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## Developing a Collaborative Teaching Syntax for Effective Online Learning Transitions

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**Abstract.** *The transition of learning using an online platform where there is a lack of preparation of educators in the transition of online learning and there are challenges to meet the needs of online learning. Therefore, the right strategy is needed to help educators to improve learning in the classroom. This research is research and development type Research and Development (R&D). This development research aims to produce a product in the form of a collaborative teaching learning model syntax. Researchers develop learning media using the 4D development model. The 4D model is a model consisting of: define, design, develop and disseminate. The syntax development of the collaborative teaching learning model that was developed was tested by 7 validators consisting of 4 physics education lecturers at Universitas Negeri Yogyakarta and 3 high school (SMA) teachers. Based on data from validation results by validators on learning media, a score for each aspect was obtained, namely 3.36; 3.43; 3.57; 3.33; 3.33; 3.29; 3.14; 3.43 with an average score of 3.36 in the very valid category. Therefore, the syntax of the learning model developed meets the criteria for being very valid and can be used in learning..*

**Keywords:** *Collaborative Teaching, Learning & Development, Online Learning Transition, Research & Development, Syntax*

**Abstrak.** Transisi pembelajaran menggunakan platform online dimana kurangnya persiapan pendidik dalam transisi pembelajaran online dan adanya tantangan untuk memenuhi kebutuhan pembelajaran online. Oleh karena itu, diperlukan strategi yang tepat untuk membantu pendidik dalam meningkatkan pembelajaran di kelas. Penelitian ini merupakan jenis penelitian dan pengembangan Research and Development (R&D). Penelitian pengembangan ini bertujuan untuk menghasilkan suatu produk berupa model pembelajaran kolaboratif sintaksis. Peneliti mengembangkan media pembelajaran dengan menggunakan model pengembangan 4D. Model 4D merupakan model yang terdiri dari: mendefinisikan, merancang, mengembangkan dan menyebarkan. Pengembangan sintaksis model pembelajaran kolaboratif yang dikembangkan diuji oleh 7 validator yang terdiri dari 4 orang dosen pendidikan fisika Universitas Negeri Yogyakarta dan 3 orang guru Sekolah Menengah Atas (SMA). Berdasarkan data hasil validasi

oleh validator terhadap media pembelajaran diperoleh skor setiap aspek yaitu 3,36; 3,43; 3,57; 3,33; 3,33; 3,29; 3,14; 3,43 dengan rata-rata skor 3,36 dengan kategori sangat valid. Oleh karena itu, sintaksis model pembelajaran yang dikembangkan memenuhi kriteria sangat valid dan dapat digunakan dalam pembelajaran.

***Kata Kunci: Pengajaran kolaboratif, pembelajaran & pengembangan, transisi pembelajaran online, penelitian & pengembangan, sintaksis***

## **PENDAHULUAN**

The Covid-19 pandemic has had various impacts on education around the world. The biggest impact is on the transition of classroom learning to online learning. Online learning that has been going on for approximately 2 years has various impacts on classroom learning (Prasetyanto et al., 2022). Meeting the needs of online learning is a challenge for teachers and all levels of education personnel in schools, such as: transitioning to distance learning (both technical and methodological), implementing and managing hygiene measures, to the lack of education personnel due to health problems (Lücker et al., 2022). These impacts occur due to the sudden transition from traditional face-to-face learning to online learning (Tsantopoulos et al., 2022). However, despite the lack of preparation and the difficulties encountered, teachers showed a willingness and initiative to learn through various online platforms (Silvhiany, 2022). (Rapanta et al., 2021) state that the current overall picture of education shows the openness of education providers and institutions to innovation and new learning opportunities. Therefore, this condition is a good opportunity to present various new innovations in learning.

Innovation can provide novelty in classroom learning. Innovations in learning can change performance, paradigms for challenges, and become opportunities to adapt to new systems. In addition, innovations in learning are needed to systemically respond to the demands of the times and create a sustainable future (Serdyukov, 2017). These learning innovations and skills are also needed in physics learning to answer the needs of today's world (Bani-Hamad & Abdullah, 2019). Innovation in physics learning is needed to create more constructive learning (Aziz Ardiansyah, 2020). The constructivist point of view sees that collaborative elements are needed in classroom learning in the current technological era (Han & Resta, 2020). Collaborative elements in learning can be a form of learning innovation (Rodríguez-Triana et al., 2020). (Vivona et al., 2023) stated that collaborative activities are the main key to starting an innovation. Collaborative activities can increase positive attitudes towards diversity and creativity (Baruah & Paulus, 2019). For this reason, collaborative activities need to be carried out in classroom learning. Collaborative activities can be an option for classroom learning.

