



I

nternational Journal of Innovation and Thinking

Journal Website: ij-it.com

E-ISSN: 3066-4047

RESEARCH ARTICLE

LMS-Based Disability Student Development Milestone Assessment Guide for Shadow Teachers

Agil Torresia Nirwanasari ¹, Siti Masitoh ², Budiyanto ³State University of Surabaya, Surabaya, Indonesia ^{1,2,3}

*Corresponding Author: agilnirwanasari@gmail.com

ARTICLE INFO

Keywords

Assessment, Students with Disabilities, Learning Management System, Shadow Teacher, ADDIE Development Model.

ABSTRACT

This study aims to test the acceptability and effectiveness of LMS-based developmental milestone assessment guidelines for students with disabilities to improve the ability of "shadow teachers". This guide is an instrument for "shadow teachers" in organizing guidance and mentoring services in schools. The development procedure in this study follows the ADDIE development model divided into Phase 1 involving the use of a literature review to conceptually map the tool. Stage 2 validation by 2 material experts and 2 media experts. Stage 3 assesses the validation of the scale construct generated from the practitioner. The instruments used for the assessment consisted of 15 items that referred to the acceptance of the LMS-based development milestone assessment guidebook for students with disabilities. The analysis of the assessment results uses the formulation of the content validity ratio calculation. The results of the analysis showed that the validity of the LMS-based developmental milestone assessment guidebook for students with disabilities has a content validity index (CVI) of 1 which means very good or special. Based on these results, the LMS-based guidebook for assessing the development milestone of students with disabilities to improve the ability of shadow teachers developed in this study has met the eligibility criteria to be used as an instrument in carrying out "shadow teacher" services. A trial of the effectiveness of the guide was tested on 20 shadow teachers. The results of the questionnaire analyzed using the one group paired sample t-test method with the SPSS program showed that the LMS-based development milestone assessment guide for students with disabilities was effectively used by shadow teachers.

INTRODUCTION

Persons with disabilities who are able to educate, especially those with barriers *Autism Spectrum Disorder* (ASD), requires special attention in the educational process. ASD is a complex neurodevelopmental condition characterized by difficulties in social



interaction, communication, and limited and repetitive patterns of behavior and interests (Howlin, 2012). Today the prevalence of ASD has shown significant increases in recent decades, with the current estimate reaching 1 in 54 children in the United States (Dietz et al., 2020). Similar phenomena are also encountered in various other countries, including Indonesia, although comprehensive epidemiological data are still limited, similar trends are also observed, indicating the urgent need for effective assessment strategies and interventions (Prince, 2024).

Special Supervisory Teachers (GPK) in this case commonly called "*Shadow Teachers* (ST)" have problems faced in inclusive schools, especially in conducting assessments of children with ASD, which is an important issue to be addressed. A preliminary study conducted at Athalia's Blessing, an institution that provides "*Shadow Teachers*", found that many "*Shadow Teachers*" do not have a special educational background in conducting assessments of children with ASD. This is a serious challenge in inclusive education, where assessment is one of the key components in understanding students' needs and potentials to design appropriate interventions.

The school conducts an Assessment for ASD Children before participating in Education. The assessments carried out are not only limited to academic aspects, but also include non-academic aspects, such as social skills, adaptive behavior, emotional abilities, and sensory responses (Davis et al., 2021). *Milestone* Developments, which include specific achievements in those various domains, are critical to identify during the assessment process. Children with ASD often face difficulties in these areas, which has a significant impact on their social interaction and ability to fit in in school and community settings (Volkmar, 2014). Therefore, a comprehensive assessment is not only important to understand academic development but also non-academic development, so that "*Shadow Teacher*" can develop a more holistic and targeted intervention program (Kasari et al., 2012).

A crucial aspect in early childhood education is the assessment of developmental *milestones*, especially for students with disabilities such as ASD. In accordance with Permendikbud Number 137 of 2014 concerning National Standards for Early Childhood Education (PAUD), this assessment includes the measurement and monitoring of physical, cognitive, linguistic, social, and emotional aspects. This comprehensive approach is not only applied to typical early childhood, but is also relevant for children with special needs. Through structured assessments, the "*Shadow Teacher*" can identify the individual needs of the child more precisely, so that the design of interventions can be carried out optimally.

Crucial early diagnosis can be obtained from assessment *Milestone* accurate and comprehensive in preparing intervention planning, and evaluation of the development of children with ASD (Lord et al., 2018). However, "*Shadow Teacher*" In the ASD assessment process, it is often hampered by several factors, including: (1) Limited access to mental health professionals trained in ASD assessment, especially in plural areas or developing countries (Durkin et al., 2015); (2) Lack of standardization in assessment procedures, which can lead to variability in diagnosis and intervention recommendations (Falkmer et al., 2013); (3) Limited knowledge and skills of Special Supervisors in this regard "*Shadow Teacher*" in conducting ASD assessments, even though they are often at the forefront of early identification and intervention in the education environment (G. Lindsay et al., 2016); (4) The complexity of existing



assessment tools, which often require extensive training and long administrative time (Pereira et al., 2022).

Inclusive education policies in Indonesia, although they have emphasized the importance of "*Shadow Teacher*" competencies in dealing with students with disabilities, there is still a gap between existing regulations and their implementation in the field (Perwali Surabaya, 2022). Preliminary studies at the Athalia Institute show that many prospective "*Shadow Teachers*" do not have adequate qualifications to conduct assessments of ASD children. This emphasizes the importance of developing training programs and practical guidance that can help "*Shadow Teachers*" improve their competence in conducting ASD assessments.

The development of a *development milestone* assessment guide for students with disabilities based on the *Learning Management System* (LMS) for "*Shadow Teachers*" is relevant. LMS provides flexibility in the delivery of training materials and can help "*Shadow Teachers*" access assessment guides anytime and anywhere. In addition, LMS also allows for standardization of the assessment process, so that assessments conducted by "*Shadow Teachers*" are more consistent and accurate (Parsons et al., 2019).

