Development of the Academic Supervision Model Based on Differentiated Learning in Inclusive Schools

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Sections Info	ABSTRACT
	Objective: This study aims to develop an academic supervision model based on differentiated learning, evaluate its feasibility, and measure its effectiveness. **Method:** The research employs the ADDIE model development methodology. Data were collected through interviews, observations, and questionnaires in two inclusive senior high schools in Sidoarjo. **Results:** The findings indicate that (1) The academic supervision model based on differentiated learning includes stages that incorporate elements of differentiated learning into every supervision instrument. These elements cover the assessment preparation to evaluate student's readiness, interest, learning profiles, and the implementation of teaching processes, including content, process, and learning outcomes. (2) The academic supervision model based on differentiated learning is deemed feasible. The score obtained from subject matter experts indicates that the developed instruments and guidebooks meet the criteria for "very feasible." (3) Based on the results of the normalized gain test, the mean difference between the pre-test and post-test indicates that the developed product has a high level of effectiveness and is suitable for use as an academic supervision instrument. **Novelty:** This research emphasized the development of an academic supervision model based on differentiated learning in inclusive schools.

INTRODUCTION

Inclusive schools are one of the government's policies to ensure every citizen can enjoy educational services regardless of differences. The school provides proper and quality education for children with special needs and regular children in general for the future of their lives (Couper-Kenney & Riddell, 2021; Demchenko et al., 2021; Giangreco, 2021; Yazcayir & Gurgur, 2021). Meanwhile, there is a demand for inclusive education, namely that children with special needs must be able to study in the same class as their peers in the surrounding public schools (Liew Audrey & Loh, 2023; Lindner et al., 2023; Madhesh, 2023). The guarantee of obtaining the right to education for every citizen is based on the principles stated in "A Human Rights – Based Approach to Education for All" regarding education for all. The legislation ensures that every child has the right to education without discrimination (Bayat et al., 2023; Mujtaba, 2023; Yoshitoshi & Takahashi, 2023). The "Education for All" principle is the basis for the government to organize inclusive education.

Article 31, paragraph 1 of the 1945 Constitution emphasizes that every citizen has the right to education. This statement was then elaborated in Law number 20 of 2003, precisely in article 5, paragraph 1 concerning the National Education System, which emphasizes that every citizen has the same right to get a quality education—continued

in paragraph 2, which explains that citizens who have abnormalities, both physical, emotional, mental, intellectual, and/or social, are entitled to special education.

East Java is one of the provinces that pays great attention to inclusive education by providing educational services for children with special needs. This statement is driven by the increasing need for quality special education services that are affordable to all people. East Java Province has a total number of students with special needs from elementary, junior high, high school, and vocational education levels of 11247 children. Inclusive education has become the government's commitment to be implemented in every school so that at the level of implementation of its operational form in learning (Fathonah Nasrullah, 2023; Mutanga, 2024; Opoku, 2022; Suryanto et al., 2023; Syahrir et al., 2024), it needs to be carried out by paying attention to the differentiation of the potential and abilities of all students. The achievement strategy is implemented through differentiated learning that pays attention to the differences in students, starting from their readiness, interests, and learning styles (Anggraeny & Dewi, 2023; Hidayah et al., 2024; Hidayati & Sujarwati, 2023; Krishan & Al-Rsa'I, 2023; Puteri & Alfiansyah, 2023). The implication is that a learning management system that pays attention to diversity is needed. Appropriate supervision instruments are needed in diversity-based learning supervision or differentiation.

There are two main reasons for this study; the first is that teachers' readiness to carry out learning in inclusive classrooms stems from the lack of optimal supervisory functions in inclusive schools, one of the causes of which is related to the lack of an academic supervision model that accommodates explicitly the needs of inclusive schools. The available supervision model is general for regular schools and specifically for Exceptional Schools (Rodrigues & Ávila de Lima, 2024; Sutarno, 2023; Zeinabadi et al., 2023; Zhang et al., 2023). School supervisors in charge of inclusive schools still use supervision instruments for regular schools. The statement is based on the results of initial interviews with two school supervisors from East Java Province RA on August 15, 2021, and WS on December 1, 2021, and one supervisor from Central Java Province RN on November 13, 2021.

