Development of Argumentative Learning Model Procedures Inquiry Blended Learning on Acid-Base Materials

*Feronica Purba [1], Harizon [2], Muhammad Haris Effendi-Hsb[3]

Magister Pendidikan Kimia, Fakultas Pacasarjana, Universitas Jambi,
1,2,3 Jl. Jambi-Muaro Bulian KM.15 Mandalo Indah Muaro Jambi, Jambi, Indonesia
.
*e-mail: feronicapurba41@gmail.com

Abstract: Argumentation skills play a major role in developing critical thinking skills and understanding problems and ideas. Argumentation ability is one of the most complex thinking skills in the learning process. The purpose of this study was to determine the procedure for developing an argumentative inquiry blended learning model on acid-base material. The research method used the "Research and Development" (R & D) method. The research procedure for developing a procedural learning model uses the type of procedure type F2-O2-S4-A3. The Argumentative Learning Model Procedure produced in this study is a combination of the Inquiry Argumentative Learning Model and the blended learning model using one type of research procedure for the development of Lee J.L and Jang with Type F2-O2-S4-A3. The conclusion of the study is that this development design model went through several stages, namely the stage of determining data sources, collecting data, analyzing data, generating ideas, describing models, urgency of procedures, concept validation, providing recommendations for testing procedures, practical validation, describing model II.

Keywords: Argumentatif Inquiry Blended Learning

Abstrak: Kemampuan argumentasi memainkan peran utama dalam mengembangkan kemampuan berpikir kritis serta pemahaman terhadap permasalahandan gagasan. Kemampuan argumentasi merupakan salah satu kemampuan berpikir yang paling kompleks dalam proses pembelajaran. Tujuan dari penelitian ini untuk mengetahui prosedur pengembangan model pembelajaran argumentatif inquiry blended learning pada materi asam basa.metode penelian menggunakan metode"Research and Development" (R & D). Prosedur penelitian untuk pengembangan model pembelajaran prosedural mengunakan jenis prosedur Tipe F2-O2-S4-A3. Prosedur Model Pembelajaran Argumentasi yang dihasilkan pada penelitian ini merupakan penggabungan dari Model Pembelajaran Argumentatif Inquirydan Model Pembelajaran bleded learning dengan menggunakan salah satu jenis prosedur penelitian pengembangan Lee J.L dan Jang dengan Tipe F2-O2-S4- A3. Kesimpulan penelitian yaitu Model desain pengembangan ini melalui beberapa tahapan yaitu tahap menentukan sumber data, mengumpulkan data, menganalisis data, memunculkan ide, menggambarkan model, urgensi prosedur, validasi konsep, memberikan rekomendasi pengujian prosedur, validasi praktis, menggambarkan model II.

***Kata kunci:** Argumentatif Inquiry Blended Learning*

▪ **INTRODUCTION**

Students' understanding of chemistry must be related to chemical concepts. If one concept cannot be understood correctly, it will hinder the understanding of the next concept. To understand the concept correctly, students need to develop the ability to think abstractly, critically and analytically. This skill is the ability to argue. This thinking ability can only be obtained by students from a learning model that involves students in argumentation skills (Wahdan, Sulistina, & Sukarianingsih, 2017).

Argumentation skills play a major role in developing critical thinking skills and understanding problems and ideas. Argumentation ability is one of the most complex thinking skills in the learning process. One of the learning objectives by developing argumentation skills is to train students in critical thinking and communication (Devi, Susanti, & Indriyanti, 2018).

Argumentation skills can be trained using the Toulmin Argumentation Pattern (PAT). The main components in PAT are claim, evidence, warrant, backing, qualifier, and rebuttal. According to McNeill & Krajcik (2011) with student abilities, namely: Claim is the ability of students to provide opinions based on information obtained or students' arguments in answering the questions given. Evidence is the ability of students to inform what they know. Warrant is a student's ability to provide and analyze data, the ability to provide justification where students can relate data and claims by writing examples, writing down what is known in mathematical problems, writing equations. Backing is the ability of students to provide support where students can answer all questions. Qualifier is the ability of students to provide accurate answers in accordance with the theory. Rebuttal is the ability of students to make rebuttals to problems where students must reject a statement that they think is wrong (Robertshaw & Campbell, 2013). Argumentation can be used as a strategy to improve students' ability to make decisions and scientific knowledge (Dawson & Katherine, 2017). Ade (2016) argues that argumentation skills play an important role in developing critical thinking skills and adding in-depth understanding of an idea or idea.

Based on the results of interviews with chemistry teachers at SMAN 10 Jambi City, it was found that the learning outcomes on acid-base material were still below the Minimum Completeness Criteria (KKM) of 72. The percentage of student achievement was 65%. Meanwhile, the results of interviews at SMAN 2 Jambi City also found that student scores were still below the KKM, with the percentage of student achievement being 68%. Teachers with both schools still use the lecture method so that students' abilities are still relatively low in arguing, especially on acid-base material.

