Online Inclusive School: A Technological Breakthrough in Inclusive Education During the Covid-19 Period

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Abstract: This research aims to develop an inclusive online school (OIS) to overcome the problem of the low learning competence of inclusive students, especially during the Covid-19 pandemic. The research method used the ADDIE model with the following steps: analyze, design, development, implementation, and evaluation to develop OIS in prototypes and learning steps. Research participants included students at the elementary school level in Indonesia. The instruments used in data collection are validation sheets and student learning competency tests. The data analysis technique used in this study is SPSS version 22.0 (IBM Corp. Released 2016) with a significance level of 0.05 with a paired sample t-test with p-value or sig. (2-tailed). The study results showed that OIS and its learning steps were feasible and appropriate to facilitate the learning competencies of inclusive students during the pandemic. The learning competence of inclusive students also increased significantly after the implementation of OIS. This research implies that OIS tools can be a technology-based breakthrough in inclusive education, focusing on limited classroom practice.

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Introduction

In the last decade, international organizations for education and protection of children's rights (e.g., the United Nations Children's Fund, UNESCO and the Convention on the Rights of Persons with Disabilities) have pushed for reform of the education system towards inclusive education (Bose & Heymann, 2020). This reform towards inclusive education does not only occur in developed countries but also in developing countries. Qatar began to include elements of inclusion in its curriculum starting in 2007 by eliminating discrimination experienced by children with special needs in schools starting at the elementary level (Hassanein et al., 2021). Countries in Africa around 2015 began to ensure an equal education system for normal and inclusive children through inclusive education (Asongu et al., 2019). Japan provided professional certification starting in 2017 for teachers who have received an inclusive education training program to assist students with disabilities (Yada et al., 2018).

The priority of education in Indonesia is currently aimed at developing inclusive education (Darma & Rusyidi, 2015; Salim et al., 2021). Indonesia has children with special needs who have not received the same education rights as normal children (Budiyanto et al., 2018). Meanwhile, inclusion children are considered strange (Marlina & Kusumastuti, 2019),

lower than normal children and ostracized in society (Husniati et al., 2020). According to data from the Indonesian Ministry of Education and Culture, out of 1.6 million children with special needs in Indonesia, only 18% have received inclusive education services. Around 115,000 children with special needs attend special schools for students with disabilities, while the other inclusive children attend regular schools with a total of 299 thousand children (Darma & Rusyidi, 2015).

The Covid-19 pandemic that emerged at the end of 2019 quickly became a serious global health threat after spreading rapidly worldwide (Karakose, Yirci, & Papadakis, 2021). The Covid-19 Pandemic has changed the paradigm of face-to-face learning to online. For inclusive students, of course, this condition is very detrimental, including for teachers who teach. The learning competence of inclusive students showed a drastic decline during the pandemic. Inclusive students fail to understand the material due to limited assistance from the teacher (Daulay, 2021; Gupta et al., 2021). The learning performance and interest of inclusive students are relatively difficult to be controlled by teachers and parents. Teachers as educators also do not have the competence and inadequate teaching methods to facilitate student inclusion through online learning (Khanna & Kareem, 2021).

It can be hoped that inclusive schools in Indonesia will lead to online schools to make it easier for inclusive students to get appropriate and effective educational services (Traver-Martí et al., 2021; Udin By Arifin et al., 2021). Planning for online inclusive schools is the focus of the Government of Indonesia to realize equal education that all groups and regions can access. Thus, a solution is needed to solve learning problems for inclusive students through inclusive online schools, especially learning during the Covid-19 pandemic.

Thus, a breakthrough in online technology is needed in inclusive education, especially one that can be applied to the masses of Covid-19 in schools. In this study, the breakthrough in online technology for inclusive children is called online inclusion school (OIS). The OIS is expected to fill the gap between the learning needs that facilitate inclusive students, including students with disabilities, and the low learning competencies of inclusive students, especially during this pandemic. So that OIS integrated with the inclusive learning curriculum is a solution to improve the quality of proper and quality education to provide equal educational opportunities for normal students with inclusive students (Saleh et al., 2019; Salim et al., 2021).