LMS has proven to be effective in providing flexible and interactive learning platforms across a wide range of Education contexts (Aldiab et al., 2019). In the context of ASD assessment, an LMS can offer several advantages, including: (1) High accessibility, allowing Special Tutors to access materials and guidance anytime and anywhere; (2) The ability to integrate various media formats, including demonstration videos and interactive simulations, which can improve understanding and practical skills; (3) Automatic progress tracking and feedback features, which can facilitate self-paced learning and continuous evaluation; (4) The potential to facilitate collaboration and exchange of experiences between practitioners through online discussion forums.

Nonetheless, research on the development and implementation of LMS-based ASD assessment guidelines for "*Shadow Teacher*" is still limited. The majority of previous studies have focused on the use of technology for direct and manual interventions in children with ASD (Grynszpan et al., 2014), or at parent training (Ingersoll et al., 2016), while the potential of the LMS in increasing capacity "*Shadow Teacher*" to conduct an ASD assessment has not been fully explored.

Several previous studies have attempted to address this challenge by developing a variety of technology-based tools and methods. Dewi (2022), for example, developed an early intervention guide assisted by a *Learning Management System* (LMS) for parents of children with ASD. The results of the study showed that the use of LMS was able to increase parents' understanding as well as the effectiveness of interventions, with an feasibility rate of 88.75% according to material experts and 97% according to media experts.

In addition, Kurniasari (2021) developed a learning plan that uses the *Universal Design for Learning* (UDL) principle to help overcome *The Triad of Impairments* in autistic children at the elementary school level. This research emphasizes the importance of flexibility and accessibility in the learning process, which is also relevant in the context of special education assessment.



This study develops and evaluates the effectiveness of LMS-based practical guidance for ASD assessment for "*Shadow Teachers*". The novelty of this study lies in: (1) A specific focus on the development of an ASD assessment guide for "*Shadow Teachers*", which combines the advantages of an LMS in terms of accessibility and flexibility; (2) Integration of digital assessment rubrics that can be accessed by classroom teachers and parents, allowing them to monitor the development of children's abilities in *real-time*; (3) A collaborative approach between the "*Shadow Teacher*" and parents in the assessment process, which is expected to improve the accuracy and comprehensiveness of the assessment; (4) The use of LMS technology to provide ongoing training and support for "*Shadow Teachers*" in conducting ASD assessments.

The results of this study may contribute to improving the quality and accessibility of ASD assessments in the educational setting, which in turn can support early identification and more targeted interventions for children with ASD. This research can also serve as a model for similar institutions in Indonesia in an effort to improve the competence of "*Shadow Teachers*", in line with the national inclusive education policy.

LITERATURE REVIEW

The Role of Shadow Teachers in Inclusive Education

Shadow teacher or accompanying teachers have a significant role in inclusive education, especially in supporting children with special needs in a regular classroom environment. Libriyanti et al. (2024) identified the main challenges in the implementation of inclusive education, such as limited funding and lack of training for *Shadow Teacher* (Libriyanti et al., 2024).

Sismawijaya & Astutik, (2024) states that *Shadow Teacher* has an important role in helping children with communication disorders to adapt to the school environment. Febriyah, (2025) emphasizing that emotional mentoring by *Shadow Teacher* contribute greatly to the social and academic well-being of children with special needs.

In addition, research by (Nimatuzahroh & Sari, 2024) demonstrate that competence *Shadow Teacher* are still diverse and require further training to be more effective in supporting inclusive learning.

Learning Management System (LMS) in Teacher Training

Use *Learning Management System* (LMS) in teacher training is growing, especially after the COVID-19 pandemic. Pascua-Ramos et al., (2025) states that LMS helps improve teachers' digital skills and supports flexible online learning.

Several studies highlight that LMS platforms such as Moodle and Google Classroom are effective in improving teacher competence, especially in the management of online classrooms (Linus et al., 2025). Other studies by Simanullang & Rajagukguk, (2020) emphasizing the importance of teacher training in using LMS optimally to improve learning outcomes.



In addition, the integration of technologies such as artificial intelligence in LMS can provide a more personalized learning experience for teachers, as stated by Joseph, (2025) in its review of technology trends in education.

METHODOLOGY

This research uses research and development or Research and Development (R&D). The development model used is the ADDIE model (*Analysis, Design, Develop, Implementation, Evaluation*). The ADDIE model is a model for the development of learning tools (Branch, 2010). This model was chosen because it aims to produce products in the form of test devices. The product to be developed is then tested first for validity and product testing to find out the feasibility of the instrument to be used. In this study, the product in question is a milestone assessment instrument that can measure the development of students with disabilities based on LMS. The research subjects used were 2 people which included, 2 lecturers of Special Education from the State University of Surabaya and 20 people consisting of 10 Special Supervisors of Kindergarten and Elementary School in Surabaya, as well as 10 "Shadow Teachers" from the Athalia Blessing Institute Surabaya.

The data collection method used is a questionnaire or questionnaire. Questionnaires are a data collection technique through a number of written questions that are used to obtain information or responses from respondents needed by researchers. Questionnaire is a data collection tool in the form of questions that will be filled out or answered by respondents.

A research instrument is a tool used to collect data in a research. Research instruments can be differentiated into test instruments and non-test instruments. The instrument was tested for validity and realism. The requirements of a good instrument must be valid and reliable. An instrument that is said to be valid if it can measure what it should be measured and an instrument that is said to be reliable if the instrument is consistent in providing an assessment of what is measured. In this study, the researcher used a questionnaire or non-test questionnaire. The steps in the preparation of instruments in the research are; (1) Identify the variables to be studied, (2) Formulate indicators, (3) Compile instrument grids, (4) Formulate question items or instrument statements and compile instrument item numbers, (5) Instructions for filling instruments, (6) And test instruments. The measurement scale of the variables in this study is using the Likert scale (*Likert Scale*), each was made using a scale of 1-5 answer categories, each of which was given a score or weight, namely the number of scores between 1-5 with a choice of five alternative answers (Suputra et al., 2021). Furthermore, in the development of the scale of students' learning interest, an instrument is needed in its measurement. The steps taken in compiling this instrument begin with compiling a grand theory-based instrument grid and then compiling indicators and statement items in the instrument.