Acid-base learning in schools is less interesting because the material is difficult to understand. The teacher in delivering the material is too monotonous and rote so that students are less interested in learning and result in low test scores. The low score of students is caused by less active communication between students and teachers because the learning model used is still lecture method. According to Sanjaya (2009) the lecture method is a method by presenting lessons through oral narrative or direct explanations to a group of students. Learning theory that underlies the lecture method is behavioristic learning theory. According to behavioristic learning theory, learning is a process of changing behavior as a result of the interaction between stimulus and response. The weakness of the lecture method is that learning becomes boring, students become passive and the density of concepts given results in students not being able to master the material being taught. This is in accordance with Taufik (2013) research which states that the lecture method in the learning process of teachers is actively involved while students only receive passive learning in terms of argumentation. Therefore, to

overcome this problem, a learning model is needed that has the aim of improving students' argumentation skills.

Learning models that can train students in developing argumentative abilities are learning models that involve students in argumentation activities, such as cooperative learning models (Matuk, 2015). For example in Andriani (2018) research using the Two Stay Two Stray (TSTS) and Think Pair Share (TPS) learning models to develop students' argumentation skills. The TSTS and TPS models are cooperative learning models that provide opportunities for groups to share results and information with other groups. This cooperative learning model has the aim of inviting students to work together in finding a concept.

Similarly, research conducted by Ginanjar (2015) has applied the Argumentation Driven Inquiry (ADI) learning model. ADI is an inquiry-oriented learning model that emphasizes argumentation activities to help students in their opinion and make a scientific explanation to finally reflect on the work done. In addition, research conducted by Hadiwidodo et. al (2017) by developing chemistry learning tools using the Argument Driven Inquiry (ADI) model, showing that the implementation of learning using the Argument Driven Inquiry (ADI) learning model is effective for improving argumentation skills and student learning outcomes..

The inquiry learning model comes from English inquiry which can be interpreted as the process of asking and finding answers to scientific questions posed. Scientific questions are questions that can lead to research activities on the object of the question. In other words, inquiry is a process to obtain and obtain information by conducting observations or experiments to find answers or solve problems by asking and finding out (Khoirul, 2015).

The inquiry learning model is included in one of the scientific approaches in the learning process. This model has many advantages in implementing it but also has weaknesses and difficulties faced in carrying out classroom learning. These include (1) lack of time, (2) large number of students, (3) lack of equipment and facilities, (4) lack of knowledge, skills and experience (Hasibuan & Mukminin, 2019) and (5) teacher belief in the importance of inquiry (Hasibuan, Ngatijo, & Urip, 2019). Difficulties such as limited time to conduct experiments in class, this is because the initial material taught by the teacher before starting the experiment takes quite a lot of time, students do not have the courage to argue because students do not have initial readiness before learning in class and do not have the basic concepts of the material to be studied. taught by the teacher so that students will have difficulty making questions in arguing, the material to be taught cannot be fully taught because of the limited time for students to learn so that the material that should be taught by the teacher at that hour cannot be implemented, students are only fixated on the material and books taught by the teacher. The weakness of this learning model can be minimized in order to increase argumentation ability as a more effective learning goal and can increase students' confidence in arguing during the learning process by designing inquiry learning model procedures combined with blended learning.

Blended learning model is a learning model that occurs in the classroom and outside the classroom. The advantage of using blended learning is the combination of direct teaching (face to face) and online teaching (Dwiyogo, 2018). The benefits of blended learning according to Sihkabuden (2011) that blended learning is considered capable of activating or provoking students according to the competencies achieved, material characteristics, student characteristics and facilities and infrastructure both web and

face-to-face so that they can interact optimally. In addition, Primasari (2011) states that with blended learning teachers can upload teaching materials on the internet and can be accessed by students anywhere and anytime.

In its application, combining learning models can be done, this is in line with Agustiningsih (2019) research by developing an argumentation learning model procedure using the flipped-classroom (online learning) model integrated with the Toulmin Argumentation Pattern (TAP) with an active debate model. In this study, the results were feasible to be tested and received positive responses from teachers and students with the conclusion that the procedure for the integrated flipped-classroom (online learning) argumentation learning model to the Toulmin Argumentation Pattern (TAP) is good to use as a learning model. Furthermore, Ramadani (2019) argues that research on the development of the inquiry learning model syntax combined with the flipped classroom (online learning) learning model resulted in a new learning model innovation to improve students' argumentation skills.

