoting lifelong learning opportunities for all.

Moreover, learning independence is increasingly seen as a key competency in today's rapidly evolving world. Individuals are expected to take ownership of their learning to keep up with continual societal and technological changes. SDL aligns with this demand, drawing from Humanistic philosophy, which emphasizes personal growth and self-actualization and Pragmatic philosophy, which values learning that

directly relates to real-life goals and practical applications (Morris, 2019). This aligns with SDG 4 by promoting skills for lifelong learning, crucial for reducing inequalities in access to education.

Given the growing relevance of SDL, further exploration into this area is essential for driving meaningful improvements in the education system. However, one challenge is the limited number of Indonesian research publications on SDL indexed internationally. While numerous international studies have explored the effectiveness of SDL in diverse contexts such as health professional education and higher education, few have addressed the unique challenges and opportunities of SDL implementation in Indonesian adult education. Furthermore, the limited number of Indonesian SDL studies indexed internationally reduces visibility of local practices and restricts contributions to the global discourse. This also speaks to SDG 10 (reduced inequalities), as increasing the visibility of Indonesian research can help create more inclusive knowledge-sharing platforms.

Several prior studies have explored the concepts of self-directed and independent learning. For instance, Murad et al. (2010) conducted a systematic literature review to assess the effectiveness of SDL in the field of health professional education. Their findings indicated that SDL leads to better knowledge acquisition compared to conventional teaching methods. Another notable study by Beckers et al., (2016) examined the integration of SDL with portfolio use, revealing that such a combination can enhance students' motivation and self-assessment abilities. The portfolios were specifically designed to support goal setting, task analysis, and the execution of learning plans.

Based on the considerations and foundations above, this study aims to address gaps in existing SDL practices through a systematic literature review by identifying research trends and determining how various variables influence SDL, specifically focusing on adult learning and education in Indonesia. Accordingly, this study addresses research questions concerning the current trends in SDL research among adults in Indonesia and how SDL both influences and is influenced by other variables.

This research is clearly crucial and relevant for examining the adaptation and impact of SDL in educational settings. These findings are expected to provide insights and guidance for future researchers and policymakers, as well as to formulate effective patterns, strategies, and policies that encourage independent learning in Indonesia.

Ultimately, this study can contribute to improving the quality of national education by strengthening independent learning.

B. Research Method

1. Research design

This study employs a Systematic Literature Review (SLR) as its primary research method. The SLR approach involves identifying, reviewing, evaluating, and interpreting all available studies related to a specific research topic and questions of interest (Triandini et al., 2019). In this context, the SLR is understood as a structured process for gathering research data, reading and documenting information, as well as organizing and analyzing it in a systematic, transparent, and critical manner (Fauzi & Pradipta, 2018).

To ensure methodological rigor, this review follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which provides structured guidance for selecting and evaluating relevant articles that align with the research objectives (Haddaway et al., 2022; Tricco et al., 2018). The PRISMA guidelines assist in systematically filtering literature sources to effectively address the predefined research questions.

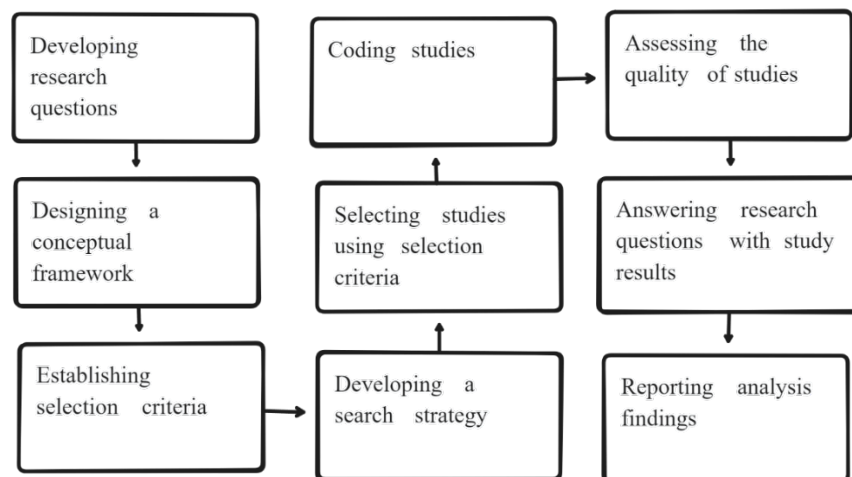


Figure 1. Systematic literature review procedure

Based on Figure 1, more precisely, Zawacki-Richter et al., (2019) describe the systematic literature review process as a series of structured steps. These include formulating the research question, constructing a conceptual framework, establishing inclusion and exclusion criteria, devising a search strategy, selecting studies based on

the established criteria, conducting coding, evaluating the quality of the selected studies, addressing the research question through the findings, and ultimately presenting the results along with their analysis.

The study selection and coding processes were conducted by three independent reviewers to ensure objectivity and reduce potential bias. All reviewers jointly developed the coding guideline, which included operational definitions for each coding category: research approach, research design, research variables, data collection techniques, data analysis techniques, and research subjects.

Table 1. Coding with Krippendorff's Alpha

Coding Categories	Scale	Krippendorff's Alpha	Interpretation
Research Approach	Ordinal	0.81	Good
Research Design	Ordinal	0.78	Acceptable
Research Variable	Ordinal	0.85	Very Good
Data Collection Techniques	Ordinal	0.82	Very Good
Data Analysis Techniques	Ordinal	0.76	Acceptable
Research Subject	Ordinal	0.81	Good

Overall, [Table 1](#) showing the Krippendorff's Alpha value in all categories is above the recommended minimum limit ($\alpha \geq 0.67$), so it can be concluded that the coding instrument in this SLR is reliable and the coding results can be trusted for further analysis.

All articles included in this review were ethically evaluated, respecting intellectual property rights and publication rights. Only publicly accessible studies indexed in Scopus were included in the review, and citations were provided appropriately to acknowledge the original authors' work.

2. Data source and search strategy

This study adopts the PRISMA framework to ensure the literature review is conducted in a structured and comprehensive manner. It focuses exclusively on research articles that are aligned with the formulated research question, using data obtained from the Scopus-indexed database. The data collection was limited to publications up until June, 2024, meaning that any studies published after that date were excluded from the review. To carry out the search, the researchers used an advanced query technique that applied specific Boolean operators to refine and target the most relevant studies.

The initial search was conducted using the following query, with additional filters were applied in the database search, including publication years from 2019 to 2024,

article-type documents, affiliation limited to Indonesia, journal sources only, language restricted to English or Indonesian, final publication stage, and all types of open access. The refined query was as follows: (TITLE-ABS-KEY ("self-directed learning")) AND PUBYEAR > 2017 AND PUBYEAR < 2025 AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (AFFILCOUNTRY , "Indonesia")) AND (LIMIT-TO (DOCTYPE , "ar")).

As a result of this filtering process, 72 relevant articles were identified and deemed suitable to proceed to the next stage of the review, which involved evaluating their eligibility based on predefined selection criteria.