Collaborative learning has been widely practiced in learning in Indonesia. Collaborative learning is based on an educational approach or learning model for teaching and learning that involves groups of learners working together to solve problems, complete tasks, or create products (Laal et al., 2014). (Dewa et al., 2019) revealed that collaborative learning can improve student learning outcomes, especially metacognitive abilities both individually and in groups (Hendikawati et al., 2016). (Kadek Noviana Sastra Dewi et al., 2020) also revealed that collaborative learning has an effective influence on improving student learning outcomes. In addition, collaborative learning focuses on students' involvement in interacting so that it can have a positive influence on students' linguistic abilities (Baker, 2015). This form of collaborative learning is proven to have a positive influence on students.

Another form of collaboration in learning is with teachers. This form of teacher collaboration has historically been practiced in special education that requires inclusivity (Morelock et al., 2017); (Tzivinikou, 2015); (Hussin & Hamdan, 2016); (Williams et al., 2022). However, this form of learning has been found in upper-level education, such as in high schools and universities (Chan, 2016); (Vangrieken et al., 2015); (Helen Yopp Mark Ellis Martin V

Bonsangue & Duarte, 2014). In Indonesia, this form of learning is carried out as a form of approach in learning but has not been widely practiced (Ni'amah, 2019). Therefore, this form of learning can be an interesting option for learning in Indonesia.

The implementation of collaborative learning between teachers can be an innovation in classroom learning. This form of collaborative learning is also known as collaborative teaching, which is a form of learning where two or more teachers work together in preparing lessons and teaching in the classroom (operational definition) (Kerin & Murphy, 2015). define collaborative teaching as a form of learning that involves two or more teachers or professionals to carry out the learning process from planning, teaching, to assessment. In addition, (Villa et al., 2013) introduced collaborative teaching as a form of collaboration between two or more people in sharing teaching responsibilities. This form of learning can be a renewal in learning activities in the classroom.

Collaborative teaching has various advantages. (Ni'amah, 2019)) stated that collaborative teaching can make learning more student-centered focus. In addition, (Vangrieken et al., 2015) also stated that teacher collaboration produces good results for students, teachers, and the entire school level regarding the importance of stimulating (research) collaboration, especially in teachers. For this reason, this learning is good to be applied in classroom learning. However, this form of learning does not yet have clear implementation steps. Therefore, this paper aims to develop the syntax of collaborative teaching as a new form of learning model.

## **METODE**

### **Research Design**

The type of research used in this study is development research or Research and Development (R&D) to produce certain products (Hanafi, 2017). This development research aims to produce products and conduct validation tests of these products. The product developed in this research is a collaborative teaching learning model, which will then be validated by experts. The research design used is the 4D development design. The 4D model is a model consisting of: define, design, develop, and disseminate. By using this 4D model, it is expected that a collaborative teaching learning model can be developed. The subjects taken in this study were 3 high school physics teachers and 4 expert lecturers in physics.

### **Research Procedures**

The initial stage in the 4D model is definition stage to determine what products will be developed along with product specifications. At this stage, it is done to analyze the things needed through literature studies. The second stage is design to create a predetermined product design. The third stage is development to make the design into a product and test the validity of the product. Then the fourth stage is dissemination to spread the products that have been tested. This research method can be illustrated in Figure 1.

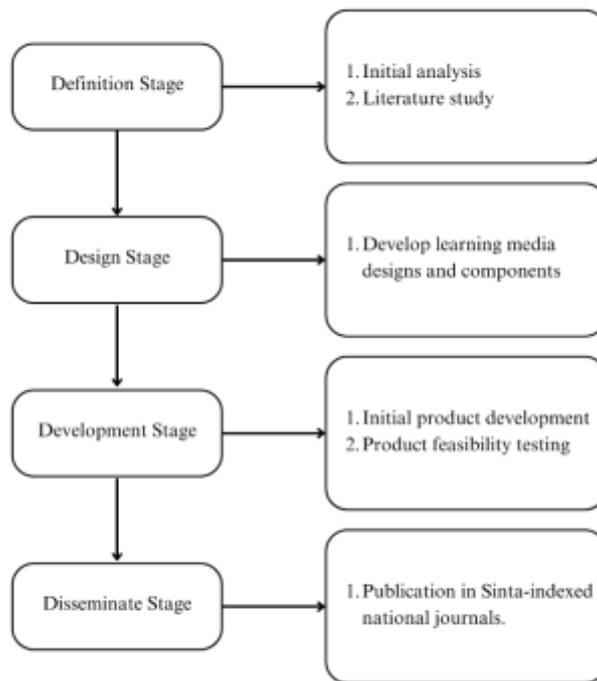


Figure 1. 4D Research Method

### Research Data Analysis Technique

This research was conducted after the initial design or prototype of the collaborative teaching learning model syntax was compiled. The next process is the validation test by experts. The validation results from experts will be analysed to analyse the feasibility. Analysis of the prototype syntax of the collaborative teaching learning model by validators was carried out using the following formula adapted from (Mu'tashimah et al., 2020), namely:

$$\bar{M}_v = \frac{\sum_{i=1}^n \bar{V}_i}{n} \quad (1)$$

Description :

$\bar{M}_v$  : Total validation average

$\bar{V}_i$  : Average validation of the i-th validator

$n$  : Number of validators

The validity criteria for the syntax of the collaborative teaching learning model used are presented in the table adapted from (Juniantari, 2017).