Therefore, to overcome the weaknesses that exist in the guided inquiry learning model which takes up a lot of time, lack of facilities and infrastructure, the number of students in the class is too many and the teacher is not able to master the material, then blended learning can be combined with inquiry. The material to be used is acid base. Acid-base is one of the class XI high school chemistry materials that learns about the notion of acid-base, acid-base theory, acid-base indicators, acidity (pH), acid-base titrations and buffer solutions. Acid-base characteristics lead to the cultivation of concepts, chemical calculations and providing direct experience to students regarding the identification of acids and bases. This argumentative inquiry blended learning model can be developed using the Lee & Jang (2014) type 8 development model, namely F2-O2-S4-A3 with a procedural learning design due to simulation tasks (Rusdi, 2018). Based on the theory and facts described above, the purpose of this study is to find out the procedure for developing an argumentative inquiry blended learning model on acid-base material.

- **METHOD**

This research is a type of instructional design development research using research and development methods (R & D. The research procedure for the development of procedural learning models uses the type of procedure Type F2-O2-S4-A3. This type constructs a design model procedural learning (procedural instructional design model) with a Practice-driven approach through simulation tasks from heuristic design patterns.This type of procedure Type F2-O2-S4-A3 has several stages, namely determining data sources, collecting data, analyzing data, generating model ideas, and describe the model.

The development steps carried out by researchers are:
1. Determine the data source (the stage of determining the data source is carried out to determine the order of the theory-driven approach followed by practice driven)
2. Collecting Data (this stage of collecting data, the researcher observes the participants' assignments and records their appearance, reactions, and conducts interviews with expected questions).
3. Analyzing Data (the data analysis stage is used to analyze the design patterns of tasks/sub-tasks and their interactions. So researchers see the potential for combining inquiry learning models with blended learning, the potential for combining these two

models will be strengthened by the opinions of several learning design experts, teachers and students).

4. Generating model ideas (the stage of generating model ideas is used by researchers to look for integration patterns or design drafts between the two learning models, namely the inquiry learning model and blended learning, then researchers develop a blended learning-based inquiry learning model in order to produce learning that can improve students' ability to argue .

5. Describing model I (there is a stage of describing this model the researcher visualizes the learning model that has been designed in the previous stage. At this stage the researcher also explains logically why the procedure has the potential to be chosen to achieve the goal of increasing students' argumentation skills. After the depiction/visualization of the model is complete then This model procedure will be validated by a learning design expert in order to get an assessment of the suitability between the basic theory of learning and learning to the combined model while the teacher validation is to get an assessment of the suitability of his experience in the combined model).

6. Explaining the urgency of the procedures that have been designed (the stage of explaining the urgency of the procedures that have been designed at this stage the researcher will explain logically by using theories that can support the procedural which has been combined from the inquiry and blended learning models can be efficient in learning that can improve student argumentation).

7. Validate the concept (the stage of conducting concept validation is an expert's assessment of the suitability between learning and learning theory on the combination of inquiry learning models and blended learning to achieve the goal of improving students' argumentation).

8. Provide recommendations for testing procedures (the stage of providing recommendations for procedural testing, at this stage the expert gives an opinion about the combination of the theoretically developed model or concept at which stage is not appropriate and at which stage it must be added while the practitioner or teacher gives an opinion on the model developed according to the experience gained during teaching).

9. Validate practitioners (the stage of conducting practitioner validation, at this stage the teacher will provide an assessment of the suitability of the inquiry and blended learning models with their experience with the inquiry model and blended learning model in improving students' argumentation skills).

10. Describing model II (after receiving responses from teachers, students and observers, then the researcher describes model II by visualizing the learning model as a result of concept validation and practical validation. After the depiction / visualization of the learning model procedure is complete, this learning model procedure can be used during the learning process as learning model and can be continued for large-scale trials (other schools) or with other chemical materials to improve students' argumentation skills).

The types of data used are qualitative data and quantitative data. Qualitative data obtained from learning design experts and data from teachers. Then quantitative in the form of obtaining scores from the teacher's response validation questionnaire on the syntax of the inquiry learning model and blended learning on acid-base material. The data collection instruments used were interview sheets, validation questionnaires for

learning design experts, teacher response questionnaires and student response questionnaires..

There are 2 data analysis techniques used in this study, namely qualitative data and quantitative data. This qualitative data was obtained from the results of teacher interviews and a questionnaire validator of learning design experts. This quantitative data is data obtained from the questionnaire response of learning media experts and the teacher and student response questionnaires were processed descriptively into interval data using a Likert scale. Then the effectiveness test data by processing the effectiveness test data is carried out by t-test using the SPSS program. The basis for determining the Independent T Test is based on the significance value (2-tailed) which measures whether there is an average difference in the subjects tested.