3. Eligibility criteria

To ensure a structured and reliable review process, this study applied a set of eligibility criteria grounded in the PICOS framework; comprising Population, Intervention, Comparison, Outcome, and Study Design. The Population targeted in this research includes scientific articles that explore SDL in the Indonesian context. The Intervention focuses on studies conducted between the years 2019 and 2024 that specifically address SDL. The Outcomes considered include annual publication trends, recurring themes within SDL discussions, research methods utilized, treatments applied, types of research subjects, and the broader influence or implications of the studies reviewed.

Additionally, specific exclusion criteria were established to refine the dataset. First, only studies published up to June, 2024, were considered, to ensure that the scope of the review remained focused and manageable within a defined time frame. Second, studies that lacked sufficient clarity in presenting their data or research findings were excluded. Furthermore, any study that did not have a primary focus on Self-Directed Learning was omitted from this review.

The entire search process and selection flow were visually mapped out using a PRISMA diagram. Following this, data analysis was conducted using only those articles that fulfilled the inclusion criteria and met the quality standards required for the study. This approach was designed to effectively address and answer the research questions that had been previously formulated.

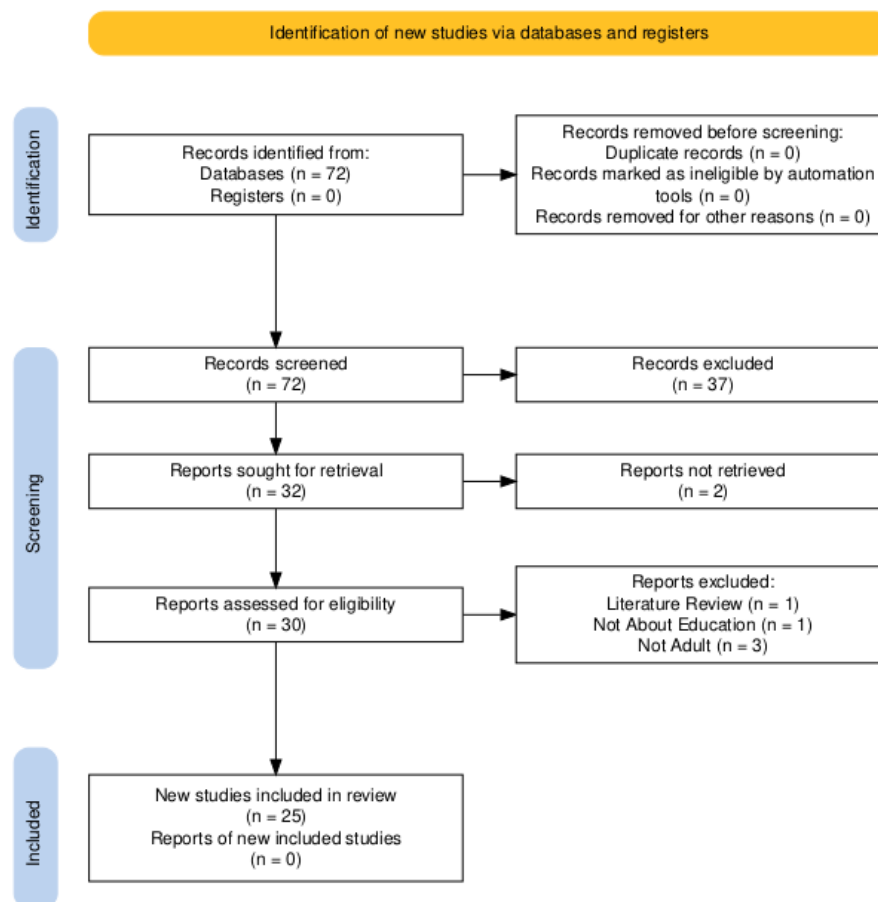


Figure 2. PRISMA flow

The systematic review process is visualized in [Figure 2](#) following the PRISMA 2020 framework adapted from Haddaway et al., (2022). The diagram illustrates the data retrieval flow from the Scopus database. Initially, 72 records were identified; however, after screening for topic suitability, the pool was reduced to 32 articles. Following the exclusion of 2 articles due to inaccessible full papers and a further comprehensive review, 25 articles remained for the final analysis. The complete list of these 25 articles, which passed all screening and eligibility criteria to ensure a high-quality assessment, is presented in [Table 2](#).

Table 2. List article result

Number	Tittle	Author Cite
Article 01	Culturally responsive self directed learning strategies of teachers in remote areas in Indonesia	(Ikawati et al., 2024)
Article 02	Development of an Android Application with Self Directed Learning to Improve the Quality and Effectiveness of Arts Learning for Performing Arts Education Students in A Wetland Environment: Lesson from Indonesia	(Nurdiyana et al., 2024)
Article 03	The Authentic Blended Assessment Model of Basic Reading for Developing Self-Directed Learning Skills	(Zaim & Atmazaki, 2024)

Article 04	The Implementation and Empirical Analysis of Android Learning Application toward Performance among Students Electronics Engineering Education	(Hidayat et al., 2024)
Article 05	Assessing Gamification-Based LMS for EFL Students: A Self-Directed Learning Framework	(Slamet & Basthomi, 2024)
Article 06	Unlocking the Potential in a Gamification-Based MOOC: Assessing Autonomous Learning and Self-Directed Learning Behaviors	(Ivone et al., 2024)
Article 07	Utilizing an SDL Approach in Designing a Gamification-Based Mooc to Enhance Autonomous Learning	(Slamet et al., 2024)
Article 08	Fostering Self-Assessment in English Learning with a Generative AI Platform: A Case of Quizizz AI	(Anggoro & Pratiwi, 2023)
Article 09	The challenges, supports, and strategies of self-directed learning among college students	(Murniati et al., 2023)
Article 10	Prospective Science Teachers' Information Literacy and Scientific Argumentation Skills in Online Learning During Covid-19 Pandemic	(Hidayati et al., 2023)
Article 11	Effectiveness of Team-Based Project Integrated E-books in Improving Student Self-Directed Learning and Creativity	(Ratnawati et al., 2023)
Article 12	Factors Affecting Teachers' Online Learning Experiences in Professional Development Program: Structural Equation Modelling	(Prihandoko, 2023)
Article 13	Assessing Student Empowerment in Mobile-Assisted Extensive Reading in a University Setting	(Misdi et al., 2023)
Article 14	Reinforcing learning organization by self-directed learning through massive open online courses: a lesson learned from Covid-19 pandemic	(Ferdianto & Anindita, 2023)
Article 15	Effect of Online Flipped Classroom on Students' Self-Directed Learning: A Case of Some Universities in Indonesia	(Diningrat & Ngussa, 2022)
Article 16	The Effect of Self-Directed Learning on Students' Digital Literacy Levels in Online Learning	(Rini et al., 2022)
Article 17	Raising Independent-Learning Awareness: An Action Research in Dance Practice Course in Indonesia	(Budiman et al., 2022)
Article 18	EFL Teachers' Identity in Self-Directed Learning: A Work-from-Home Phenomenology	(Ashadi et al., 2022)
Article 19	Evaluating supports for learner autonomy in ELT textbooks	(Khaerudin & Chik, 2021)
Article 20	Analysis of student learning habits factor towards e-learning effectiveness in XYZ university	(Kristian & Napitupulu, 2020)
Article 21	Practices of heutagogical activities among Malaysia technical university students	(Mohamad et al., 2020)
Article 22	The relationship between self-directed learning and students' social interaction in the online learning environment	(Lasfeto & Ulfa, 2020)
Article 23	Self-directed learning in the learning program for integrated healthcare service elderly managerial staff in the Bejiharjo village, Karangmojo district, Gunungkidul regency	(Wibawa & Sugito, 2019)
Article 24	Improving the quality of learning through the self-directed learning model	(Suarman & Sumarno, 2019)
Article 25	How do students become self-directed learners in the EFL flipped-class pedagogy? A study in higher education	(Zainuddin et al., 2019)