The data analysis methods used in this study are descriptive analysis methods and statistical analysis methods. In this study, the validity of the instrument from the guidebook that has been reviewed by experts (*Expert Judgment*) aims to prove the feasibility of the handbook that has been made. The results of the review by experts on each question item on the validity test sheet of the counseling guide were analyzed



using the content validity ratio approach or CVR (*Content Validity Ratio*) submitted by (Lawshe, 1975). The formula used to calculate CVR is:

$$CVR = \frac{(\sum CVR)}{k}$$

Source: (Lawshe, 1975)

Information:

CVR = Content Validity Ratio of each item

k = Number of Question Items

This development research uses qualitative descriptive analysis techniques, quantitative descriptive statistical analysis. According to (Agung, 2014) The qualitative descriptive analysis method is a way of analyzing or processing data by systematically arranging in the form of sentences or words, categories about objects so that a general conclusion is finally obtained. This qualitative descriptive analysis technique was used to process data from expert reviews, 10 Special Supervisors for Kindergarten and Elementary School, and 10 people. *Shadow Teacher*". The quantitative descriptive analysis method is a method of data processing that is carried out by systematically compiling in the form of numbers and/or percentages, regarding an object being studied, so that general conclusions are obtained. The formula used to calculate the percentage of each subject is:

$$Persentase = \frac{\Sigma(\text{Jawaban} \times \text{bobot tiap pilihan})}{n \times \text{bobot tertinggi}} \times 100\%$$

(Tegeh and Kirna, 2010: 101)

Furthermore, to calculate the overall percentage of the subject, the following formula is used:

$$\text{Percentage} = F: N \times 100\%$$

Information:

F = Total overall percentage of the subject

n = Many Subjects

To be able to provide meaning and decision-making to the results of the questionnaire or questionnaire, the Scale 5 Achievement Level Conversion stipulation is used as follows.



Table 1. Conversion of Achievement Levels with a Scale of 5

No.	Tingkat Pencapaian (%)	Kualifikasi	Keterangan
1.	90 – 100 %	Sangat Baik	Tidak perlu direvisi
2.	75 – 89 %	Baik	Sedikit revisi
3.	65 – 74 %	Cukup	Direvisi secukupnya
4.	55 – 64 %	Kurang	Banyak hal yang direvisi
5.	0 – 54 %	Sangat Kurang	Diulangi membuat produk

(Tegeh and Kirna in Agung, 2014: 251)

This guide for assessing *milestone* development of students with disabilities for "Shadow Teacher" is LMS-based. The Grid of assessment instruments is found in Table 2 as follows:

Table 2 Assessment Instrument Grid

Scope of Development	Age 0-1 Year	Age 1-2 Years	Age 2-4 Years	Age 4-6 Years
Religious and Moral Values	Getting to know prayer, religious songs, and God's creation	Imitating worship movements, starting to be kind	Understand when to say greetings, start imitating prayers	Knowing religion, behaving politely, maintaining cleanliness
Physical-Motor	Raising head, rolling, sitting, crawling	Walking unassisted, climbing stairs, holding objects	Jumping, throwing balls, going up and down stairs	Performing body coordination movements, catching, kicking
Cognitive	Recognize the faces/voices of those closest to you, understand simple commands	Getting to know some basic colors, mentioning the name of the object	Understanding cause and effect, recognizing shapes and colors	Solve simple problems, recognize numbers and letters
Language	Make a sound, start imitating words	Answer simple questions, respond to commands	Using simple sentences, understanding the story	Repeat complex sentences, understand the rules of the game
Social-	Showing emotional	Playing with friends,	React to new things, play	Showing confidence,

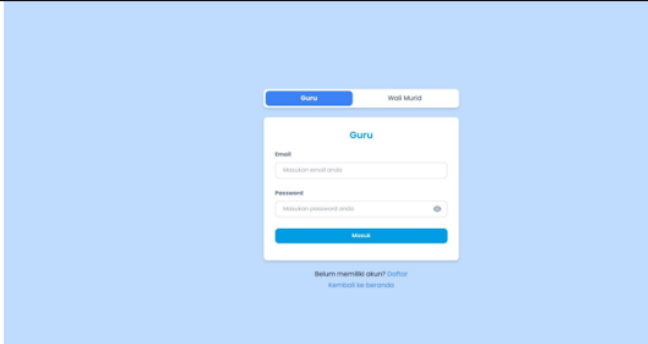


Emotional	reactions, simple interaction	showing reactions to others	simple roles to	working with friends
Art	Recognize sounds, respond to music with movement	Imitating rhythm songs, interested in sound music	the of simple instruments, imitating Movements	Drawing, playing details, musical instruments, playing dramas

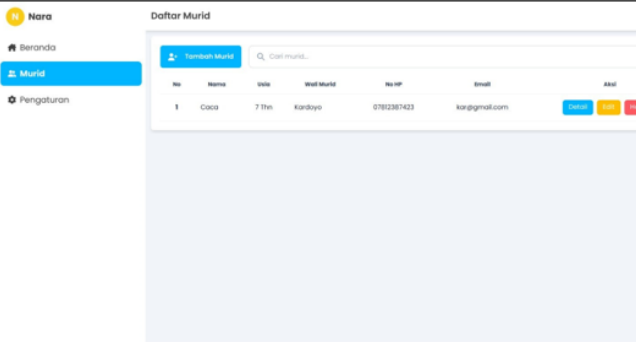
Next in Suputra et al., (2021) write down the steps to use the LMS, then the LMS for the assessment guide *Milestone* the development of students with disabilities for "Shadow Teacher" is displayed in Table 3 *Storyboard Design Learning Management System* as follows:

Table 3 *Storyboard Design Learning Management System*

Halaman	Tujuan	Deskripsi Visual	Interaksi Pengguna
Halaman Awal	Menyampaikan tujuan dan fungsi LMS secara singkat	 • Header dengan logo LMS dan navigasi utama. • Banner utama yang menampilkan tujuan dan fungsi LMS dengan gambar ilustratif. • Seksi tentang fitur utama LMS. • Footer dengan informasi kontak dan tautan penting.	• Pengguna dapat melihat informasi umum tentang LMS. • Tombol "Mulai" atau "Pelajari Lebih Lanjut" untuk navigasi ke halaman selanjutnya