The purpose of this research is to develop an online technology that can be used by an inclusive school called the Online Inclusion School (OIS); from the development of the application, it is necessary to measure the value of validation and the importance of effectiveness on student learning outcomes.

Research Method

This research design used the development and model research method with the stages of analysis, design, development, implementation, and evaluation (ADDIE) (Amir et al., 2018). This study developed OIS devices that can be accessed via the web and mobile android. The OIS device obtained the feasibility of theoretical validation. It was then tested at Sekolah Dasar Muhammadiyah 1 Sidoarjo on 10 inclusive students and implemented in Sekolah Dasar Khazanah Ilmu on 15 inclusive students.
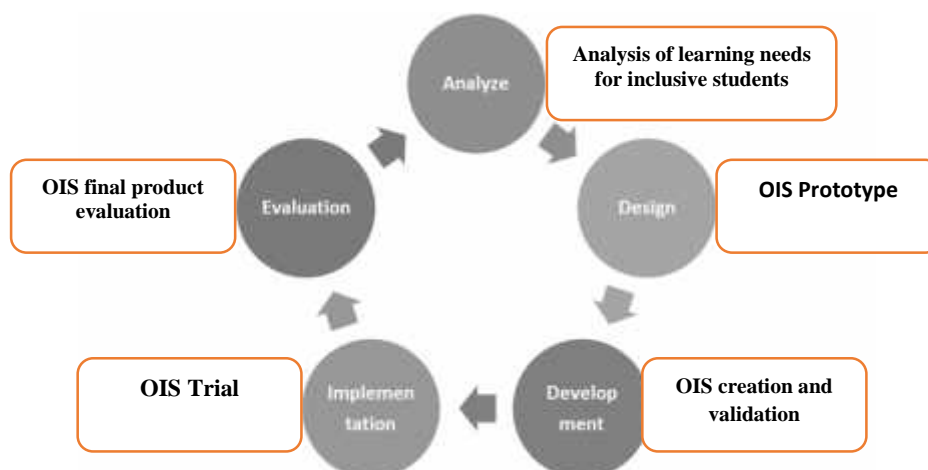
Figure 1. OIS Research and Development Stages

The instruments used in data collection are validation sheets and student learning competency tests. The validation sheet consists of 10 statements covering the assessment's four aspects: feature format, content, ease of access, and language used. The criteria for the validity of OIS are if the mean value is 3.6 V < 4 then OIS is declared very valid, if the mean value is 2.6 V < 3.5 then it is declared valid, if the mean value is 1.6 V < 2.5 then it is declared less valid, and if the mean value of 1 V < 1.5 then it is declared invalid. The results of the empirical test at the Sekolah Dasar Muhammadiyah 1 Sidoarjo showed that the product moment correlation analysis was 0.002, while the Cronbach's Alpha analysis results were 0.922. Therefore, the OIS validation sheet is declared valid and reliable.

The inclusive student learning competency test consists of 10 multiple choice questions covering 10 aspects of ability in terms of asking questions, making simple materials, communicating, making observations, imitating abilities, simple motor skills, logical abilities, speaking skills, moderate motor skills, and the ability to respond to situations. The results of the empirical test at the Sekolah Dasar Muhammadiyah 1 Sidoarjo showed the results of the product-moment correlation analysis were 0.003, while the results of Cronbach's Alpha analysis were 0.988. Therefore, the inclusive student learning competency test is valid and reliable. Analysis of student learning competence data using SPSS version 22.0 (IBM Corp. Released 2016) with a significance level of 0.05. Data analysis is a paired sample t-test with p-value or sig. (2-tailed) criteria of <0.05 to conclude Ho (no OIS effect on inclusive student learning competence) is rejected and Ha is accepted (there is an effect of OIS on the learning competence of inclusive students).