4. Research Instrument

To systematically synthesize and interpret the findings of the selected studies, this review employed a structured analytical framework comprising several categorization dimensions. These categorizations were designed to capture

methodological, thematic, and contextual characteristics of the included literature, thereby enabling a comprehensive mapping of research trends and patterns. Accordingly, the analysis reports were organized into multiple categories encompassing publication attributes, research methodologies, variable structures, analytical techniques, and future research orientations related to self-directed learning (SDL). Several categorizations of analysis reports were carried out to adjust the findings; including (1) Publication Year (2) Research Approach (3) Research Design (4.1) Variable Mapping and Dimension Categorization (4.2) Categorization of Independent Variables (4.3) Categorization of Dependent Variables (5) Keyword Variable Correlation (6) Research Subjects (7) Treatments (8) Data Collection Instruments (9) Data Analysis Techniques (10) Research Direction on SDL.

C. Results and Discussion

1. Research trends of self-directed learning in Indonesian adult education

The findings indicate a clear upward trend in SDL research in Indonesia, particularly after 2022, reflecting the post-pandemic shift toward autonomous and technology-enhanced learning environments. Quantitative approaches dominate the field, suggesting a strong tendency toward measurement-oriented investigations, while qualitative and mixed-method studies remain underrepresented.

a. SDL research growth trends

The research landscape of SDL in adult education in Indonesia has experienced notable fluctuations over the past few years, as evidenced by the distribution of publications from 2019 to 2024. This trend reflects both the challenges posed by external factors, such as the Covid-19 pandemic, and the growing significance of SDL in the context of evolving educational practices.

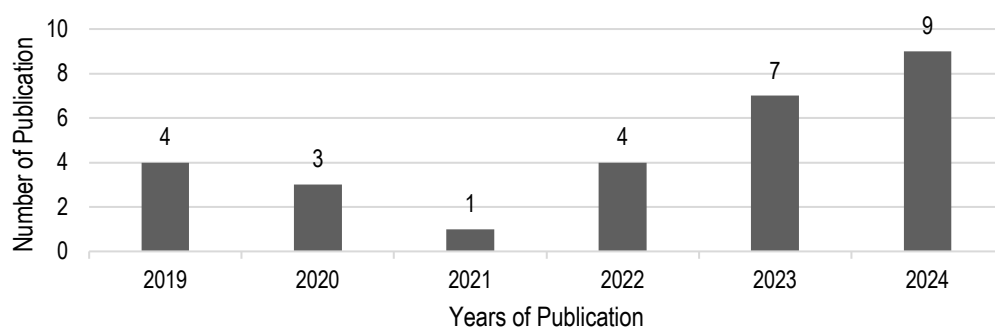


Figure 3. Number of publication

The distribution of publications over the 2019–2024 period, as illustrated in Figure 3, demonstrates a fluctuating yet generally upward trend in research on SDL in adult education in Indonesia. Following a moderate output in 2019 (4 publications) and a slight decline in 2020 (3 publications), the number of studies dropped significantly in 2021 (1 publication). This decrease likely reflects the disruptions caused by the Covid-19 pandemic, which shifted academic productivity and research focus during that period."

However, a clear increase in publications is evident from 2022 onward. The number of studies rose to 4 in 2022, followed by a substantial growth in 2023 (7 publications) and reaching its peak in 2024 (9 publications). This rising trend indicates a renewed and growing scholarly interest in SDL, particularly in response to the increased adoption of online and blended learning environments in higher and adult education. Overall, these findings suggest that SDL have become increasingly relevant research topics in Indonesia, reflecting their importance in supporting autonomous learning and adaptability in contemporary educational contexts.

b. Methodological trends

The methods used in research on SDL in adult education reveal distinct trends in how scholars approach the study of this learning model. The following section presents a breakdown of the research approaches used in the publications from 2019 to 2024, highlighting the dominance of quantitative research, the role of qualitative methods, and the emerging interest in Research and Development (R&D) approaches. It also discusses the limited use of mixed-method research and suggests that future studies could benefit from integrating both qualitative and quantitative techniques to provide a more nuanced understanding of SDL and its impact on adult learners.

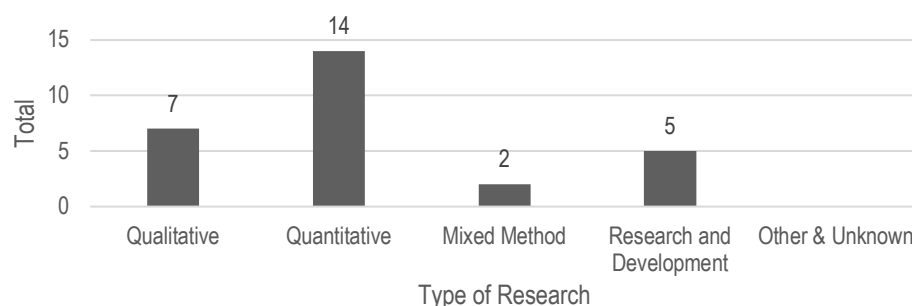


Figure 4. Types of research/research approach

The distribution of research approaches, as illustrated in Figure 4, shows that quantitative research is the most used method, with 14 studies. This indicates that

most researchers prefer to measure self-directed learning using numerical data, surveys, and statistical analysis. Qualitative research, with 7 studies, is also frequently used to explore participants' experiences and perspectives in more depth.

In addition, R&D approaches appear in 5 studies, reflecting an interest in developing and testing learning models, instruments, or educational products related to SDL. Mixed-method research is used in only 2 studies, showing that the combination of quantitative and qualitative methods is still limited. Overall, these findings suggest that future research could benefit from a greater use of mixed methods to provide a more comprehensive understanding of self-directed learning.