Halaman	Tujuan	Deskripsi Visual	Interaksi Pengguna
Halaman Login	Memberikan akses aman bagi Guru dan Wali Murid sesuai peran	 - Formulir login dengan bidang untuk nama pengguna dan kata sandi. - Pilihan peran pengguna (Guru atau Wali Murid). - Tombol "Login" dan opsi "Lupa Kata Sandi".	- Pengguna memasukkan kredensial mereka dan memilih peran. - Sistem memverifikasi akses dan mengarahkan pengguna sesuai peran.
Halaman Materi	Menyediakan materi asesmen ASD berdasarkan sektor perkembangan	 - Menu navigasi samping dengan empat sektor perkembangan: nilai moral dan agama, nilai akademik, nilai sosial, dan nilai lingkungan. - Konten materi dengan panduan langkah demi langkah. - Checklist tugas perkembangan untuk setiap sektor.	- Guru dapat memilih sektor perkembangan dan mengakses panduan asesmen. - Mengisi checklist setelah melakukan asesmen pada setiap tugas.
Halaman Beranda	Menyajikan laporan singkat mengenai peserta didik dan status asesmen mereka	 - Dashboard dengan ringkasan peserta didik. - Grafik perkembangan dan status asesmen. - Notifikasi atau pembaruan terbaru.	- Guru dapat melihat informasi singkat tentang perkembangan peserta didik. - Navigasi cepat ke detail lebih lanjut atau asesmen.

Consumer Narratives on AI-Based Marketing Personalization Experiences: A Study of Habitus and Social Capital in the Jabodetabek Area

Halaman	Tujuan	Deskripsi Visual	Interaksi Pengguna
Halaman Murid	Mengelola data murid dan melakukan asesmen langsung melalui platform	 • Daftar murid dengan opsi tambah, edit, dan hapus. • Formulir untuk menambahkan atau mengedit identitas murid. • Tombol untuk memulai asesmen langsung.	Guru dapat menambah murid baru, mengedit data murid, dan melakukan asesmen melalui platform.
Halaman Infografik	Menyediakan visualisasi data asesmen yang jelas dan mudah dipahami	 • Grafik interaktif yang menampilkan data asesmen. • Visualisasi perkembangan peserta didik dalam berbagai sektor. • Filter untuk melihat data berdasarkan kriteria tertentu.	Guru dan wali murid dapat melihat dan menganalisis data asesmen dengan visual yang mudah dipahami.

RESULT AND DISCUSSION

Expert Validation Results

Based on the data obtained from the calculation of the experts' validation, the I-CVI Results (relevance of each item) can be known. The calculation of I-CVI for the relevance of each item on the point of material aspects of suitability, accuracy, up-to-date and encouraging *the curiosity of the shadow teacher* as well as the presentation technique of 5 items with 15 questions on the validation instrument was marked as relevant and the I-CVI ranged from 0.66 to 1.00. Three items with 7 questions have I-CVI = 1.00, two items with 5 questions have I-CVI = 0.83 and 1 item with three questions have I-CVI = 0.66. Based on these results, it can be concluded that 5 items with 15 contained in the validation instrument are considered relevant with the mean value of I-CVI = 0.84 and still greater than the limit of I-CVI = 0.78. So it can be concluded that the development *milestone* assessment guide for students with disabilities for LMS-based "Shadow Teachers" developed is appropriate and feasible to use. The results of the relevance of the validation from the experts can be seen in figure 1

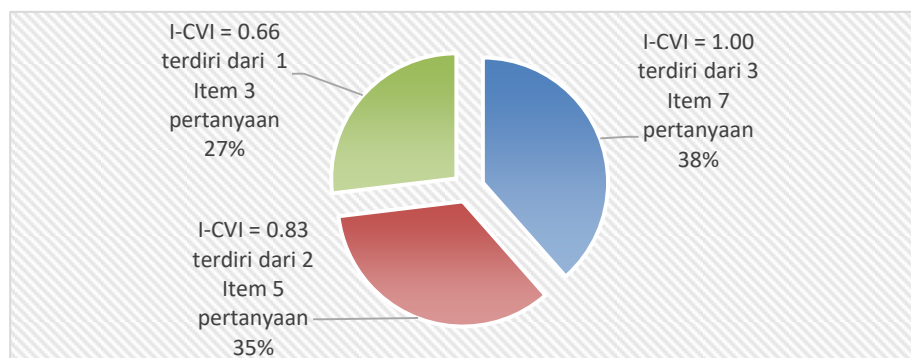


Figure 1. Expert Validation Results

To find out the results of the implementation of the development milestone assessment guide for students with disabilities for LMS-based "*Shadow Teacher*", it shows that the results of the research that have been carried out, the knowledge of "*Shadow Teacher*" has increased as seen from the N-gain score in table 4.

Table 4 N-gain Knowledge "*Shadow Teacher*"

NO	IMPLEMENTATION MILESTONE ASSESSMENTS	OF	AVERAGE N-gain	CATEGORY
1	First		0.67	KEEP
2	Second		0.68	KEEP
3	Third		0.68	KEEP
AVERAGE N-gain			0.68	KEEP

Based on table 2, the increase in knowledge of "*Shadow Teachers*" after the implementation of the development milestone assessment guide for students with disabilities occurred in all three implementations with moderate effectiveness. When compared to each implementation process, the N-gain score of "*Shadow Teacher*" knowledge has a tendency to increase for each implementation, starting from 0.67 for the implementation of the first assessment, 0.68 for the implementation of the second assessment, and 0.68 for the implementation of the third assessment. This shows that the development milestone assessment guide for students with disabilities for LMS-based "*Shadow Teacher*" has the effectiveness of increasing the knowledge of "*Shadow Teacher*" which is getting better for each milestone assessment carried out .