▪ **RESULT AND DISCUSSION**

The process of developing this model uses one type of development research procedure by Lee J.L and Jang (2014). Type F2-O2-S4-A3 which is then varied according to the needs of the developer. The description of the process of developing the learning model procedure is to determine data sources, collect data, analyze data, generate model ideas, to describe the model. Media and learning materials in the development of argumentative inquiry learning model procedures for blended learning on acid-base materials are carried out by media experts and materials experts using validation sheets. (3) Assessment of the design of the learning model development procedure is carried out by learning design experts using a questionnaire. (4) The teacher's respondents' assessment of the learning model that has been made by distributing questionnaires. Respondents consist of 5 chemistry teachers who teach in various schools.

1. Determine the Data Source

The stage of determining the data source is carried out to determine the order of the theory-driven approach. So at this stage the researcher analyzes development needs such as literature that can help and support the process of developing learning model procedures (Rusdi, 2018). At this stage the researchers began to determine the sources of research data, including literature review, expert opinions and teachers can be seen in table 4.1 below:

Table 1. Data Source

No	Data source	Data Collection Instruments
1.	Literature	Research Journals and books
2.	Learning Design Expert	Learning Design Expert Questionnaire
3.	Learning Device Expert	Learning Device Expert Questionnaire
4.	Teacher	Teacher Response Questionnaire

In the early stages of the research, the researcher determines the data sources from the literature that will assist and support the process of developing the argumentative inquiry blended learning model procedure. Next, the researcher determines the data sources needed, from experts (lecturers), namely the existence of learning design experts and learning device experts who will provide information or studies regarding the suitability of the learning model procedures in terms of theories and concepts. Then there are practitioners (teachers) who will provide information or studies regarding the suitability of the learning model procedures based on experience.

2. Collecting Data

At the stage of collecting data, the researcher will sort out various sources obtained from the literature as theory-driven. Sorting or collecting data through this literature is done so that researchers have initial concepts and valid data regarding model development and learning models (Rusdi, 2018). Sources of data obtained from relevant literature reviews from research journals related to the inquiry learning model, blended learning learning model and the ability to argue. The data sources from the inquiry learning model can be seen as follows:

Table 2. Inquiry Data Source

No	Literature	Inquiry Learning Model Syntax					
		Orientation	Formulate Problem	Formulating Hypotheses	Collect Data	Testing Hypotheses	Formulate Conclusion
1	Effendi-hasibuan (2019)	✓	✓	✓	✓	✓	✓
2	Ertikanto (2016)	✓	✓	✓	✓	✓	✓
3	Yultari (2019)	✓	✓	✓	✓	✓	✓

The data sources obtained from the blended learning model can be seen as follows:

Table 3. Blended Learning Data Sources

No	Literature before class (online)	Blended Learning Syntax	
		Before class (Online)	Class time (Face to face)
1.	Ahmad (2017)	✓	✓
2.	Deklara (2018)	✓	✓
3.	Widiara (2018)	✓	✓

The sources of data obtained from the argument can be seen as follows:

Table 4. Data Sources of Argumentation

No	Literature	Argumentation Syntax		
		Claim	Evidence	Warrant
1.	Andriani(2015)	✓	✓	✓
2.	Saputri (2017)	✓	✓	✓
3.	Yultari (2015)	✓	✓	✓

Then the researchers conducted preliminary observations at SMAN 2 Jambi City and SMAN 10 Jambi City to conduct interviews with teachers. This interview was conducted so that researchers have valid data regarding the characteristics of students, and the needs of students to assist the process of developing the learning model procedures that will be developed.

3. Analyze Data

The data analysis stage is used to analyze the theoretical data that underlies the potential combination of the two models (Lee & Jang, 2014). So the researcher will see the potential for combining the inquiry learning model with the blended learning model, the potential for combining these two models will be strengthened by the opinion of the teacher so that from this data analysis a relationship is obtained that can combine the inquiry learning model with blended learning.

At this stage the researcher has analyzed each learning model, both the inquiry learning model and the blended learning model, both of which have their respective strengths and weaknesses. The inquiry learning model and the blended learning model when combined can complement each other. One example is by combining the inquiry learning model and the blended learning model, it will allow the teacher to minimize the number of meetings that usually occurs in the application of the blended learning model.

Based on the results of interviews with chemistry teachers at SMAN 2 Jambi City and SMAN 10 Jambi City, they already know about argumentation skills but have not yet applied their argumentation skills in learning chemistry, especially acid-base materials. This is due to the lack of availability of learning models that can train students' argumentation skills. For this reason, it is necessary to provide a learning model that specializes in training students' argumentation skills to overcome these problems.