The choice of data collection instruments plays a critical role in shaping the findings and insights of SDL research. This section explores the various instruments employed in the studies reviewed, highlighting the prevalence of questionnaires as the most used tool for assessing SDL and its associated variables. While questionnaires offer efficient ways to gather data from large participant groups, other methods such as interviews, tests, and focus group discussions are less frequently utilized. The limited use of diverse instruments suggests a potential opportunity for future studies to incorporate multiple methods, enhancing data triangulation and improving the overall validity and depth of SDL research findings.

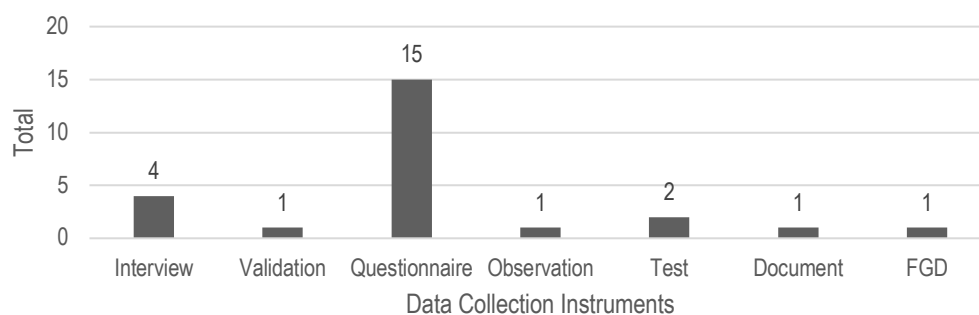


Figure 5. Data collection instruments

Based on the 25 articles analyzed, questionnaires are the most commonly used data collection instrument, appearing in 15 studies as shown in [Figure 5](#). This indicates a strong reliance on self-report measures to assess Self-Directed Learning, its dimensions, and related variables, as questionnaires are efficient for gathering data from relatively large groups of participants.

In comparison, interviews are used in 4 articles, providing more in-depth qualitative insights, while tests appear in 2 studies to measure learning outcomes or competencies. Other instruments, such as observations, document analysis, validation

procedures, and focus group discussions (FGD), are each used in only one article, suggesting that these methods are still underutilized. Overall, the findings indicate that future research could benefit from combining multiple data collection instruments to enhance data triangulation and strengthen the validity of SDL research findings.

The techniques used for data analysis are essential in determining the robustness and depth of findings in SDL research. This section examines the various data analysis methods employed across the reviewed studies, highlighting the predominant use of both quantitative and qualitative analytical techniques. The distribution of methods reveals a methodological diversity, with a strong emphasis on quantitative analyses, particularly descriptive statistics and statistical tests, and qualitative approaches, with thematic analysis being the most widely applied.

Table 3. Data analysis techniques

Analysis Approach	Data Analysis Method	Times
Quantitative	Phenomenological (reduction, presentation, verification)	1
	Interpretive Phenomenological Analysis (IPA)	1
	Thematic Analysis (manual / NVivo / Atlas.ti)	5
	Content Analysis based on a theoretical framework	1
	Qualitative Descriptive Analysis	1
Quantitative Description	Descriptive statistics (mean, SD, frequency, percentage)	5
	Likert Scale	1
Test of Differences and Relationships	Paired t-test	3
	Pearson Correlation	3
	Linear Regression	1
	One-way ANOVA	1
	PLS-SEM (SmartPLS 3.2 / 4.0)	4
Mixed Methods	Combined quantitative (SPSS) & qualitative	3
Konseptual	Conceptual & descriptive literature analysis	1

Based on the analysis of data analysis approaches in [Table 3](#), the reviewed studies demonstrate a strong dominance of quantitative and qualitative analytical techniques, reflecting methodological diversity in SDL research. Within the qualitative analysis category, thematic analysis is the most frequently used method (5 studies), often supported by software such as NVivo or Atlas.ti, indicating researchers' efforts to systematically interpret textual data. Other qualitative approaches, including phenomenological analysis, Interpretive Phenomenological Analysis (IPA), content analysis, and qualitative descriptive analysis, appear less frequently, suggesting that in-depth explorations of learners' lived experiences remain limited but methodologically varied.

In terms of quantitative descriptive analysis, descriptive statistics (mean, standard deviation, frequency, and percentage) are widely applied (5 studies), highlighting their role in summarizing respondents' perceptions and levels of Self-

Directed Learning. Analytical techniques used to test differences and relationships, such as paired t-tests and Pearson correlation (3 studies each), as well as linear regression and one-way ANOVA- indicate an interest in examining associations and causal tendencies among SDL-related variables. Additionally, PLS-SEM is employed in 4 studies, reflecting a growing trend toward using advanced statistical modeling to analyze complex relationships between latent constructs.

Furthermore, mixed-methods approaches are used in 3 studies, combining quantitative analysis (e.g., SPSS) with qualitative techniques to provide more comprehensive insights. However, the relatively small number of mixed-method and conceptual analyses (1 study) suggests that integrative and theory-building approaches are still underrepresented. Overall, while the findings reveal a strong emphasis on quantitative and statistical analyses, they also highlight opportunities for future research to strengthen qualitative depth, methodological integration, and conceptual development in the study of Self-Directed Learning.

c. Design trends

The research design employed in studies on SDL in adult education reflects a range of approaches aimed at exploring, developing, and validating various aspects of SDL. By examining the research designs used in the 25 articles analyzed, this study gains insight into how researchers structure their studies to address different dimensions of SDL, from learners' experiences to the relationships between key variables. This section provides an overview of the predominant research designs, such as R&D, and highlights the variety of analytical, relational, and experimental methods applied.

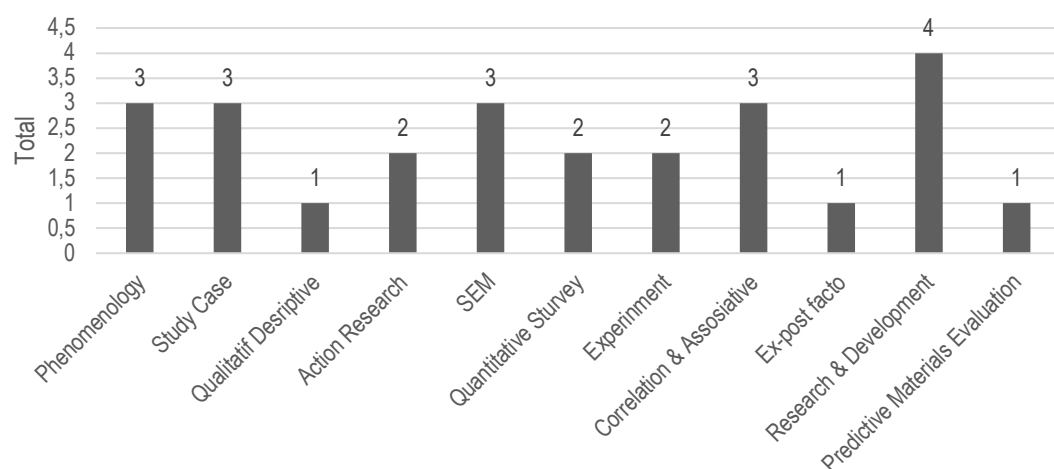


Figure 6. Research design

Based on Figure 6, the 25 articles analyzed employed a wide variety of research designs to examine SDL in adult education. Research and Development (R&D) was the most frequently used design (4 studies), indicating a strong focus on developing and validating learning models, instruments, or instructional materials. Several analytical and relational designs were also commonly applied, including phenomenology, case study, structural equation modeling (SEM), and correlation and associative designs, each appearing in 3 studies. This reflects effort to explore both learners' experiences and the relationships among key variables.