<b>Tabel 1. Criteria for Learning Model Validity</b>	
<b>Interval</b>	<b>Category</b>
$3,25 \leq \bar{x} \leq 4,00$	Very Valid
$2,50 \leq \bar{x} \leq 3,24$	Valid
$1,75 \leq \bar{x} \leq 2,49$	Less Valid
$1,00 \leq \bar{x} \leq 1,74$	Invalid

Based on the table, the learning model Q is declared valid if the average obtained is more than or equal to 2,50 ( $\bar{x} \geq 4,00$ ).

## HASIL DAN PEMBAHASAN

### Hasil

The results of this development include collaborative learning syntax and validation of the feasibility of collaborative learning syntax. The learning model prepared includes learning syntax is in figure 2.

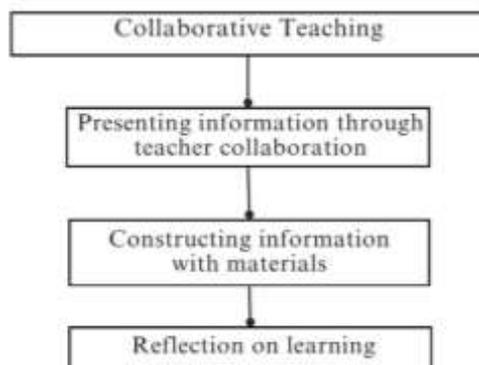


Figure 2. Collaborative Teaching Syntax

The preparation of the learning model syntax is based on six components, namely the theory underlying model development, syntax/stages, social system, reaction principle, support system, and impact.

Table 2. Collaborative Teaching Learning Model Lattice

Number	Component	Presenting information through teacher collaboration	Constructing information with materials	Reflection on learning	Collaborative Teaching Learning Model
1	Supporting Theory	Vygotsky's constructivism theory underlies the form of interaction between practitioners and primary teachers in providing introductory information and learning topics.  Co-Teaching theory emphasizes the collaboration of teachers and	Piaget's Cognitive Development Theory emphasizes students' activeness in building understanding from introductory information and learning materials. Then, the main teacher helps in forming students' understanding .	Piaget's Cognitive Development Theory emphasizes students' activeness in discussing the results of their understanding with the teacher. Then, students and teachers together conclude the lesson.	This collaborative teaching model combines two important theories in education and one theory regarding co-teaching. This is proven by the implementation of learning derived from these three theories (teacher explanation, interaction between teachers, interaction

Number	Component	Presenting information through teacher collaboration	Constructing information with materials	Reflection on learning	Collaborative Teaching Learning Model
		practitioners in teaching together in the classroom.			between teachers and students, individual interpretation of students)
2	Syntax	The teacher together presents introductory information to the students. The main teacher conveys the learning topic	Teachers guide students and provide stimuli that stimulate student discussion. Students are expected to be able to independently construct the information obtained in the material	The teacher explains the introductory information and material that has been studied. The teacher together with the students discusses the results of the students' understanding of the introductory information and material that has been studied. The teacher together with the students concludes the lesson	<p><b>Presenting information through teacher collaboration</b> The teacher together presents introductory information to the students</p> <p><b>Constructing information with materials</b> The teacher together presents introductory information to the students</p> <p><b>Reflection on learning</b> The teacher explains the introductory information and material that has been studied.</p>
3	Social Systems	Creating a good relationship pattern by collaborating with teachers who share information	Creating a good relationship pattern by collaborating with teachers who share information	Creating a pattern of good relationships between teachers and students between	Creating good relationship patterns through teacher collaboration, relationships between students, and