The achievement of "*Shadow Teacher*" knowledge for each milestone assessment can be seen from the distribution of test scores as shown in figure 2

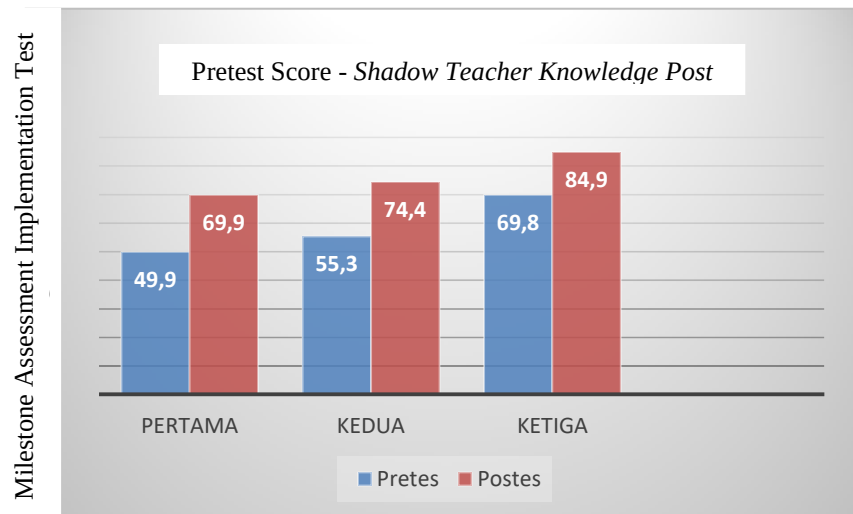


Figure 2. Distribution of pretest and post-test scores Shadow Teacher Knowledge for each milestone assessment

The increase in *Shadow Teacher* knowledge is accompanied by the achievement of a fairly high score for the implementation of *milestone* assessments. Based on figure 2, the achievement of the *Shadow Teacher's* knowledge score in the implementation of the *first milestone1* assessment is in the range of 69, the implementation of the second milestone assessment is in the range of 74, and continues to increase to the range of 84 in the implementation of the third milestone assessment. The improvement and achievement of *Shadow Teacher* knowledge that is quite high cannot be separated from the active use of the *development milestone* assessment guide for students with disabilities in the process of implementing *milestone assessments* that are carried out and the use of applications contained in the LMS because there are several aspects of objectives that must be learned, including: understanding of personal social assessments; the ability to do social self-assessment; understanding of fine motor movement assessment; the ability to perform fine motor movement assessments; understanding of language assessment; the ability to conduct language assessments; understanding of gross motor movement assessment; and the ability to perform gross motor movement assessments. The improvement and achievement of *Shadow Teacher* knowledge can also be analyzed for each aspect as shown in table 5.

Table 5 Shadow Teacher knowledge aspect score recapitulation

Yes		Implementation of <i>milestone assessments</i>									Average N-gain
		First			Second			Third			
		PreTest s	PostTe sts	N-gain	PreTest s	PostTes ts	N-gain	PreTest s	PostTe sts	N-gain	
1	Understanding of social personal	44.5	69.4	0.81	49.5	71.8	0.79	51.4	73.1	0.81	0.80



assessment											
2	Ability to conduct personal social assessments	38.5	62.3	0.63	38.5	63.8	0.70	53.7	76.0	0.93	0.75
3	Understanding of fine motor movement assessment	44.5	71.6	0.96	52.9	72.9	0.73	56.8	73.0	0.60	0.76
4	Ability to perform fine motor movement assessments	39.4	66.6	0.81	49.8	69.0	0.62	53.1	73.1	0.75	0.73
5	Understanding of language assessment	46.8	69.6	0.75	49.9	70.1	0.67	54.5	71.5	0.60	0.67
6	Ability to conduct language assessments	34.5	62.2	0.73	33.9	60.5	0.67	55.1	71.2	0.56	0.66
7	Understanding of gross motor movement assessment	44.5	56.8	0.29	45.3	68.0	0.71	53.7	74.3	0.80	0.60
8	Ability to perform gross motor movement assessments	35.6	54.8	0.42	44.1	61.3	0.45	50.6	71.3	0.72	0.53

Based on table 5, the LMS-based development milestone assessment guide for students with disabilities has different effectiveness in improving aspects of *Shadow Teacher knowledge*. Referring to the category of effectiveness of the assessment implementation set, information was obtained that the highest improvement occurred for the aspect of understanding of personal social assessment, for understanding of fine motor movement assessment, the ability to perform fine motor movement assessment, understanding of language assessment, the ability to conduct language assessments in the medium category, and the ability to perform gross motor movement assessments in the low category

Of the eight aspects of *Shadow Teacher knowledge*, the largest N-gain score occurred in the aspect of understanding social personal assessment, which was with an average score of 0.80. This is because the ability to understand personal social assessment is the simplest ability that *Shadow Teachers* can do with student observation. *Shadow Teachers* need enough time to be able to digest the information they obtain in order to remember and perform assessments properly.



The knowledge aspect of *Shadow Teacher* with the lowest N-gain score occurred in the aspect of being able to perform gross motor movement assessments with an average score of 0.53. In contrast to other aspects of knowledge, the understanding of fine motor movement assessment, the ability to do fine motor movement assessment, the understanding of language assessment, the ability to do language assessment are in the medium category have a tendency to increase for each implementation although it is not too high. It is predicted that this is because *the Shadow Teacher* has not been properly trained and has difficulty in doing quite a lot of information during the assessment while the *Shadow Teacher* comes from a non-educational background, so they do not have the appropriate basic knowledge. In addition, other knowledge and understanding can still be learned in order to be successful in carrying out duties as ASD companions as contained in the LMS.

Discussion

This study describes a *milestone* assessment guide that is easy to use. Development of LMS-based development milestone assessment guide for students with disabilities for *Shadow Teachers* through five stages, namely analysis, design, development, implementation and evaluation. The resulting product is an LMS-based milestone assessment guidebook. This product is first validated by material and media experts. Based on the results of the evaluation from experts, it shows that the milestone assessment guide developed is suitable for use in learning. The implementation of this milestone assessment guide in the implementation of *the developmental milestone* assessment of students with disabilities has given positive results in increasing the knowledge of *Shadow Teachers*, especially during the implementation of assessments.

Accurate and comprehensive assessments are an important foundation in providing effective interventions for children with ASD (Randall et al., 2023). *Shadow Teacher* play a crucial role in this assessment process, especially in the context of inclusive education (S. Lindsay et al., 2021). However, the complexity of ASD and the variability of its symptoms are often a challenge for *Shadow Teacher* in conducting accurate assessments (Majoko, 2023).

The development of practical assessment guides aims to bridge the gap between the complexity of ASD and *the Shadow Teacher's* need for an easy-to-use and accurate assessment tool. This guide can assist *Shadow Teachers* in identifying and evaluating various aspects of child development with ASD in a systematic and structured manner.