Other designs were used in smaller numbers, such as action research, quantitative surveys, and experimental studies (2 studies each), which demonstrate attempts to improve learning practices and test the effects of specific interventions. Meanwhile, qualitative descriptive, ex-post facto, and predictive materials evaluation designs were used only once, suggesting that these approaches remain underutilized. Overall, the findings indicate methodological diversity, but they also highlight opportunities for future research to balance exploratory, developmental, and experimental designs to strengthen evidence on SDL in adult education.

d. Contextual trend (HE-dominated)

The selection of research subjects plays a crucial role in shaping the findings and implications of SDL studies. This section examines the distribution of research subjects across SDL studies in Indonesia, revealing a strong concentration on undergraduate students, who are considered central to developing learner autonomy and independent learning skills. However, the limited representation of other adult learner populations, such as teachers, employees, and postgraduate students, highlights a significant gap in the research. The analysis also considers the distribution of sample sizes in these studies, with a majority relying on small to medium sample sizes, suggesting a need for more diverse and larger-scale studies to enhance the generalizability and impact of SDL research.

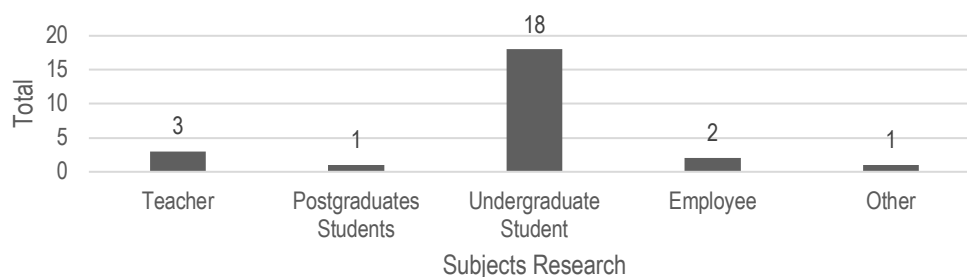


Figure 7. Research subject

Figure 7 shows that undergraduate students are the most dominant research subjects in studies on SDL, appearing in 18 articles. This indicates that SDL research in Indonesia is largely concentrated in higher education contexts, particularly at the undergraduate level, where learner autonomy and independent learning skills are considered essential. The strong focus on undergraduate students also reflects the accessibility of this population for academic research and their relevance to technology-enhanced and student-centered learning environments.

In contrast, teachers are involved as research subjects in only 3 studies, while employees appear in 2 studies, and postgraduate students and other subjects are each represented in just 1 study. This uneven distribution suggests a research gap in exploring SDL among adult learners outside traditional undergraduate settings, such as professional workers, lifelong learners, and postgraduate populations. Therefore, future studies are encouraged to broaden the range of research subjects to better capture the role and impact of SDL across diverse adult education contexts.

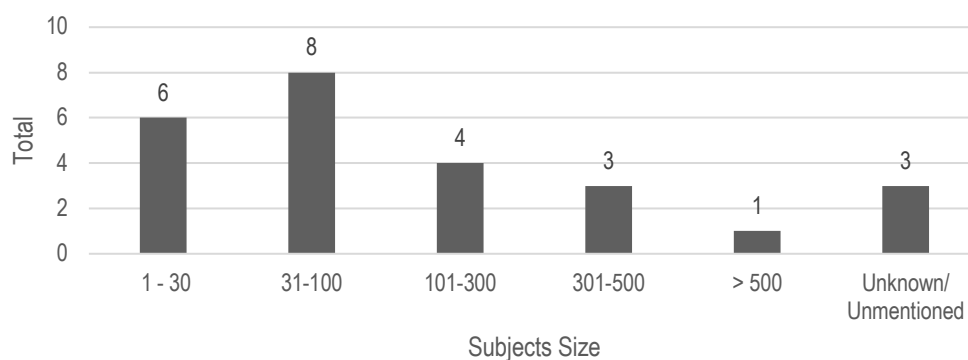


Figure 8. Research subject size

Figure 8 presents the distribution of research subject sizes across the analyzed articles. Most studies involved small to medium sample sizes, with 31–100 participants being the most common category (8 articles), followed by studies with 1–30 participants (6 articles). This pattern indicates that many SDL studies rely on manageable sample sizes, which are often suitable for survey-based, experimental, or qualitative research designs commonly used in educational research.

Larger sample sizes are less frequently used, with 101–300 participants reported in 4 articles, 301–500 participants in 3 articles, and only 1 article involving more than 500 participants. Additionally, 3 articles did not clearly report or mention their sample size, which may affect the transparency and reproducibility of the findings. Overall, these results suggest that while most studies provide sufficient data for exploratory

and inferential analysis, future research could benefit from larger and more clearly reported sample sizes to enhance the generalizability and methodological rigor of SDL research.

2. Factors influencing self-directed learning in Indonesian studies

a. Supporting factors

Supporting factors in Indonesian SDL studies extend beyond classroom interventions, emphasizing the role of an enabling ecosystem that sustains learner autonomy over time. Within this subsection, Figure 9 highlights how social support, learning organization, and digital literacy repeatedly emerge as foundational conditions that empower adults to regulate their learning trajectory. These findings suggest that SDL is most likely to flourish when individual readiness is reinforced by supportive structures, resources, and evaluative guidance within the learning environment.

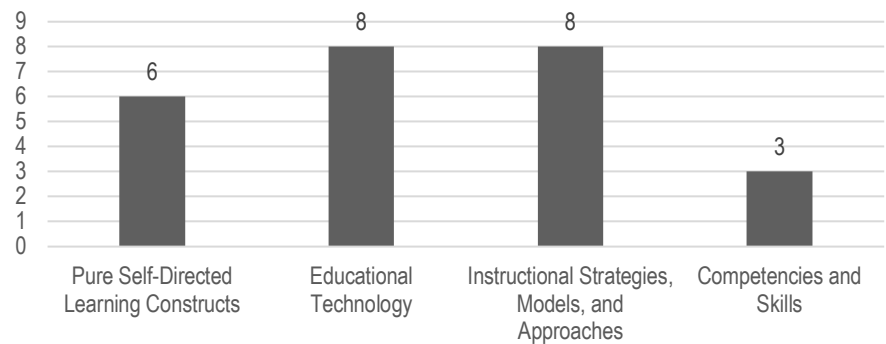


Figure 9. Categorization of independent variables

Figure 9 illustrates the categorization of independent variables, revealing that Educational Technology and Instructional Strategies are the most dominant categories, each appearing in 8 articles. This distribution indicates that SDL research in Indonesian adult education prioritizes the investigation of how technological tools and pedagogical approaches function as primary supports for learner independence. Meanwhile, pure SDL constructs appear in 6 studies, suggesting that the concept is frequently examined through integrated frameworks rather than in isolation. In contrast, Competencies and Skills represent the least explored category (3 studies), highlighting a significant research gap regarding how specific learner attributes contribute to SDL development.