4. Generating Model Ideas

The stage of generating model ideas is used by researchers to find patterns of integration or to design drafts between the two learning models, namely the inquiry learning model and blended learning, then the researcher develops an inquiry blended learning argumentative learning model in order to produce a learning model procedure that can improve students' argumentation skills shown in the table:

Table 5. Initial Design of Argumentative Inquiry Blended Learning Model Procedures

No	Description of Blended Learning Model Syntax	Learning Theory	Description of Inquiry Learning Model Syntax	Learning Theory	Combined Syntax	Learning Theory	Learning Activities
1	**At home** (before class): Submission of material in the form of pictures, videos and assignments for the next meeting through an online application	Ausubel Theory	The teacher provides material delivery (orientation), formulates problems and hypotheses	Ausubel's Theory, Peaget's Theory	**Online learning activities: 1. Giving Material, Asking Questions and Hypotheses**	Ausubel Theory, Peaget Theory, Connectivism Theory, Toulmin . Pattern Theory	Students are required to have prior knowledge through a description of the material provided by the teacher in the form of images, videos and text online. It aims to facilitate the learning process and the existence of questions and hypotheses so that students understand the material.
2	Divide students into heterogeneous groups	Scaffolding theory, Vygotsky's learning theory	Divide students into two debating groups, one pro and the other cons.	Scaffolding theory, Vygotsky's learning theory	**2. Giving Argumentative Examples** **3.Group Division**	Vygotsky's theory of learning Scaffolding Theory, Toulmin Pattern Theory Positive Burden Theory	The benefits of giving examples of arguments and dividing students into several heterogeneous groups to discuss the tasks that have been given by the teacher

3	Class (during class): Teachers and students conduct discussions to discuss difficult material or assignments (questions) carefully.	Cognitive theory according to Brunre	The teacher gives assignments to discuss the material to be discussed, work in groups and collect data and analyze data	Teori kognitif menurut Brunre	4. Collecting Data 5.Analyzing Data 6. Prepare claims/answers	Cognitive theory according to Brunre	Students sit in groups according to the groups that have been given by the teacher and begin to conduct discussion and argumentative group work by using the components of claims, evidence, and warrants to complete or answer tasks or problems given by the teacher in previous learning activities.
4	-	Piaget's theory	The teacher appoints members of the pro group to speak and express their opinion, then the counter group responds by testing the hypothesis	Scaffolding Theory	7. Class Discussion	Piaget's Theory, Scaffolding Theory and Cognitive Burden Theory, Toulmin's Pattern Theory	Next, students conduct discussions between groups to strengthen students' understanding of the material or topic of discussion given by the teacher.
5	After Class The teacher gives post-test questions		The teacher invites students to make conclusions.	Ausubel Theory	8. Rewards & Post Test	Ausubel's Theory and Piaget's Theory	The teacher gave a reward for the 2 best groups and continued with a post test.

5. Describing the Draft Model I

At the stage of describing the draft model I, the researcher visualized the learning model that had been designed in the previous stage (Lee & Jang, 2014). At this stage the researcher also explained logically why the procedure was potentially chosen to achieve the goal of increasing students' argumentation skills. After the depiction/visualization of the model is complete, the procedure for this model will be validated by a learning design expert in order to obtain an assessment of the suitability between the basic theory of learning and learning to the combined model, while the teacher's validation is to obtain an assessment of the suitability of his experience in the combined model.

6. Explain the urgency of the procedure that has been designed.

At this stage the researcher explains the urgency of developing a procedural learning model that has been designed logically by using theories that can support the statement of the procedural inquiry blended learning model so that it is efficient in the learning process to improve students' ability to argue which is contained in table 4.8.

In the teaching and learning process, it is expected that the learning model used by the teacher can provide sufficient space for students to develop all their potential and skills, so that learning objectives can be achieved effectively. In general, teachers have many obstacles when teaching, for example, the time needed when teaching is not

enough so that the delivery of the material is not all, the characteristics of the material are not in accordance with the learning model that will be applied and the learning model used by the teacher is only that this makes the student learning environment less enjoyable so the purpose of learning is not effective.

So we need a separate development in the learning process of a learning model so that a new learning procedure or syntax is obtained so that the expected learning objectives are more effective in achieving and can improve students' ability to argue..

7. Perform Concept Validation

The Learning Design Expert sees and listens to the flow chart of the developed learning model procedure, then the Learning Design Expert evaluates the learning model procedure using a questionnaire (the validation questionnaire is attached), from the validation results suggestions and improvements are obtained for the developed learning model procedure and data is obtained. Validation by Learning Design Experts was carried out twice so that a procedure for the Inquiry Blended Learning Argumentative Learning Model was obtained which was ready to be tested..

Based on the first validation data from the second validator, the questionnaire from the expert on learning design procedures for the argumentative inquiry blended learning model on acid-base material was declared feasible to be tested. The following are the results of the recapitulation and validation stages of the first and second learning designs which can be seen in the following table:

Table 6. Validation Results of Learning Design Experts

Rated aspect	Validation I	Validation II
Total score	44	42
Category	good	good
Average Score	43	

So it can be concluded that the results of the first validation obtained a score of 44 with a good category and a second validation was carried out with different validators obtained a score of 42 with a good category as well and an overall average score of 43.