Results and Discussion
Analyze Stage

The needs analysis in this study included identifying problems related to educational needs for inclusive children during the Covid-19 pandemic. In addition to analyzing student needs, the important thing that needs to be done is analyzing student characteristics because inclusive children have different characteristics according to their needs. This analysis included the actual abilities possessed by students and student learning styles. A common problem that simultaneously arises was the absence of a learning system that facilitates inclusive children to get good learning and adequate competence, especially during the Covid-19 pandemic (Daulay, 2021; Gupta et al., 2021; Khanna & Kareem, 2021). The result of this stage was the need for OIS in the form of websites and androids that were online for inclusive students (Traver-Martí et al., 2021; Udin By Arifin et al., 2021).

Design Stage

The framework of the OIS device was mapped through four components of the needs of inclusive students in online learning, namely, e-modules, remote mentoring, consultation, and competency-based evaluation (See Figure 2).

E-modules provide facilities for inclusive students to learn independently online, of course, by involving the active role of parents (Janá ek & Š astný, 2018; Woodruff et al., 2020). E-modules in OIS have four characteristics, including (1) Self-instructional: providing inclusive students so that they can learn independently and not depend on other parties; (2) Self-contained: providing all the material according to the competencies studied in full in one module; (3) Stand Alone: E-modules do not depend on other media and can be used separately, but still in accordance with the material and planned to learn objectives [20]; (4) Adaptive: has a high adaptive power that adapts to the needs of inclusive students; and (5) User Friendly: providing clear instructions and information and making it easier for users to respond and access as desired (Rapanta et al., 2021).
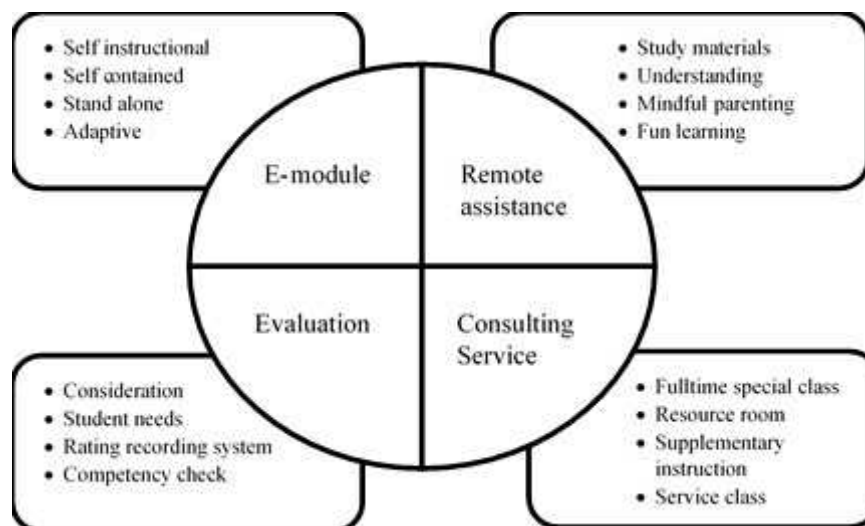

Figure 2. OIS Components Framework

Remote mentoring provides practical assistance services through OIS and will assist in the form of (1) material assistance that is considered difficult and unsolvable; (2) understanding assistance for inclusive students who have difficulty in reasoning and grasping the systematics of learning; (3) Mindful Parenting: mentoring where the teacher is fully present when students need assistance outside the network or within the network; (4) Fun Learning Reflection: assistance if students have shown fatigue in learning to be invited to do other activities that please them to explore their potential (Azorín et al., 2019; Robinson et al., 2018; Udin By Arifin et al., 2021).

The OIS consulting services include (1) Full-time particular class: students receive planned programs under the direction of a special class teacher; (2) Resource room: Students will have additional half-time in-room consultations with specialized staff and equipment; (3) Supplementary instruction and services class: students receive additional programs or services from specialists at school (Tur-Porcar et al., 2021).

Competency-based evaluation provides a comprehensive evaluation to inclusive students, which is obtained from the results of (1) Integrated learning scores; (2) consideration of student needs; (3) assessment recording system, (4) competency check that has been exceeded (Aparicio-Herguedas et al., 2020).