LMS offers a flexible and accessible platform for delivering learning and training content (Aldiab et al., 2019). In the context of developing ASD assessment guides, LMS can provide several advantages: (1) Accessibility: *Shadow Teachers* can access guides anytime and anywhere, allowing for flexible learning and reference; (2) Interactivity: The LMS allows the integration of various media such as videos, animations, and interactive simulations that can improve *the Shadow Teacher's* understanding of the assessment process; (3) Content updates: The guide can be updated periodically to reflect the latest developments in ASD assessment without the need to reprint physical materials; (4) Progress tracking: The LMS can help track *the Shadow Teacher's progress* in understanding and implementing assessment guidance.



Effective practical guidance should integrate current theories about ASD with evidence-based assessment practices. This includes: (1) An in-depth understanding of the characteristics of ASD and its variability (Lord, 2020); (2) Knowledge of various validated ASD assessment methods and instruments (Lord et al., 2018); (3) Strategies to adapt the assessment process according to the individual needs of children; (4) A collaborative approach involving parents and other professionals in the assessment process (Chaidi & Drigas, 2020).

The development of LMS-based guides aims not only to provide assessment tools, but also to improve *the overall competence of Shadow Teachers*. This can be achieved through: (1) Provision of comprehensive training materials on ASD and assessment methods; (2) Simulation of practical cases and scenarios that allow *Shadow Teachers* to practice their assessment skills; (3) An online discussion forum that facilitates the exchange of experience and knowledge between *Shadow Teachers*; (4) Continuous evaluation and feedback that helps *the Shadow Teacher* identify areas for improvement.

Parental involvement in the assessment process and intervention of children with ASD is essential for optimal outcomes (Chaidi & Drigas, 2020). LMS-based guidance can facilitate this collaboration through: (1) Providing easily accessible information for parents about the assessment process; (2) Features that allow parents to provide their input and observations as part of the assessment process; (3) Assessment reports that can be securely shared through the LMS platform; (4) Intervention recommendations that can be accessed and implemented by parents at home.

The development of a practical guide to assessment of children with ASD based on LMS for *Shadow Teachers* is a holistic approach that combines a deep understanding of ASD, evidence-based assessment practices, modern learning technologies, and multi-stakeholder collaboration. Through the integration of these components, the guide has the potential to improve the quality and consistency of ASD assessments, support the professional development of *Shadow Teachers*, and ultimately improve learning outcomes and development of children with ASD in an inclusive education setting.

CONCLUSION

Based on the results of the research, it can be concluded that the role of *LMS-based development milestone assessment guides for students with disabilities can improve the ability* of Shadow Teachers, *it is appropriate to see from the results of increased knowledge when carrying out milestone assessments, the more often the use of LMS-based milestone assessment guides, the more Shadow Teacher's abilities and knowledge the better*. The implementation of the *LMS-based development milestone assessment guide for students with disabilities* should be continued with mentoring and training because it uses an LMS where *the Shadow Teacher* still does not fully master every material contained in the LMS.

REFERENCES

Agung, A. A. G. (2014). Textbook of Educational Research Methodology (2nd ed.). In



Yogyakarta.

- Aldiab, A., Chowdhury, H., Kootsookos, A., Alam, F., & Allhibi, H. (2019). Utilization of Learning Management Systems (LMSs) in higher education system: A case review for Saudi Arabia. *Energy Procedia*, 160. <https://doi.org/10.1016/j.egypro.2019.02.186>.
- Branch, R. (2010). Instructional Design: The ADDIE Approach. In *Boston, MA*.
- Chaidi, I., & Drigas, A. (2020). Parents' involvement in the education of their children with autism: Related research and its results. *International Journal of Emerging Technologies in Learning*, 15(14). <https://doi.org/10.3991/ijet.V15i14.12509>.
- Dietz, P. M., Rose, C. E., McArthur, D., & Maenner, M. (2020). National and State Estimates of Adults with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders* 50(12). <https://doi.org/10.1007/S10803-020-04494-4>.
- Durkin, M. S., Elsabbagh, M., Barbaro, J., Gladstone, M., Happe, F., Hoekstra, R. A., Lee, L. C., Rattazzi, A., Stapel-Wax, J., Stone, W. L., Tager-Flusberg, H., Thurm, A., Tomlinson, M., & Shih, A. (2015). Autism screening and diagnosis in low resource settings: Challenges and opportunities to enhance research and services worldwide. In *Autism Research (Vol. 8, Number 5)*. <https://doi.org/10.1002/Aur.1575>.
- Falkmer, T., Anderson, K., Falkmer, M., & Horlin, C. (2013). Diagnostic procedures in autism spectrum disorders: A systematic literature review. In *European Child and Adolescent Psychiatry (Vol. 22, Number 6)*. <https://doi.org/10.1007/S00787-013-0375-0>.
- Febriyah, J. (2025). THE IMPORTANT ROLE OF SHADOW TEACHER IN EMOTIONALLY GUIDING CHILDREN WITH SPECIAL NEEDS AT MUHAMMADIYAH NOTOPRAJAN PRIMARY SCHOOL YOGYAKARTA. *Pendas: Scientific Journal of Basic Education*, 10(01), 681–691.
- Grynszpan, O., Weiss, P. L., Perez-Diaz, F., & Gal, E. (2014). Innovative technology-based interventions for autism spectrum disorders: A meta-analysis. In *Autism (Vol. 18, Number 4)*. <https://doi.org/10.1177/1362361313476767>.
- Howlin, P. (2012). Textbook of Autism Spectrum Disorders. *Child and Adolescent Mental Health*, 17(1). https://doi.org/10.1111/j.1475-3588.2011.00640_8.x.
- Ingersoll, B., Wainer, A. L., Berger, N. I., Pickard, K. E., & Bonter, N. (2016). Comparison of a Self-Directed and Therapist-Assisted Telehealth Parent-Mediated Intervention for Children with ASD: A Pilot RCT. *Journal of Autism and Developmental Disorders*, 46(7). <https://doi.org/10.1007/S10803-016-2755-Z>.
- Lawshe, C. H. (1975). A Quantitative Approach To Content Validity. *Personnel Psychology*, 28(4), 563–575. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
- Libriyanti, Y., Wirda, Y., Izazy, N. Q., & Martono, S. F. (2024). Challenges and Opportunities Inclusive Education in Primary Schools: A Case Study of Readiness in The Era of Society 5.0. *International Conference on Elementary Education*, 6(1), 594–602.