Symmetric Measures		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.500	.234	1.528	.170[c]
Ordinal by Ordinal	Spearman Correlation	.500	.234	1.528	.170[c]
Measure of Agreement	Kappa	.400	.299	1.500	.134
N of Valid Cases		9			
a. Not assuming the null hypothesis.					
b. Using the asymptotic standard error assuming the null hypothesis.					
c. Based on normal approximation.					

Based on the table above, it can be seen from the first learning design validator and the second learning design validator that the number is 0.400, it is in the medium category in the sense that the two validators have quite agreed on the validation of the learning design and are feasible.

8. Provide recommendations for testing procedures

The stage of providing recommendations for procedural testing, at this stage the expert gives an opinion about the combination of the theoretically developed model or

concept at which stage is not appropriate and at which stage it must be added while the practitioner or teacher gives an opinion on the model developed according to the experience gained during teaching).

9. Doing Practitioner Validation

The stage of conducting practitioner validation is carried out by the teacher. At this stage the teacher will provide an assessment of the suitability of the argumentative inquiry learning model and the blended learning learning model in improving students' argumentation skills with their experience. This validation was carried out by five teachers who were actively teaching chemistry subjects. Based on the results of the questionnaire given to the teacher, there was a positive response to the procedure for the argumentative inquiry blended learning model that had been developed by the researcher.

Based on the results of the teacher response questionnaire, it can be seen that the argumentative inquiry blended learning model was responded positively by several teachers. This is because all the procedures for the argumentative inquiry blended learning model have a good sequence and include all the components needed to train students' argumentation skills. In addition, this learning model is considered quite interesting and fun because students can explore their ability to argue in chemistry learning. The following correlations are taken from the data of the fourth teacher and fifth teacher because the average score of each is close to being able to be seen in the following table:

Correlations

		guru4	guru5
guru4	Pearson Correlation	1	.791[*]
	Sig. (2-tailed)		.011
	N	9	9
guru5	Pearson Correlation	.791[*]	1
	Sig. (2-tailed)	.011	
	N	9	9

*. Correlation is significant at the 0.05 level (2-tailed).

From the table above, the correlation test between the fourth teacher and the fifth teacher was found to be 0.791, which means that there is a positive relationship that has been developed and is feasible to use.

10. Describing Model II

After receiving a response from the teacher, the researcher then described model II by visualizing the learning model of the concept validation and practical validation. After the depiction/visualization of the learning model procedure is complete, the procedure of this learning model is feasible to be used during the learning process with chemical bonding material or other materials to improve students' argumentation skills..

Discussion

The development of the argumentative inquiry blended learning model for chemical bonding was adapted from Lee and Jang's development model Type F2-O2-S4-A3. In the preparation of the procedure for the argumentative inquiry blended learning model, there are several stages carried out, including the stages of determining data sources, collecting data, analyzing data, generating ideas, and describing the model..

The initial stage to develop the procedure for this Argumentation Learning Model is to determine the data source. The stage of determining the data source is carried out to determine the order of the practice-driven approach. At this stage the researcher begins to determine the sources of research data which include literature review, Expert Opinions, and Teachers. At this stage the researcher also analyzes development needs such as literature, experts and participants (teachers) who can assist and support the process of developing learning model procedures (Rusdi, 2018). Then after determining the source of the data, the researcher carried out the initial data collection stage from a literature review, and conducted interviews with 5 chemistry teachers with different schools in Jambi City. After collecting data, the next stage is analyzing the data used to analyze the design pattern of the task/sub-task and its interactions. First, the researchers here will look at the potential for combining the inquiry learning model with the blended learning model through a literature review, the potential for combining these two models will be strengthened by the opinion of the teacher. The selection of the blended learning learning model is based on the fact that in its implementation the teacher can maximize learning time in class. This is because, subject matter has been given online at home before class starts, and learning activities in class are in the form of working on assignments, and discussions about materials or problems that students have not understood..

According to Pratiwi et. al (2017) by doing assignments at school it is expected that when students experience difficulties, they can be directly consulted with their friends or with the teacher so that the problem can be solved immediately. Meanwhile, the inquiry model is used to overcome the weaknesses that exist in the blended learning model which does not facilitate students to carry out activities arguments or arguments that will improve students' argumentation skills.

This is reinforced by the results of initial interviews with 2 chemistry teachers at SMAN 2 Jambi City and SMAN 10 Jambi City, who did not know much about argumentation skills as a whole and had not applied argumentation skills intentionally to chemistry learning. This is due to the lack of availability of learning models that can train students' argumentation skills. For this reason, it is necessary to provide a learning model that specializes in training students' argumentation skills to overcome these problems.