Development Stage

The initial development step was to create an OIS prototype by coding and mapping the OIS design on the Figma application to create a UI design (See Figure 3).
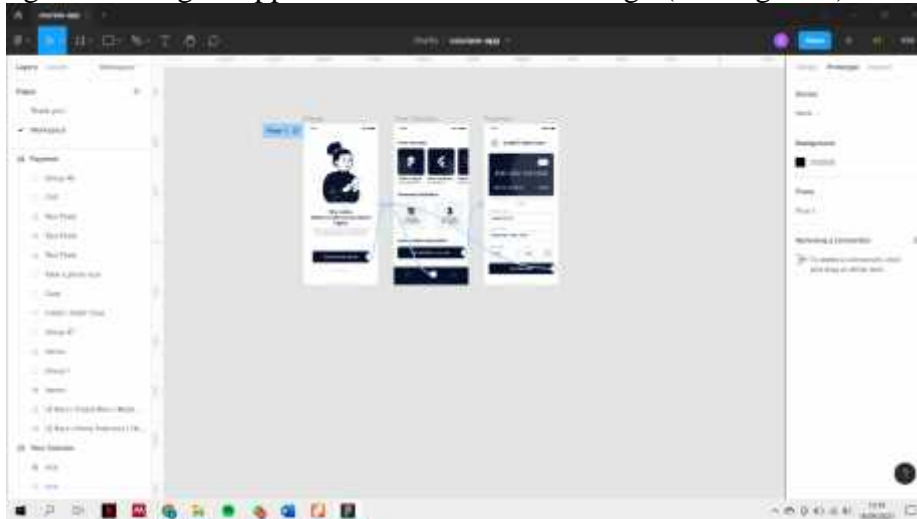

Figure 3. Initial development of the OIS Prototype on Figma

The result of this development step was an OIS prototype which can be accessed via the web http://siumsida.com/. The results of the OIS Prototype are in the form of features and tools that made it easier for students to access OIS, starting from the dashboard that has displayed: (1) Home tools; (2) learning videos for inclusive children; (3) Human Resources; (4) the facilities obtained by the user; (5) Latest info; (6) Contact if you need OIS services; (7) List of packages 1, 2 and 3, and their payments; (8) Related links (See Figure 4).
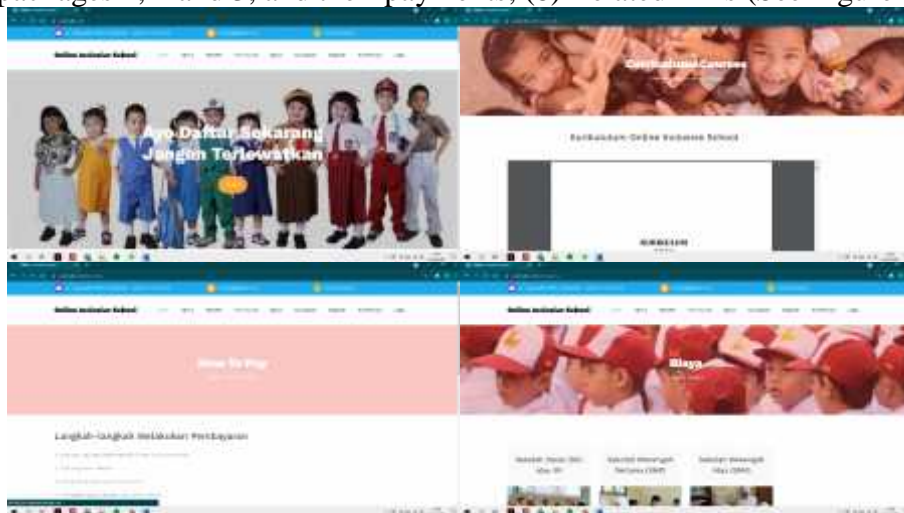
Figure 4. The OIS Accessed Via PC

Researchers verify and validate OIS in the form of a questionnaire filled out by educational technology experts and educational practitioners to assess the feasibility of developing the OIS made (Picabea, 2019). The researcher involved the main stakeholders, namely, professors of educational technology, Information technology experts, and elementary school teachers in Indonesia.

