Development of Hypercontent Based Learning Model for High School Students

R. Simbolon1, A. H. Saragih2, J. Situmorang3

1,2,3Studies Program in Doctoral Educational Technology, Universitas Negeri Medan, Jl. Willem Iskandar, Pasar V, Medan, 20221, North Sumatera, Indonesia

*Corresponding author : rasminsimbolon02@gmail.com

Abstract. In the era of the Coronavirus Disease 2019 pandemic and the development of information technology affecting student learning styles, notably high school students. Researchers in the field of education are competing to find effective and efficient learning models today. This study intends to answer these challenges in a literature review by offering a new learning model based on hypercontent from the synthesis of the ICARE and Blended Learning models. The stages of this new learning model offer an introduction, connection, learning resources, collaboration, independence, celebration, and assessment. The development of learning tools follows the systematic steps of the Borg and Gall development model, with to propose QR code applications on smartphones.

1. Introduction
Since entering the 21st century, the world of education in Indonesia has undergone significant changes. These changes occur due to awareness or concern about the dangers of lagging behind the quality of education in Indonesia. Changes in the flow of education in Indonesia are also caused by advances in technology, information, and globalization which are felt to be increasingly strong and open in all lines known as the industrial revolution 4.0.

According to [1], there are four competencies in the 21st century which are the basis for all human beings living in this 21st century. In popular terms, it is now known as 4-C, namely Critical Thinking, Creativity, Communication, and Collaboration. Therefore, everyone is required to develop their potential so that they can compete in the 21st century. The article of [2-3] said that the progress of science and technology had an impact on the world of education. Therefore, the education and learning paradigm also undergoes a shift and transformation. These shifts are (1) focus on developing individual competencies holistically, (2) the learning process can not only occur in the classroom but also in the school environment which is an effective learning resource, (3) the communication model of educators and students must be further improved. interactive and democratic, (4) learning assessment is also not only results-oriented but also process-oriented, and (5) the diversity of student characteristics in learning demands the sensitivity of the attention of educators. This paradigm shift can have implications for the nature of the learning process, learning resources, the role of educators, students, and the learning evaluation system.

In the context of educational technology, according to [4], learning resources muse the component of the learning system that needs attention. One example of developing technology currently is the Quick Response Code or often abbreviated as QR code, which is a two-dimensional barcode.
introduced by the Japanese company Denso Wave in 1994. Intuition emerged, why is QR code not used in the learning process in high school? With the assumption that the QR code is expected to help in the learning process by creating links so that students can connect with supporting materials. The application of the QR code is expected to be used as a connection to the learning resource.

Based on observations of four schools in Medan city, namely: SMA Negeri 1, SMA Negeri 2, SMA Negeri 13, and SMA Negeri 21, it shows that student learning outcomes are still low where the minimum completeness criteria score is still below 75. The low learning outcomes can be seen from several factors:

1. The application of the learning model still tends to lecture and duty;
2. The use of learning media in learning has not been optimal and has not interactive;
3. The teaching materials used by teachers and students are not yet diverse;
4. Teachers have not been able to produce innovation and creativity in themselves learn;
5. Teachers have not used renewable applications on smartphones.

Elenena [5] said that to improve the quality of learning it is necessary to combine face-to-face learning and online learning. The terminology of combining face-to-face learning and online learning is called Blended Learning. The character of Blended Learning according to Sharpen et.al. (2006: 18) is the suitability of selecting learning resources in classroom learning with online learning. In general, the learning model of Blended Learning is in accordance with the cognitive and constructive learning theory and has links with other learning theories. Besides the learning model of Blended Learning, the ICARE learning model is also applied to online learning which was first introduced by [5] at San Diego State University. Some of the advantages of the ICARE learning model are (1) balancing the content structure with theories, (2) having a life skills-based approach, (3) enabling schools to conduct monitoring and evaluation that are open to their teachers, (4) providing opportunities for schools to reformulate their curriculum structure accordingly with the needs and needs of students as well as existing environmental conditions, and (5) providing opportunities for teachers to make perceptions of any learning that will be carried out easily [6].

1.1. Aim of Research

Based on the background described, this study offers a new learning model (novelty) to improve learning outcomes in high school. The new learning model is called a hypercontent based learning model in Senior High Schools. The hypercontent based learning model is thought to improve learning outcomes and provide solutions for online learning in an atmosphere of the 2019 coronavirus disease (COVID-19) pandemic.