A deeper analysis of the dominant categories identifies specific interventions that effectively catalyze learner autonomy. Research highlights the efficacy of flipped classroom models (Diningrat & Ngussa, 2022; Zainuddin et al., 2019) and blended learning environments (Zaim & Atmazaki, 2024) in shifting responsibility to the learner. Furthermore, the integration of gamification within Massive Open Online Courses (MOOCs) and Learning Management Systems has proven instrumental in sustaining engagement (Ivone et al., 2024; Slamet & Basthomi, 2024; Slamet et al., 2024). These findings underscore that SDL is cultivated through structured designs utilizing flexible tools, such as mobile-assisted applications (Hidayat et al., 2024; Misdi et al., 2023; Nurdiyana et al., 2024) and project-based e-books (Ratnawati et al., 2023), which enable learners to manage their own pacing.

Beyond instructional interventions, a supportive educational ecosystem is essential for sustaining SDL. The review identifies social support (Murniati et al., 2023), learning organization (Ferdianto & Anindita, 2023), and digital literacy (Hidayati et al., 2023; Rini et al., 2022) as critical foundational factors empowering learners to control their educational trajectory. Additionally, assessment mechanisms play a pivotal role; the implementation of daily and authentic assessments provides the necessary structure for continuous self-reflection and evaluation (Anggoro & Pratiwi, 2023; Zaim & Atmazaki, 2024). Consequently, successful SDL implementation relies on a synergistic approach combining individual readiness with an academic environment that offers clear evaluative frameworks and motivational support.

b. Instructional & technological factors

The analysis of instructional and technological factors, as categorized by the treatment types in Figure 10, reveals a research landscape currently dominated by observational studies and the utilization of existing tools. Specifically, "no treatment" and "product usage" emerge as the most frequent categories, each appearing in 8 articles. This trend indicates that the majority of SDL research in Indonesia assesses learner autonomy within established instructional environments or through the adoption of standard educational products, rather than manipulating these factors to observe causal effects.

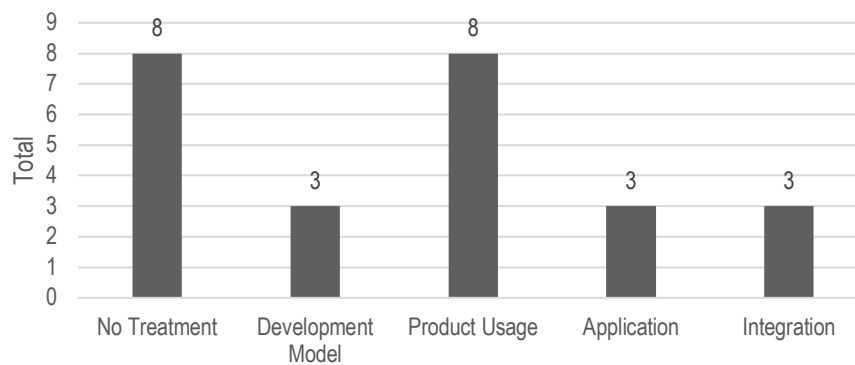


Figure 10. Treatment

Conversely, active interventions—comprising development models, application creation, and integration-based treatments—are less common, with each category represented in only 3 studies. This limited presence suggests that design-based research aimed at engineering specific technological or pedagogical solutions to foster SDL is still underrepresented. Consequently, a critical gap exists in understanding the direct efficacy of new educational tools. Future scholarship is encouraged to prioritize experimental and developmental designs to rigorously evaluate how purposeful instructional innovations and technological integrations can actively cultivate self-directed learning skills.

The prevalence of non-treatment studies suggests that current research tends to view technology as a passive environment rather than an active catalyst for SDL. However, the limited experimental studies reviewed demonstrate that intentional pedagogical design significantly amplifies learner autonomy. For instance, interventions that move beyond simple tool adoption, such as the implementation of an online flipped classroom (Diningrat & Ngussa, 2022) or gamification-based MOOCs (Ivone et al., 2024; Slamet et al., 2024), have shown direct positive correlations with improved self-directed behaviors. This implies that technology alone is insufficient; to effectively foster SDL in adult education, digital tools must be embedded within structured, active learning strategies rather than serving merely as delivery platforms.

c. Pedagogical factors

The systematic review indicates that pedagogical shifts toward student-centered models are fundamental drivers of SDL in Indonesian adult education. Specifically, the implementation of flipped classroom pedagogy has been identified as a significant strategy for transitioning learners from passive recipients to active managers of their learning process (Diningrat & Ngussa, 2022; Zainuddin et al., 2019). Furthermore, the

adoption of heutagogical practices, which emphasize self-determined learning, allows learners to explore, create, and reflect more deeply than traditional andragogical methods (Mohamad et al., 2020). These active learning strategies, often combined with team-based projects (Ratnawati et al., 2023), create an environment where autonomy is not merely an expectation but a structural requirement of the curriculum.

Complementing these instructional models, assessment strategies serve as critical pedagogical levers for reinforcing learner autonomy. Authentic assessment frameworks, particularly those integrated into blended learning environments, require students to engage in continuous self-monitoring and goal setting, thereby directly enhancing SDL skills (Zaim & Atmazaki, 2024). Additionally, the use of technology-aided self-assessment tools has been found to foster metacognitive awareness and reflection (Anggoro & Pratiwi, 2023). However, for these pedagogical interventions to be effective, research suggests that educators must first actively raise learners' awareness of independent learning principles through targeted action research and guidance (Budiman et al., 2022).

3. Impacts of self-directed learning on learners and learning systems

This subsection examines the impacts of Self-Directed Learning (SDL) by synthesizing how Indonesian studies conceptualize learner and system-level outcomes. Figure 11 provides an overview of the dependent variables used to capture these impacts, revealing prevailing emphases and overlooked dimensions within SDL research. Through this lens, the analysis highlights how SDL influences not only learner autonomy and regulation but also broader learning processes and educational effectiveness in adult education contexts in Indonesia.