Second, the government is designing a driving school program with a differentiated learning strategy through the Ministry of Education and Culture, Research and Technology. Differentiated learning means collaborating on differences to obtain information, find ideas, and display student learning outcomes. The policy is based on the principle of inclusive schools. From this background, there is a great need for a supervision tool that can be used as a reference for the program's implementation in the form of a guidebook containing academic supervision instruments adapted to the development of inclusive schools. Based on the researcher's rationale, the research entitled "Development of Academic Supervision Model based on Differential Learning in Inclusion Schools" is vital. Based on the background of the problem that has been described, the problem formulation in this study is described as follows: (1) What is the model of academic supervision in inclusive schools?; (2) How feasible is the differentiated instruction-based academic supervision model in inclusive schools?; (3) How effective is the differentiated instruction-based academic supervision model in inclusive schools?

RESEARCH METHOD
This study uses a developmental research model to develop and validate an academic supervision model based on Differential Learning in inclusive schools. This procedural

development model refers to the ADDIE development model, which is an important part of designing academic supervision: Analyze, Design, Develop, Implement, and Evaluate (Branch, 2009). Each phase in the ADDIE model is related to the others.
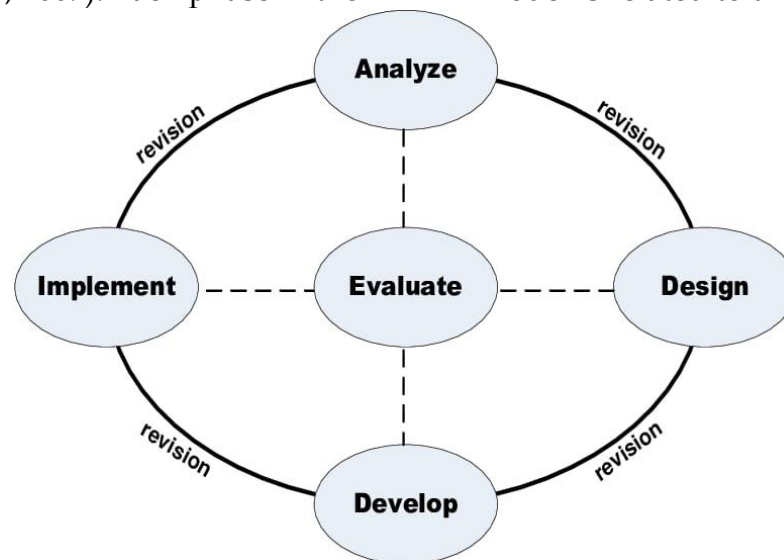

Figure 1. ADDIE concept (Branch, 2009).

ADDIE is a process that serves as a guiding framework in complex situations; it is very appropriate to develop educational products and other learning resources, which is why making products using the ADDIE process is one of the effective ways. The ADDIE model is also one of the models commonly used in instructional design development as a guide to producing effective designs (Hidayah et al., 2024; Krishan & Al-Rsa'I, 2023). This model helps researchers in developing academic supervision models. The data sources in this study are: (1) preliminary study stage: supervisors, principals, and teachers of inclusive schools; (2) development stage: experts, namely lecturers and practitioners; and (3) implementation stage: supervisors, principals, and teachers of inclusive schools in Sidoarjo Regency and Surabaya City. The subjects of this study are divided into three types, namely: (1) in the preliminary stage, the subjects are taken from supervisors and two inclusive schools; (2) at the feasibility test stage, called expert validation; and (3) at the stage of effectiveness testing, called practitioner validation. The subject of the feasibility test is the validation of experts from universities, namely, one expert in the development of supervision instruments and one expert in the inclusion schools. The subjects of the effectiveness test for practitioner validation consisted of four target users, namely two school supervisors and two principals. The research subjects used as data sources in this study are subject teachers who teach inclusion classes at 1 Gedangan Senior High School and 4 Sidoarjo Senior High School. Subject teachers or respondents are 17 teachers in each school. The total number of teacher respondents in this study was 34 subject teachers. Each teacher represents the subject taught. The data collection instruments used in this study are (a) interview guidelines, (b) questionnaires, (c) observation sheets, and (d) validation sheets. After the research data was obtained, the researcher analyzed the data using the regular gain test.

RESULTS AND DISCUSSION

Results

The research findings are derived from each stage of the development process. During the analysis stage regarding the competencies of teacher respondents, it was found that 68% admitted to having difficulties implementing teaching in inclusive classrooms, 71% did not apply a modified curriculum, and 65% lacked comprehensive teaching modules. Meanwhile, interview results revealed that the supervision conducted by school supervisors was deemed ineffective as it was still limited to administrative aspects. Among supervisors in inclusive education schools, there were still those who did not understand students with special needs. The instruments used in supervision were not explicitly designed for inclusive schools but for regular schools.