- Lindsay, G., Ricketts, J., Peacey, L. V., Dockrell, J. E., & Charman, T. (2016). Meeting the educational and social needs of children with language impairment or autism spectrum disorder: the parents' perspectives. *International Journal of Language & Communication Disorders*, 51(5). <https://doi.org/10.1111/1460-6984.12226>.
- Lindsay, S., Osten, V., Rezai, M., & Bui, S. (2021). Disclosure and workplace accommodations for people with autism: a systematic review. *In Disability and Rehabilitation* (Vol. 43, Number 5). <https://doi.org/10.1080/09638288.2019.1635658>.
- Linus, A. A., Aladesusi, G. A., Monsur, I. A., & Elizabeth, F. J. (2025). Perceived Usefulness, Ease of Use, And Intention to Utilize Online Tools for Learning Among College of Education Students. *Indonesian Journal of Multidisciplinary Research*, 5(1), 41–52.
- Lord, C. (2020). The future of autism: Global & local achievements & challenges. *In the Indian Journal of Medical Research* (Vol. 151, No. 4). https://doi.org/10.4103/Ijmr.Ijmr_874_20.
- Lord, C., Elsabbagh, M., Baird, G., & Veenstra-Vanderweele, J. (2018). Autism spectrum disorder. *The Lancet*, 392(10146), 508–520. [https://doi.org/10.1016/S0140-6736\(18\)31129-2](https://doi.org/10.1016/S0140-6736(18)31129-2).
- Majoko, T. (2023). AUTISM AND INCLUSION. *In Autism: Perspectives from Africa: Volume 1* (Vol. 1). <https://doi.org/10.4324/9781003365631-12>.
- NIMATUZHROH, N., & SARI, A. P. (2024). POTRAYAL OF SHADOW TEACHER'S COMPETENCIES IN INDONESIA. *Turkish International Journal of Special Education and Guidance & Counselling* ISSN: 1300-7432, 14(2), 208–217.
- Pascua-Ramos, M. A., Lucas, J. C. C., Melad, A. L., Gerardo, J. M., Malenab, L. F. P., & Lodivico, E. B. (2025). Evaluation of Higher Education Teachers' Attitudes Toward Online Learning During the Covid-19 Pandemic. *Technoarete Transactions on Advances in Social Sciences and Humanities (TTASSH)*, 5(1), 1–7.
- Pereira, V. C., Silva, S. N., Carvalho, V. K. S., Zanghelini, F., & Barreto, J. O. M. (2022). Strategies for the implementation of clinical practice guidelines in public health: an overview of systematic reviews. *In Health Research Policy and Systems* (Vol. 20, Number 1). <https://doi.org/10.1186/S12961-022-00815-4>.
- Putri, A. N. (2024). *Integrated Autism Child Care in Surabaya City*.
- Randall, K. N., Ryan, J. B., Hirsch, S. E., & Allen, A. A. (2023). A self-monitoring intervention to improve the self-determination of individuals with intellectual and developmental disabilities in a postsecondary educational program. *Focus on Autism and Other Developmental Disabilities*, 38(2). <https://doi.org/10.1177/10883576221121637>.
- Simanullang, H., & Rajagukguk, J. (2020). Learning Management System (LMS) Based On Moodle To Improve Students Learning Activity. *Journal of Physics: Conference Series*, 1462, 12067. <https://doi.org/10.1088/1742-6596/1462/1/012067>
- Sismawijaya, A., & Astutik, A. P. (2024). *A Shadow Teacher Strategy in Overcoming Deaf*



Children with Special Needs (ABK) in Communication Difficulties: A Shadow Teacher Strategy in Overcoming Communication Difficulties for Children with Special Needs (ABK) Deaf.

- Suputra, K. A., Suranata, K., & Sudarsana, G. N. (2021). Development of Behavioral Counseling Guidelines with Self-Management Techniques Based on Schoology LMS Website to Increase Students' Learning Interest. *SCHOULID: Indonesian Journal of School Counseling*, 6(3), 183. <https://doi.org/10.23916/08968011>
- Volkmar, F. R. (2014). "Autistic Disorder." In *Encyclopedia of Autism Spectrum Disorders*, by Fred R. Volkmar, 371–376. New York: Springer.
- Yusuf, F. A. (2025). Trends, opportunities, and challenges of artificial intelligence in elementary education-A systematic literature review. *Journal of Integrated Elementary Education*, 5(1), 109–127.
- Agung, A. A. G. (2014). Textbook of Educational Research Methodology (2nd ed.). In Yogyakarta.
- Aldiab, A., Chowdhury, H., Kootsookos, A., Alam, F., & Allhibi, H. (2019). Utilization of Learning Management Systems (LMSs) in higher education system: A case review for Saudi Arabia. *Energy Procedia*, 160. <https://doi.org/10.1016/j.egypro.2019.02.186>.
- Branch, R. (2010). Instructional Design: The ADDIE Approach. In Boston, MA.
- Chaidi, I., & Drigas, A. (2020). Parents' involvement in the education of their children with autism: Related research and its results. *International Journal of Emerging Technologies in Learning*, 15(14). <https://doi.org/10.3991/ijet.V15i14.12509>.
- Dietz, P. M., Rose, C. E., McArthur, D., & Maenner, M. (2020). National and State Estimates of Adults with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders* 50(12). <https://doi.org/10.1007/S10803-020-04494-4>.
- Durkin, M. S., Elsabbagh, M., Barbaro, J., Gladstone, M., Happe, F., Hoekstra, R. A., Lee, L. C., Rattazzi, A., Stapel-Wax, J., Stone, W. L., Tager-Flusberg, H., Thurm, A., Tomlinson, M., & Shih, A. (2015). Autism screening and diagnosis in low resource settings: Challenges and opportunities to enhance research and services worldwide. In *Autism Research (Vol. 8, Number 5)*. <https://doi.org/10.1002/Aur.1575>.
- Falkmer, T., Anderson, K., Falkmer, M., & Horlin, C. (2013). Diagnostic procedures in autism spectrum disorders: A systematic literature review. In *European Child and Adolescent Psychiatry (Vol. 22, Number 6)*. <https://doi.org/10.1007/S00787-013-0375-0>.
- Febriyah, J. (2025). THE IMPORTANT ROLE OF SHADOW TEACHER IN EMOTIONALLY GUIDING CHILDREN WITH SPECIAL NEEDS AT MUHAMMADIYAH NOTOPRAJAN PRIMARY SCHOOL YOGYAKARTA. *Pendas: Scientific Journal of Basic Education*, 10(01), 681–691.
- Grynszpan, O., Weiss, P. L., Perez-Diaz, F., & Gal, E. (2014). Innovative technology-based interventions for autism spectrum disorders: A meta-analysis. In *Autism (Vol. 18,*



Number 4). <https://doi.org/10.1177/1362361313476767>.