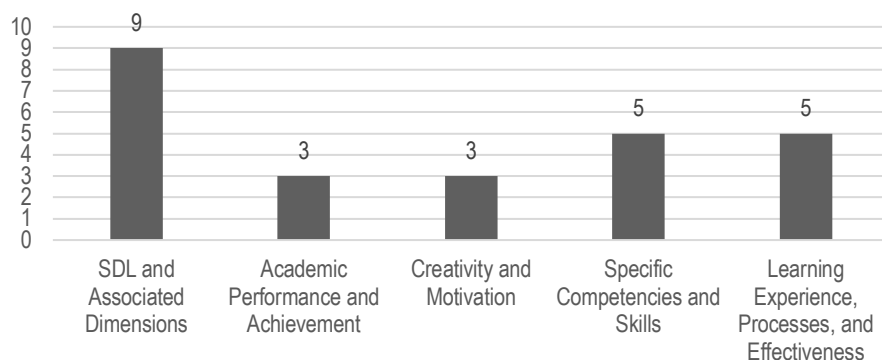


Figure 11. Categorization of dependent variables

The categorization of dependent variables in [Figure 11](#) shows that SDL and its associated dimensions are the most frequently examined outcomes, appearing in 9 studies. This indicates a strong focus on measuring changes in learners' autonomy, self-management, and self-regulation. Learning experience, processes, and effectiveness, as well as specific competencies and skills, are also commonly used dependent variables, each found in 5 studies, reflecting researchers' interest in understanding how SDL influences both learning quality and skill development. In contrast, academic performance and achievement, creativity, and motivation are less frequently investigated, with 3 studies each, suggesting that future research could further explore the broader academic and affective impacts of SDL in adult education contexts in Indonesia.

Expanding on these findings, the review reveals that SDL serves as a critical determinant of learning quality, particularly within digital and flexible learning environments. Research indicates that high levels of self-direction are directly correlated with improved e-learning effectiveness and positive online learning habits ([Kristian & Napitupulu, 2020](#)). Beyond general effectiveness, SDL impacts specific academic competencies; for instance, the implementation of blended and mobile-assisted learning models has been linked to significant enhancements in basic reading skills and increased student empowerment ([Misdi et al., 2023](#); [Zaim & Atmazaki, 2024](#)). Furthermore, the adoption of SDL models has been shown to broadly improve the overall quality of learning interactions and outcomes in adult education settings ([Suarman & Sumarno, 2019](#)).

In the cognitive and affective domains, SDL fosters competencies that extend significantly beyond academic retention. Cognitively, the ability to direct one's learning is strongly associated with the elevation of digital literacy levels ([Rini et al., 2022](#)) and the refinement of scientific argumentation skills and information literacy ([Hidayati et al., 2023](#)). On the affective spectrum, SDL interventions, particularly those utilizing team-based projects, have been shown to significantly stimulate student creativity ([Ratnawati et al., 2023](#)) and sustain autonomous learning behaviors through gamified engagement ([Ivone et al., 2024](#)). Additionally, contrary to the perception of SDL as a solitary pursuit, research indicates a positive relationship between self-directedness and the quality of social interaction in online environments ([Lasfeto & Ulfa, 2020](#)), suggesting that autonomous learners are better equipped to engage meaningfully in collaborative digital spaces.

4. Self-directed learning as a central construct in Indonesian adult education research

a. Network variable correlation

The interconnectedness of research variables in SDL can be better understood through the analysis of keyword co-occurrence networks, as visualized in [Figure 12](#). This network identifies SDL as the central node bridging diverse thematic clusters in Indonesian adult education research. This centrality indicates that SDL serves as the primary conceptual hub connecting pedagogical strategies, learner characteristics, and educational contexts. The analysis reveals distinct clusters defining the current landscape. The first and most dense cluster revolves around Educational Technology, characterized by terms such as Learning Management Systems (LMS), gamification, and blended learning, confirming that SDL discourse is intrinsically tied to technological integration ([Ivone et al., 2024](#); [Slamet et al., 2024](#)).

The second cluster emphasizes Educational Context, predominantly situated in higher education, reflecting a trend driven by the necessity of pandemic-induced remote learning to foster student independence ([Diningrat & Ngussa, 2022](#)). A third, smaller cluster highlights Situational Contexts, linking SDL to specific demographics such as teachers in remote areas ([Ikawati et al., 2024](#)) and integrated healthcare centers ([Wibawa & Sugito, 2019](#)). Overall, the network demonstrates that SDL research in Indonesia is increasingly interdisciplinary, technology-driven, and context-responsive.

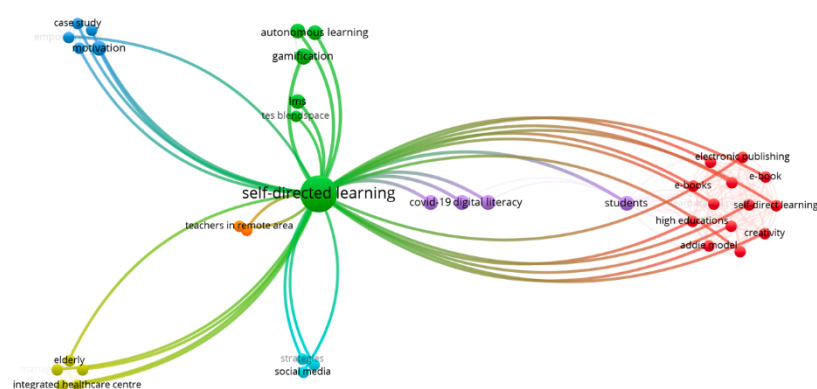


Figure 12. Network variable correlation

b. Direction research based on variable distribution

Understanding the key variables that influence SDL is essential for enhancing its implementation and effectiveness in adult education. This section presents a comprehensive overview of the research variables identified through keyword

analysis of the reviewed articles, offering insights into the factors that support and the outcomes that result from SDL. Additionally, this section highlights research gaps, such as the underexplored areas of competencies and skills, providing a foundation for future studies to further explore the complex dynamics of SDL in adult education.