56% of teachers were found to have little or no understanding of differentiated instruction. Next, regarding the need for guidance and assistance from supervisors and principals in implementing dedicated learning, 100.0% of teachers answered that they needed guidance in implementing dereferenced learning. Likewise, about the need to develop academic supervision by decentralized learning, 100.0% of teachers answered that it is necessary.

The results obtained from the questionnaire data further strengthen the importance of developing academic supervision instruments based on differentiated learning. In line with these data, the following is a recapitulation of the validation of experts and practitioners on differentiated learning-based academic supervision instruments and guidebooks. The academic supervision model is highly necessary to assist teachers in receiving guidance for inclusive classroom teaching and to ensure that all students, especially those with special needs, are adequately served.

During the design stage, based on the combination of field research and literature studies, the researcher developed a conceptual model of academic supervision consisting of planning, implementation, evaluation, and follow-up stages by incorporating elements of differentiated instruction centered on the students. This begins with assessing readiness, interests, and learning styles. The differentiated teaching process also includes content, process, product, and a safe and comfortable learning environment for students. The result of this stage is referred to as the conceptual model.

In the development stage, the conceptual model, equipped with supervision instruments and a guidebook for implementing differentiated academic supervision, was submitted for validation by experts and practitioners. The validated conceptual model is referred to as the hypothetical model, and the validation results are used to determine the feasibility of the developed product.

The following implementation stage involved testing the hypothetical model in inclusive schools. After evaluation and revision, the results of this implementation stage are referred to as the final model. This final model becomes the end product of the development process. The evaluation was conducted at every process or procedure stage. This evaluation was used to test each stage to achieve the desired results.

In line with these data, Table 1 recapitulates the validation of experts and practitioners on differentiated learning-based academic supervision instruments and guidebooks. Experts and practitioners evaluated the instruments and guidebooks to assess their feasibility (Nurohman et al., 2021; Saputra et al., 2021).

Table 1. Recapitulation of expert and practitioner validation results.

Aspects	Expert Validation	Practitioners Validation	Average
Usability	12.0	10.8	11.4
Feasibility	18.0	16.8	17.4
Accuracy	13.5	15.2	14.3
Decency	11.5	11.8	11.6
Total			54.8

To determine whether the instruments and guidebooks are feasible for use and implementation in supervision, it is necessary first to establish the interval scores using a four-point scale with the following formula:

$$\text{Interval Score} = \frac{\text{Max Score} - \text{Min Score}}{4}$$
$$= \frac{(\text{Number of Indicator} \times \text{Highest Score}) - (\text{Number of Indicator} \times \text{Lowest Score})}{4}$$
$$= \frac{(21 \times 3) - (21 \times 0)}{4} = \frac{63 - 0}{4}$$
$$= 15{,}75$$

From this calculation, the feasibility criteria are based on the average validation scores from experts and practitioners, as in Table 2.

Table 2. Validation result eligibility criteria.

Criteria	Score Interval	Feasibility Level
0	0 – 15.75	Not Feasible, Requires Revision
1	15.76 – 31.50	Less Feasible, Needs Revision
2	31.51 – 47.25	Feasible with Revisions
3	47.26 – 63.00	Highly Feasible

Based on Table 1, it is known that the average number obtained from the results of the validation of experts and practitioners is 54.8, so it can be concluded that the instruments and guidebooks that have been prepared, including the criteria, are very feasible to be used as a guide and applied. Furthermore, an N-gain effectiveness test was conducted to determine how effectively a decentralized learning-based academic supervision model was developed. N-gain (Normalized Gain) is an effectiveness analysis technique that calculates the difference in respondents' answers before the treatment is applied (pre-test) and after the treatment is applied (post-test) (Erman et al., 2021; Purba et al., 2022; Rahman et al., 2024).

Table 3. N-gain test results.

	N	Min	Max	Mean	Std. Deviation
N_Gain_Score	33	-1.00	1.00	.80	.40
N_Gain_Persen	33	-100.00	100.00	84.40	45.18
Valid N (listwise)	33				

These results align with categorizing the mean N-gain values of pre-test and post-test data. If n < 0.07 is obtained, the product is declared to have high effectiveness (Hake, 1999).