Table 1. Mean Validity Value of OIS

No	Aspects	V1	V2	V3	Mean	Criteria
1	Feature Format	3,9	4,0	4,0	3,97	Very Valid
2	Contents page	3,8	4,0	3,6	3,80	Very Valid

3	Easy to access	3,7	3,6	3,8	3,70	Very Valid
4	Language used	4,0	4,0	3,9	3,97	Very Valid
	Total Mean Value	**3,85**	**3,90**	**3,83**	**3,86**	Very Valid

Description: V1 validator 1, V2 validator 2, V3 Validator 3

Table 1 showed that OIS got a mean score of 3.86 with very valid criteria. The lowest point is the ease of access. This is a follow-up to the improvement to the program OIS so that it can be accessed via mobile.

Implementation Stage

The implementation of OIS during the pandemic was carried out through a guide to learning steps, including activities carried out by teachers and students (See Table 2).

Table 2. Learning Steps Using OIS

Educator Behavior	Student Activities
Phase 1. Identifying the problem	
• Educators present material through e-modules and videos • Educators assist inclusive students to find solutions to the problems they are experiencing. • Educators conduct competency-based evaluations and learning outcomes.	• Listening and taking notes on the material provided through online e-modules and videos. • Students present problems/materials they do not understand from e-modules or videos. • Students ask the companion if there are difficulties encountered during online learning.
Phase 2. Identifying Learning Issue	
• Educators facilitate students to identify problems experienced by inclusive students through e-modules and videos • Educators formulate a relevant learning topic according to the ability of inclusive students. • Give students assignments to get enough information through reading, observation, interviews, and discussions.	• Revealing questions related to the material presented. • Identify the problems presented by the educator and try to answer the questions that arise • Sharing roles and tasks to solve these problems by seeking information from various sources.
Phase 3. Setting Goal and Making Plan	
• Educators guide students to identify problems that exist in e-modules and videos, then formulate them in the form of hypotheses • Educators guide and facilitate inclusive students to collect data from knowledge, concepts, and theories by finding various alternative problem-solving.	• A discussion partner assists inclusive students in formulating hypotheses • Inclusive students are allowed to collect relevant information, read literature, observe objects, interview sources, conduct their own trials, and so on.
Phase 4. Learning and Applying Knowledge	
• Educators provide opportunities for inclusive students to find problem-solving through examples and implementations obtained by inclusive students during the learning process. • Guiding the discussion activities of inclusive students.	• Make a simple report on the results of the activities that have been carried out in the learning process, either from e-models or videos.
Phase 5. Assessing and Reflecting	
• Educators provide additional information if what is presented by students is still lacking. Besides that, it also provides corrections and	• Submitting the results of reports and solving problems that have been obtained • Conduct discussions about the results of the

Educator Behavior	Student Activities
reinforcement of the results that students have presented. • Educators facilitate inclusive students to evaluate and reflect.	submitted reports • Together with the facilitators/educators, conclude the reported exposure and discussion results. • Together with the facilitators/educators, they reflect on the values obtained from the conclusions.

The trial of OIS implementation and the set of learning steps was carried out at Sekolah Dasar Muhammadiyah 1 Sidoarjo on 10 randomly selected inclusion students (Hillen, 2019). The results of this trial are in Table 3.

Table 3. Improving the Learning Competence of Inclusive Students in the Trial Phase

Skill Indicator	Mean	Sd
1. Asking	3,20	1,37
2. Making simple ingredients	3,22	1,41
3. Communicate	3,17	1,31
4. Make observations	3,33	1,34
5. Imitate	3,31	1,31
6. Simple	3,36	1,33
7. Logical	3,43	1,41
8. Talking	3,28	1,39
9. Medium motor	3,19	1,37
10. Respond to the situation	3,29	1,36
Total	**3,28**	

In Table 3, the mean value of the learning competence of inclusive students was 3.28 if converted to the criteria for determining the level of learning success that had been set, it could be concluded that the value of the results of increasing learning competence using the OIS that had been developed had a high success rate with achievement scores 3.28 (82%). Thus, there was an increase in the competence of inclusive student learning outcomes when using OIS. The things that need to be improved in implementing OIS are related to: (1) the lack of communication skills so that only 3.17 points are obtained, which identify that the assistance services provided were still not optimal. (2) The improvement of students' moderate motor skills was still lacking, with 3.19 points indicating that the OIS provided had not yet optimized the provision of motor assignments.