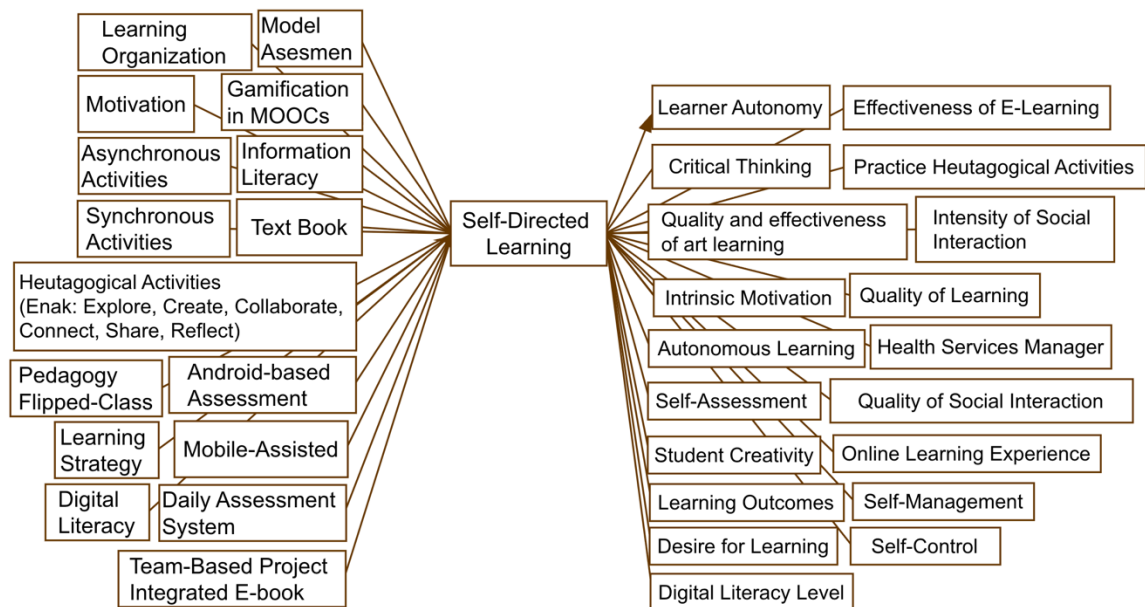


Figure 13. Variable mapping

Based on the keyword analysis of all reviewed articles visualized in [Figure 13](#), this study categorizes the research directions into antecedents and outcomes. The variables positioned on the left side of the SDL construct represent factors that function as antecedents or supporting elements. These include pedagogical approaches such as flipped classroom pedagogy ([Diningrat & Ngussa, 2022](#); [Zainuddin et al., 2019](#)) and heutagogical practices ([Mohamad et al., 2020](#)), alongside technological interventions like mobile-assisted learning ([Hidayat et al., 2024](#); [Misdi et al., 2023](#)) and gamification in MOOCs ([Ivone et al., 2024](#); [Slamet et al., 2024](#)). Furthermore, structural supports such as authentic assessment models ([Zaim & Atmazaki, 2024](#)) and learning organization strategies ([Ferdianto & Anindita, 2023](#)) play a crucial role in facilitating learners' ability to take responsibility for their own learning processes.

Conversely, the right side illustrates the outcomes and impacts associated with the implementation of SDL. Key impacts include enhancements in learner autonomy and critical thinking, as well as specific skill improvements such as digital literacy levels ([Rini et al., 2022](#)). Additionally, SDL fosters affective growth, including intrinsic motivation and student creativity ([Ratnawati et al., 2023](#)), while also improving the

quality of social interaction in educational settings (Lasfeto & Ulfa, 2020). These findings suggest that SDL not only enhances cognitive and metacognitive skills but also supports learners' readiness to engage effectively in flexible and technology-enhanced learning environments. Overall, the keyword mapping highlights SDL as a central construct that connects instructional strategies with meaningful learning outcomes in adult education contexts.

c. Research direction of SDL based on finding

Understanding the research direction on SDL is essential for identifying the factors that both influence and are influenced by SDL. This section explores the dynamic relationships between various variables in SDL research, categorizing them into those that contribute to the development of SDL and those that reflect its impact on learners. By examining instructional, technological, and organizational factors that support SDL, alongside the outcomes and learner characteristics it affects, this analysis provides a comprehensive view of SDL's role in enhancing both academic and personal growth. Furthermore, the research direction emphasizes the importance of controlled technology use, such as social media, in fostering effective SDL, highlighting key considerations for future research and practice.

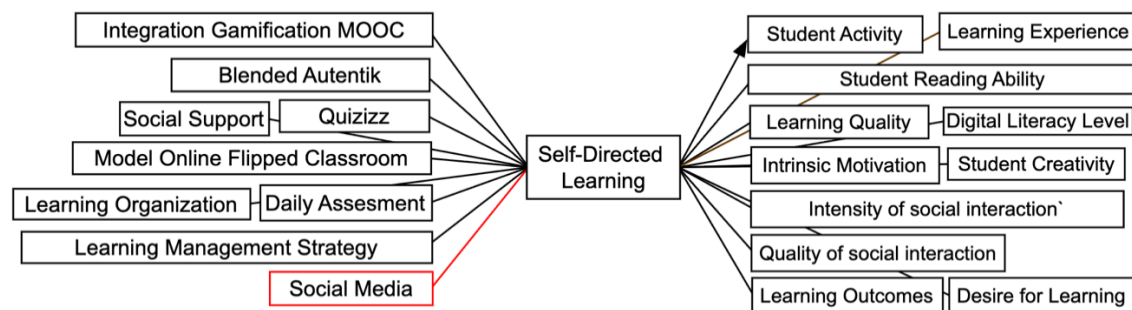


Figure 14. Research direction on SDL

The causal framework, visualized in Figure 14, explicitly distinguishes between the antecedents (left side) and the outcomes (right side) of Self-Directed Learning. The analysis identifies robust instructional and organizational drivers as prerequisites for SDL development. Structured environments, specifically those utilizing gamification-integrated MOOCs (Ivone et al., 2024; Slamet et al., 2024) and online flipped classroom models (Diningrat & Ngussa, 2022; Zainuddin et al., 2019), are shown to actively cultivate autonomy. These pedagogical strategies are reinforced by authentic assessment mechanisms (Zaim & Atmazaki, 2024) and social support (Murniati et al.,

2023), underscoring that learner independence is not spontaneous but requires a scaffolded educational foundation.

Conversely, the outcome side demonstrates the transformative impact of SDL on learner development. Successful implementation is causally linked to tangible improvements in reading ability (Misdi et al., 2023), digital literacy levels (Rini et al., 2022), and student creativity (Ratnawati et al., 2023). However, a critical anomaly appears regarding Social Media (highlighted in red in Figure 14). Unlike structured educational technologies, unstructured social media usage is identified as a potential hindrance to self-regulation. This finding suggests that without pedagogical alignment, social media may act as a distractor, emphasizing the need for guided technology integration to effectively foster SDL.

D. Conclusion

This systematic literature review utilizing the PRISMA framework analyzed 25 Scopus indexed articles published between 2019 and 2024 to map the trajectory of Self-Directed Learning within Indonesian adult education. The findings reveal a significant surge in research interest following 2022 driven by the acceleration of technology enhanced learning environments and aligning with the mandate for inclusive lifelong learning under SDG 4. Methodologically the field is currently dominated by quantitative approaches and centered primarily on undergraduate students in higher education contexts leaving broader adult learner populations underrepresented. Thematically the review establishes that learner autonomy is effectively cultivated through structured antecedents including educational technology such as gamified MOOCs and Learning Management Systems alongside instructional strategies like flipped classrooms and blended learning.

These interventions are causally linked to positive outcomes including enhanced learner autonomy digital literacy and intrinsic motivation. However, a critical distinction emerges regarding digital tools wherein purposeful educational technology fosters independence while uncontrolled social media usage is identified as a potential hindrance to self-regulation necessitating guided integration. Based on these findings educators and policymakers are recommended to prioritize the development of structured digital learning ecosystems that regulate the pedagogical use of social media to mitigate distraction. Curricula should explicitly integrate self-regulatory practices such as goal setting and self-assessment particularly within blended learning formats.

Future research must diversify beyond undergraduate populations to include professional and non-formal adult learners to better address the scope of adult education and employ mixed methods or experimental designs to rigorously examine the causal mechanisms of instructional interventions.

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