Discussion

The differentiated learning-based academic supervision model was developed using the Research and Development (R&D) method, applying the ADDIE model, which includes five stages: analysis (analyze), design (design), development (develop), implementation (implement), and evaluation (evaluate). The final model of differentiated learning-based academic supervision begins with monitoring teacher performance in conducting lessons in inclusive classrooms. This is followed by implementing academic supervision based on differentiated learning, encompassing planning, supervision execution, evaluation, and follow-up. Cogan and Goldhammer developed supervision through several stages (Sergiovanni & Starratt, 1983). Cogan described clinical supervision in eight stages, while Goldhammer summarized it into five stages: pre-observation, observation, analysis and strategy, post-observation conference, and post-conference analysis. Based on this theory, the researcher also utilized five stages of supervision: pre-observation, observation, post-observation, evaluation, and follow-up. The tools or instruments prepared for conducting academic supervision include (1) a Pre-Observation Questions List, (2) an Academic Supervision Instrument, (3) a Post-Observation Questions List, (4) a Supervision Evaluation Format, (5) a Follow-Up Supervision Instrument. In supervision theory, the type of supervision teachers need is called clinical supervision. As Sergiovanni (1982) stated, academic supervision developed in this study is part of the clinical supervision model, which focuses on teaching improvement through a systematic cycle involving planning, observation, and intensive and thorough analysis of a teacher's teaching practices. This aims to facilitate rational changes.

Supervisors refer to classroom observation and classroom visit instruments as guidelines during the supervision process. The instrument used at this stage is the academic supervision or observation instrument, which includes planning, teaching execution, and closure based on differentiated learning principles. According to Tomlinson (2001), planning categorizes students' learning needs into three aspects: 1) readiness, 2) interest, and 3) learning profile. During teaching, teachers prepare content, the learning process, and products created by students. These terms are integral to differentiated learning: content refers to what students learn, the process refers to how they acquire knowledge and skills, and the product refers to evidence of their learning outcomes. These outcomes transform students from "consumers of knowledge to producers with knowledge" (Rasheed & Wahid, 2018). At the closure stage, teachers provide reinforcement, opportunities for celebration, and reflection. These aspects of differentiated learning must be included in academic supervision instruments during the observation stage.

The developed academic supervision model requires input and evaluation from selected validators through comments, suggestions, revisions, and assessments of each indicator related to the guidebook structure, usability, feasibility, accuracy, and appropriateness. Expert and practitioner evaluations were conducted to determine the feasibility of the instruments and guidebooks. The average score is calculated and placed within the feasibility criteria range to decide whether the instruments and guidebooks are feasible for use and implementation. However, interval values must

first be determined using a four-point scale. The formula for the interval is the maximum value minus the minimum value divided by 4. The maximum value is obtained from the number of indicators multiplied by the highest score, while the minimum value comes from the number of indicators multiplied by the lowest score. The resulting feasibility criteria are (0–15.75) Not Feasible, (15.76–31.50) Less Feasible, (31.51–47.25) Feasible with Revisions, (47.26–63.00) Highly Feasible. The average score from expert and practitioner validation is 54.80, placing the instruments and guidebooks in the "Highly Feasible" category. Furthermore, an N-gain effectiveness test was conducted to assess the effectiveness of the differentiated learning-based academic supervision model. N-gain (Normalized Gain) is an effectiveness analysis technique that calculates the difference between pre-test and post-test scores. This study's pre-test and post-test involved 34 respondents, all subject teachers. The N-gain analysis using IBM SPSS Statistics Version 20 indicated an average (mean) score difference of 0.84. This result demonstrates the developed product's high level of effectiveness. Hake (1999) states that an N-gain score of ≥ 0.7 indicates high effectiveness.

CONCLUSION
Fundamental Finding: The product developed is a Differentiated Academic Supervision Model. The feasibility test is carried out using the results of product validity assessments from expert validators and practitioners who use the Likert scale. Based on the calculation of the validity test, the instruments and guidebooks that have been prepared have very feasible criteria to be used as a guide and applied. In addition to the validity test to measure the feasibility of the product, an effectiveness test is also carried out to get an idea of how effective the development of the academic supervision model based on deferential learning is. The measuring tool used is Normalized Gain (N-gain) to calculate the difference between pre-test and post-test scores. The results of the pre-test and post-test effectiveness tests show the difference. So the products developed have a high level of effectiveness. **Implication:** The results of the validity and effectiveness testing show that the differentiated learning-based academic supervision model is very feasible and has a high level of effectiveness to be used as a guidebook and instrument for implementing academic supervision in inclusive education schools. **Limitations**: This research is a development research using the ADDIE model. The product developed is an instrument and a guidebook for academic supervision based on dedicated learning. As a source of data in this study, the subject teachers who teach inclusion classes. **Future Research:** It is necessary to conduct further research with a broader test subject so that this model of academic supervision based on differential learning can be used by all levels of schools (elementary, junior high, high school, vocational school), both schools that provide inclusive education and regular schools. In addition, further research is needed to develop academic supervision instruments used to supervise counseling guidance teachers in public schools.

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