Followed by the stage of generating model ideas used by researchers to find patterns of integration or design drafts between the two learning models, namely inquiry learning models and blended learning. Then the researchers developed the Inquiry Blended Learning Argumentative Learning Model in order to produce a learning model procedure that can improve students' ability to argue. After getting the model idea, then the researcher visualizes the model idea in the form of a flow chart that will be validated by the learning design expert. At the validation stage, this concept was carried out 2 times. After being validated by the Learning Design Expert, then material validation is carried out. With the results of both validations, it is feasible to use.

In the teacher's response questionnaire, he said that the sequence of procedures developed was good and there were no unimportant components in the developed procedures. This means that all the procedures of the learning model developed are very important to train students' argumentation skills and are quite easy to use for both teachers and students. In addition to being easy to use, this procedure is also interesting and fun because at the end of the lesson, students will be rewarded who dare to express their opinions directly, supported by appropriate data and reasons. This learning model

is also quite efficient because in its implementation the time used to carry out all the procedures of this learning model is quite in accordance with the availability of a predetermined time..

This learning model is not only devoted to acid-base material but can also be used for other materials. Because this model has a very positive impact on students' understanding of concepts. This is in accordance with Ade (2016) who argues that argumentation skills play an important role in developing critical thinking skills and adding a deep understanding of an idea or idea. In addition, Siswanto et.al (2014) also states that argumentation skills play an important role in building an explanation and theory of a concept being studied, because practicing argumentation skills means training cognitive and affective abilities that can be used to help understanding concepts..

Supporting evidence from this research is research conducted by Siswanto et.al (2014) This researcher has created an argumentation learning model on different materials by combining the argumentation learning model with other methods. The results showed that there was an increase in students' cognitive abilities and argumentation skills in both classes. However, the magnitude of the increase in the experimental class (using the scientific method) was more significant than the control class (without the scientific method). Furthermore, Diwu (2010) has also developed a Dialogical Argumentation learning model to train students' scientific argumentation skills. In this model, students have an argumentative dialogue based on Toulmin's Argumentation Pattern (TAP). Students develop their own argumentation patterns starting from making claims, collecting and analyzing data, making warrants and making backings to strengthen claims.

The following are the advantages of the Argumentation-Based learning model
Blended learning:
1. Improve students' argumentation skills.
2. Help improve students' understanding.
3. Improve students' ability to IT.
4. Responsible and Independent.
The weaknesses of the argumentation learning model based on blended learning are:
1. Can only be done in an accessible place with an internet network.
2. It is necessary to do more control so that we can still monitor the activities of students even outside the classroom.

From the results of the validation of the expert team, teacher responses, and relevant research as well as several literature reviews regarding the argumentative learning model, it was found that the inquiry blended learning argumentative learning model has a positive influence as a learning model that can improve students' argumentation skills, and make it easier for students to understand the material.

- **CONCLUSION**

Based on the results of the research on the Development of Argumentative Inquiry Blended Learning Model Procedures on Acid-Base Materials, the following conclusions can be drawn:

The Argumentative Learning Model procedure produced in this study is a combination of the Inquiry Argumentative Learning Model and the Blended Learning Model using one type of Lee J.L and Jang development research procedure with Type F2-O2-S4-A3. This development design model goes through several stages, namely (1)

the stage of determining data sources including literature review, learning design experts, learning device experts and teachers, (2) collecting data including literature review data and teacher interviews, this is done so that researchers have an initial concept and valid data, (3) analyzing the data including valid data that has been obtained, (4) generating ideas including designing a draft, and (5) describing the model including describing the procedures for the learning model that has been designed. Then the stages are modified into several stages, namely (6) the urgency of the procedure includes procedures developed theoretically and concepts, (7) concept validation includes validation by 2 learning design experts and validation by 2 learning device experts, (8) practical validation includes validation by 5 teachers, (9) describes model II includes describing the procedure diagram of learning model II. This type is a procedural model that is narrative and diagrammatic, the diagrammatic form makes it easier for researchers to describe the model that has been conceptualized so that the procedure for the argumentative inquiry blended learning model is obtained.

- **REFERENCES**

Ade. (2016). Peningkatan Kemampuan Argumentasi Melalui Penerapan Model Problem Based Learning pada Siswa Kelas XI MIA SMA Batik 2 Surakarta. *Jurnal Pendidikan Kimia. 3 (2): 2457-2673*.

Agustianingsih, A. (2019). Pengembangan Prosedur Model Pembelajaran Argumentasi Berbasis Flipped Classrooom Terintegrasi Toulmin Argumentation Pattern (Tap) Pada Materi Stoikiometri Kelas X Mipa Sman 4 Kota Jambi. *Jurnal Pengembangan Prosedur Model Pembelajaran Argumentasi Berbasis Flipped Classrooom Terintegrasi Toulmin Argumentation Pattern (Tap) Pada Materi Stoikiometri Kelas X Mipa Sman 4 Kota Jambi*.