Number	Component	Presenting information through teacher collaboration	Constructing information with materials	Reflection on learning	Collaborative Teaching Learning Model
		together	together	students and other students during the learning process in evaluating the results of students' understanding and concluding learning.	teacher-student relationships in the learning process, such as: discussion activities, explanations by teachers, explanations by students, and student activity
4	Reaction Principles	Develop/invite students to develop introductory information with learning concepts through teacher collaboration	Develop/invite students to develop introductory information with learning concepts through discussion and active participation of students	Develop/invite students to be active in evaluating the results of their understanding and concluding learning	Develop/invite students to understand learning, develop collaboration skills from collaborative reflections between teachers and practitioners, increase student activity, and build collaboration between teachers and students
5	Support System	Guidebooks, lesson plans, teaching materials and media according to the characteristics of the stage of presenting information through teacher	Guidebooks, lesson plans, teaching materials and media according to the characteristics of the stage of constructing information with material	Guidebooks, lesson plans, teaching materials and media according to the characteristics of the evaluating and concluding learning stage	Guidebooks, lesson plans, teaching materials and media according to the characteristics of collaborative teaching

Number	Component	Presenting information through teacher collaboration	Constructing information with materials	Reflection on learning	Collaborative Teaching Learning Model
6	Impact	collaboration Improving students' 21st century abilities and physics identity			

The syntax validation results of the collaborative teaching learning model are presented in the table.

**Table 3. Syntax Validation Result**

Rated aspect	Average Validator Rating							Average Media Validation	Category
	V1	V2	V3	V4	V5	V6	V7		
Completeness of Model Structure	3,00	3,00	3,50	3,50	4,00	3,00	3,50	3,36	Very Valid
Suitability of Supporting Theory for Model Development	3,50	3,00	3,50	3,50	4,00	3,00	3,50	3,43	Very Valid
Clarity of Model Development Goals and Assumptions	4,00	3,00	3,00	4,00	4,00	3,00	4,00	3,57	Very Valid
Learning Model Steps	3,00	3,00	3,33	4,00	4,00	3,00	3,00	3,33	Very Valid
Clarity of Social Systems in Learning	3,33	3,00	3,33	4,00	3,33	3,00	3,33	3,33	Very Valid
Clarity of Learning Model Reaction Principles	3,00	3,00	3,50	4,00	3,50	3,00	3,00	3,29	Very Valid
Clarity of Instructional Impact	2,00	3,00	4,00	4,00	3,00	3,00	3,00	3,14	Valid
Completeness of Supporting Components	3,00	3,00	4,00	4,00	4,00	3,00	3,00	3,43	Very Valid
<b>Average Validation</b>	<b>3,10</b>	<b>3,00</b>	<b>3,52</b>	<b>3,88</b>	<b>3,73</b>	<b>3,00</b>	<b>3,29</b>	<b>3,36</b>	<b>Very Valid</b>

### Pembahasan

This research produces a product in the form of a collaborative teaching learning model syntax. The research design used is a 4D development design, namely define, design, development and disseminate.

In the define stage, the initial problem encountered is determined so that a solution to the problem can be found. In this research, the problem faced is the transition of learning using an online platform where there is a lack of preparation of educators in the transition of online learning and there are challenges to meet the needs of online learning. Therefore, the right strategy is needed to help educators to improve learning in the classroom. Furthermore, the

researcher analyzes the concept to design and systematically arrange the syntax of collaborative teaching learning strategies that are adapted to existing learning.

At the design stage, this is done by compiling the design and components needed in the learning model. The learning model prepared includes learning syntax. There are three steps of activities carried out in the collaborative teaching learning model, First, presenting information through teacher collaboration. The teacher together presents introductory information to the students. Then, the main teacher will present the learning topic to stimulate students to construct the information obtained with the material to be studied. Students are expected to pay attention to the explanations given and get an overview of the material to be studied. Second, constructing information with material. Teachers guide students and provide stimulus through learning tools used to help students understand the material. Students are expected to be able to independently construct the information obtained in the material through the learning tools provided by the teacher. Third, reflect on learning. The teacher explains the introductory information and material that has been studied. Then, the teacher together with the students discusses the results of the students' understanding of the introductory information and material that has been studied. Then, together conclude the lesson. Students are expected to be able to actively participate in discussing and concluding learning.

At the development stage there are two activities, namely initial product development and product feasibility testing. The product developed is the syntax of the collaborative teaching learning model in accordance with the initial design and then validated to assess the level of validity of the product developed. The validators chosen in this research were 4 physics education lecturers at Universitas Negeri Yogyakarta and 3 high school teachers. Based on data from validation results by validators on learning media, a score for each aspect was obtained, namely 3.36; 3.43; 3.57; 3.33; 3.33; 3.29; 3.14; 3.43 with an average score of 3.36 in the very valid category.

At the disseminate stage, what researchers do is compile scientific articles that will be distributed through national journals with the Sinta index.

## **SIMPULAN**

This research produced a collaborative teaching syntax consisting of three stages, namely presenting information through teacher collaboration, constructing information with materials, reflection on learning. This syntax was then validated by 4 physics education lecturers at Yogyakarta State University and 3 high school teachers. Based on the validation results of collaborative teaching syntax with an average of all aspects, the results obtained were 3.36 with a very valid category.

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