- Howlin, P. (2012). Textbook of Autism Spectrum Disorders. *Child and Adolescent Mental Health*, 17(1). https://doi.org/10.1111/j.1475-3588.2011.00640_8.x.
- Ingersoll, B., Wainer, A. L., Berger, N. I., Pickard, K. E., & Bonter, N. (2016). Comparison of a Self-Directed and Therapist-Assisted Telehealth Parent-Mediated Intervention for Children with ASD: A Pilot RCT. *Journal of Autism and Developmental Disorders*, 46(7). <https://doi.org/10.1007/s10803-016-2755-z>.
- Lawshe, C. H. (1975). A Quantitative Approach To Content Validity. *Personnel Psychology*, 28(4), 563–575. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
- Libriyanti, Y., Wirda, Y., Izazy, N. Q., & Martono, S. F. (2024). Challenges and Opportunities Inclusive Education in Primary Schools: A Case Study of Readiness in The Era of Society 5.0. *International Conference on Elementary Education*, 6(1), 594–602.
- Lindsay, G., Ricketts, J., Peacey, L. V., Dockrell, J. E., & Charman, T. (2016). Meeting the educational and social needs of children with language impairment or autism spectrum disorder: the parents' perspectives. *International Journal of Language & Communication Disorders*, 51(5). <https://doi.org/10.1111/1460-6984.12226>.
- Lindsay, S., Osten, V., Rezai, M., & Bui, S. (2021). Disclosure and workplace accommodations for people with autism: a systematic review. In *Disability and Rehabilitation* (Vol. 43, Number 5). <https://doi.org/10.1080/09638288.2019.1635658>.
- Linus, A. A., Aladesusi, G. A., Monsur, I. A., & Elizabeth, F. J. (2025). Perceived Usefulness, Ease of Use, And Intention to Utilize Online Tools for Learning Among College of Education Students. *Indonesian Journal of Multidisciplinary Research*, 5(1), 41–52.
- Lord, C. (2020). The future of autism: Global & local achievements & challenges. In *the Indian Journal of Medical Research* (Vol. 151, No. 4). https://doi.org/10.4103/ijmr.ijmr_874_20.
- Lord, C., Elsabbagh, M., Baird, G., & Veenstra-Vanderweele, J. (2018). Autism spectrum disorder. *The Lancet*, 392(10146), 508–520. [https://doi.org/10.1016/S0140-6736\(18\)31129-2](https://doi.org/10.1016/S0140-6736(18)31129-2).
- Majoko, T. (2023). AUTISM AND INCLUSION. In *Autism: Perspectives from Africa: Volume 1* (Vol. 1). <https://doi.org/10.4324/9781003365631-12>.
- NIMATUZHROH, N., & SARI, A. P. (2024). POTRAYAL OF SHADOW TEACHER'S COMPETENCIES IN INDONESIA. *Turkish International Journal of Special Education and Guidance & Counselling* ISSN: 1300-7432, 14(2), 208–217.
- Pascua-Ramos, M. A., Lucas, J. C. C., Melad, A. L., Gerardo, J. M., Malenab, L. F. P., & Lodivico, E. B. (2025). Evaluation of Higher Education Teachers' Attitudes Toward Online Learning During the Covid-19 Pandemic. *Technoarete Transactions on Advances in Social Sciences and Humanities (TTASSH)*, 5(1), 1–7.
- Pereira, V. C., Silva, S. N., Carvalho, V. K. S., Zanghelini, F., & Barreto, J. O. M. (2022).



Strategies for the implementation of clinical practice guidelines in public health: an overview of systematic reviews. In *Health Research Policy and Systems* (Vol. 20, Number 1). <https://doi.org/10.1186/S12961-022-00815-4>.

Putri, A. N. (2024). *Integrated Autism Child Care in Surabaya City*.

Randall, K. N., Ryan, J. B., Hirsch, S. E., & Allen, A. A. (2023). A self-monitoring intervention to improve the self-determination of individuals with intellectual and developmental disabilities in a postsecondary educational program. *Focus on Autism and Other Developmental Disabilities*, 38(2). <https://doi.org/10.1177/10883576221121637>.

Simanullang, H., & Rajagukguk, J. (2020). Learning Management System (LMS) Based On Moodle To Improve Students Learning Activity. *Journal of Physics: Conference Series*, 1462, 12067. <https://doi.org/10.1088/1742-6596/1462/1/012067>

Sismawijaya, A., & Astutik, A. P. (2024). *A Shadow Teacher Strategy in Overcoming Deaf Children with Special Needs (ABK) in Communication Difficulties: A Shadow Teacher Strategy in Overcoming Communication Difficulties for Children with Special Needs (ABK) Deaf*.

Suputra, K. A., Suranata, K., & Sudarsana, G. N. (2021). Development of Behavioral Counseling Guidelines with Self-Management Techniques Based on Schoology LMS Website to Increase Students' Learning Interest. *SCHOULID: Indonesian Journal of School Counseling*, 6(3), 183. <https://doi.org/10.23916/08968011>

Volkmar, F. R. (2014). "Autistic Disorder." In *Encyclopedia of Autism Spectrum Disorders*, by Fred R. Volkmar, 371–376. New York: Springer.

Yusuf, F. A. (2025). Trends, opportunities, and challenges of artificial intelligence in elementary education-A systematic literature review. *Journal of Integrated Elementary Education*, 5(1), 109–127.