Evaluation Stage

Table 4 found the difference between the students' learning competencies with the inclusion pretest and posttest, namely, the pretest results showed a mean value of 61.52 and the posttest results showed an mean value of 86.53. Therefore the p-value or sig. (2-tailed) of 0.00, which means (<0.05). It could be concluded that Ho was rejected and Ha was accepted. This means that the evaluation of the application of OIS significantly affects the mean pretest and posttest scores of student learning competencies.

Table 4. Learning Competencies of Inclusive Students in the Experiment Phase

Paired Sample Statistic		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	61,52	15	10,855	2,803
	Posttest	86,53	15	7,198	1,858
Paired Samples Correlations		N	Correlation	Sig.	

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Pair 1	Pre – Post	15		,831			,000	

Paired Differences Correlations

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	**Sd**	**Sd Error Mean**	**95% Confidence Interval of the Difference**				
					Lower	**Upper**			
Pair 1	Pre – Post	-24,27	6,36	1,64	-27,79	-20,74	-14,77	14	,000

Discussion

This research provides a breakthrough in the online learning system for teachers, inclusive students, and their parents during the Covid-19 pandemic. Integrating e-module components, remote mentoring, consultation, and competency-based evaluation has been declared valid constructs to facilitate online inclusive student learning. Online schools in inclusive education are needed to minimize bullying of students with disabilities (Khanna & Kareem, 2021). The teacher can control students' interests and perceptions of learning during study mentoring (Amir, Fediyanto, et al., 2020; Yada et al., 2018).

The implementation of OIS has provided findings of a significant increase in the learning competence of inclusive students, especially during the Covid-19 pandemic. Similar online learning for inclusive students has shown improved learning outcomes and deeper understanding (Amir, Ariyanti, et al., 2020; Asongu et al., 2019). This is because mobile online learning assistance is more private (Arifin et al., 2021), so inclusive students can learn more comfortably (Picabea, 2019). This is in line with previous research that mentioned the importance of developing strategies to reduce the pandemic's impact on performance through more sustainable and efficient online learning (Karakose, Yirci, & Papadakis, 2021; Karakose, Yirci, Papadakis, et al., 2021).

Another finding in this study is that the learning competencies of inclusive students can be further developed in the elements of cognitive and psychomotor skills, but inclusive students have weak competencies in terms of the affective domain. Low affective skills tend to occur in activities that lead to social involvement in terms of communicating and asking questions. One of the hidden factors for using technology is weakening motivation in socializing (Fahyuni et al., 2020; Marlina & Kusumastuti, 2019).

Conclusion

The results showed that the OIS application consisting of components of e-module, remote mentoring, consultation and competency-based evaluation was very well verified and validated in the aspect of feature format, content page, easy to access and language used, especially in feature format and language used. Meanwhile, the effectiveness test's value shows that the evaluation of the application of OIS has a significant effect on the mean pretest and posttest scores of student learning competencies. It has a significant effect on increasing the learning competencies of inclusive students during the Covid-19 pandemic, sequentially increasing the learning competence of inclusive students increases in skills in the cognitive, psychomotor, and affective domains.

Recommendation

Future research recommendations are needed to modify the OIS to accommodate the needs of inclusive students so that they can be more social in online practice. This can be done if online learning practice activities also involve normal students by creating a conducive learning understanding without looking at shortcomings and still controlling excessive

mentoring for inclusive students. In particular, policymakers recommend making the OIS an alternative learning medium for inclusive students to have learning competencies that are not inferior to non-inclusive students. This is important to ensure that the confidence of inclusive students is maintained because the OIS is used online, especially during the Covid-19 pandemic. For principals, The OIS is the answer to fill the gap between the problem of unavailability of media and the need for practice in regulating learning between inclusive students with parental supervision. Meanwhile, the OIS is a conducive medium for parents to monitor the development of inclusive students' learning competencies in a more controlled manner in the classroom, even though OIS is conducted online.

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