Andriani, R. (2018). Perbandingan Kemampuan Argumentasi Siswa Pada Materi Larutan Elektrolit Dan Non-Elektrolit Dengan Model Pembelajaran Kooperatif Tipe Tsts Dan Tps Sman 5 Kota Jambi. *Pendidikan Kimia*.

Dawson, V., & Katherine, C. (2017). Using Climate Change Scenarios To Improve Grade 10 Students' Argumentation Skills. *The University Of Western Australia, Australia: 21-25*.

Devi, N. D. C., Susanti, E., & Indriyanti, N. Y. (2018). Analisis Kemampuan Argumentasi Siswa Sma Pada Materi Larutan Penyangga. *Jurnal Kimia Dan Pendidikan Kimia*, *3*(3), 152–159.

Diwu, C. (2010). *Effects Of A Dialogical Argumentation Instructional Model On Grade 10 Learners' Conception Of Fermentation* (Phd Thesis). University Of The Western Cape.

Dwiyogo, W. D. (2018). Pembelajaran Berbasis Blended Learning. *Depok: Rajagrafindo Persada*.

Ginanjar. (2015). Argumentation Driven Inquiry. *Jurnal Mipa, 20 (1): 32-37*.

Hadiwidodo, S., Tukiran, T., & Taufikurahmah, T. (2017). Pengembangan Perangkat Pembelajaran Kimia Model Argument Driven Inquiry Untuk Meningkatkan Keterampilan Argumentasi Dan Hasil Belajar Siswa. *Jpps (Jurnal Penelitian Pendidikan Sains)*, *7*(1), 1416–1421.

Hasibuan, M. H. E., & Mukminin, A. (2019). The Inquiry-Based Teaching Instruction (Ibti) In Indonesian Secondary Education: What Makes Science Teachers Successful Enact The Curriculum? *Journal Of Turkish Science Education*, *16*(1), 18–33.

Hasibuan, M. H. E., Ngatijo, & Urip. (2019). Portraying Supports, Situational Beliefs And Chemistry Teachers' Adoptions. *Journal Of Turkish Science Education. 16 (4): 538-553.*

Khoirul, A. (2015). Pembelajaran Berbasis Inkuiri Metode Dan Aplikasi. *Jakarta: Kencana.*

Lee, J., & Jang, S. (2014). A Methodological Framework For Instructional Design Model Development: Critical Dimensions And Synthesized Procedures. *Educational Technology Research And Development*, *62*(6), 743–765. Springer.

Mcneill, K. L., & Krajcik, J. S. (2011). Supporting Grade 5-8 Students In Constructing Explanations In Science: The Claim, Evidence, And Reasoning Framework For Talk And Writing. *Pearson*. Eric.

Pratiwi, A., Sahputra, R., & Hadi, L. (2017). Pengaruh Model Flipped Classroom Terhadap Self-Confidence Dan Hasil Belajar Siswa Sman 8 Pontianak. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, *6*(11).

Primasari. (2011). Model-Model Dalam Pembelajaran. *Bandung: Alfabeta.*

Ramadani, Y. (2019). Pengembangan Prosedur Model Inkuiri-Flipped Classroom Untuk Meningkatkan Kemampuan Berargumentasi Kimia. *Jurnal Pengembangan Prosedur Model Inkuiri-Flipped Classroom Untuk Meningkatkan Kemampuan Berargumentasi Kimia.*

Robertshaw, B., & Campbell, T. (2013). Constructing Arguments: Investigating Pre-Service Science Teachers' Argumentation Skills In A Socio-Scientific Context. *Science Education International*, *24*(2), 195–211. Eric.

Rusdi, M. (2018). Penelitian Desain Dan Pengembangan Kependidikan. *Depok: Pt. Rajagrafindo Persada.*

Sanjaya. (2009). . Metode-Metode Pembelajaran. *Jakarta: Gramedia.*

Sihkabuden. (2011). Model Pembelajaran Blended Learning. *Bumi Aksara.*

Siswanto, S., Kaniawati, I., & Suhandi, A. (2014). Penerapan Model Pembelajaran Pembangkit Argumen Menggunakan Metode Saintifik Untuk Meningkatkan Kemampuan Kognitif Dan Keterampilan Berargumentasi Siswa. *Indonesian Journal Of Physics Education*, *10*(2), 104–116. State University Of Semarang.

Taufik. (2013). Metode Ceramah Dalam Proses Pembelajaran. *Jurnal Pendidikan. 2 (4): 35-41.*

Wahdan, W. Z., Sulistina, O., & Sukarianingsih, D. (2017). Analisis Kemampuan Berargumentasi Ilmiah Materi Ikatan Kimia Peserta Didik Sma, Man, Dan Perguruan Tinggi Tingkat I. *J-Pek (Jurnal Pembelajaran Kimia)*, *2*(2), 30–40.