2. Literature Review

2.1. Model Pembelajaran ICARE

Hoffman [7] introduced the ICARE learning model at San Diego State University for online learning at that university. Then the ICARE learning model was developed and widely applied in schools. In 2006 the ICARE learning model was introduced in Indonesia through the Decentralized Basic Education (DBE) program. The program also introduces ICARE’s pedagogical framework in teacher training and the learning process in schools. The stages in the ICARE learning model include planning, implementation, and finally evaluation. Figure 1 shows the stages of the ICARE learning model where planning includes introduction and connection, implementation includes application, reflection, and evaluation in the extension section.
Figure 1. The stages in the ICARE learning model in active learning

The explanation of the stages of the ICARE learning model in Figure 2.1 is as follows. 1). First Phase, in the first stage or introduction, the teacher instills an understanding of the content of the lesson to students. This section should contain an explanation of the lesson objectives and the results to be achieved during the lesson; 2). Second Phase, connection at the connecting learning stage, the teacher tries to connect new knowledge with something students already know from previous learning or experiences; 3). Third Phase, application is the most important stage of learning. After students acquire new knowledge or skills through the connection stage, they need to be given the opportunity to practice or apply that knowledge and skills. The application part must last the longest in this learning process because students are required to carry out experimental activities or apply their knowledge in a real-world context, which is certainly different from the application examples that have been carried out in the previous connection stage; 4). Fourth phase, this section is a summary of the lesson, while students have the opportunity to reflect on what they have learned. The teacher's task is to assess the extent of learning success; 5) Fifth phase, extension activities are activities where the teacher provides activities that participants can do after the lesson ends to strengthen and expand learning.

2.2. Learning Model of Blended Learning

According to etymology, a Blended Learning phrase consists of two words, namely Blended and Learning. The meaning of Blend is a process of mixing or combining to improve quality so that it gets better while the meaning of Learning is learning. Literally, it can be interpreted that the phrase Blended Learning is a learning pattern that contains elements of mixing, or combining one pattern with another. Logically the question arises, what do you want to mix together? According to [5], two main elements are mixed, namely learning in class with conventional face-to-face with online learning using information and communication technology infrastructure.
The characteristics of Blended Learning are learning that combines various ways of delivery, educational models, learning styles, and various technology-based media. As a combination of direct education (face-to-face), independent learning via online.

3. Research Methodology
This research is only a literature review to obtain a new model by adopting the ICARE and Blended Learning models as the primary sources. Figure 3 shows the research roadmap that starts from observing the problem. Observations were made in four schools, namely: SMA Negeri 1, SMA Negeri 2, SMA Negeri 13, and SMA Negeri 21. Problem identification was carried out based on observation data in four schools as the research sample. The research sample was selected based on the cluster sampling method. Scheaffer [8-9] stated that the cluster sampling method is a sampling method based on different parts of a population.

![Figure 2. Learning Model Concept of Blended Learning](image)

The search for study material was carried out in a network which then provided a summary of the article. The model design is based on research and development that use three stages, namely: planning, development, and reflection. The development model used was adapted from [10] and [11] models. There are three learning model designs produced in the fifth step. In the sixth stage, focus group discussion (FGD) was carried out involving promoter and co-promoter along with experts in their fields to review and choose a better learning model design. Based on the results of the review, a revision was made to the learning model that had been selected. The final step of the methodology is validation involving experts.
3.1. Feasibility Analysis
Analysis of the feasibility of the learning model using the results of expert validation. The type of data is qualitative data using a Likert scale where the weight of each item is assigned the numbers 1, 2, 3, 4, and 5. The formula from [12] for determining the feasibility of the learning model.

\[
\text{Percentage} = \frac{\sum (\text{The answers from respondents for each item})}{n \times \text{the maximum weight of each item}} \times 100\%
\]

where:
\(\sum\) : The total sum of the answers from respondents for each item
\(n\) : Sum of all items from the questionnaire.

Table 3.1 shows the feasible category of the formula calculation results and is used to show whether the instruments and learning materials need revision or not.

| Percentage of Achievement Level | Categories      | Explanation       |
|---------------------------------|-----------------|-------------------|
| 81% - 100%                      | Very feasible   | No need to revise |
| 61% - 80%                       | Feasible        | No need to revise |
| 41% - 60%                       | Feasible enough | Repaired          |
| 21% - 40%                       | Less Feasible   | Repaired          |
| 0% - 20%                        | Not feasible    | Repaired          |

4. Research Results

4.1. Learning Model of ICLCICA Based on Hypercontent
In general, the Hypercontent-based ICLCICA Learning Model will underlie the Hypercontent-based learning model. This new learning model is adopted from several of the learning models described above, in particular the ICARE learning model and the Blended Learning model. This study offers a state art learning model from a new learning model with the expression of the Hypercontent-based ICLCICA Learning Model in high school. Figure 2.1 is a Hypercontent-Based ICLCICA Learning Model in High School. ICLCICA syntax refers to the steps to be performed in the new model being offered. This new learning model is expected to provide solutions in teaching in the new normal era that needs to adapt to learning and teaching. The schematic in Figure 2.3 shows the reduction in face-to-face stages in the Blended Learning model. Face-to-face meetings may be or not be possible, which will depend on the development of the Coronavirus Disease (COVID-19) pandemic in Indonesia.

This new learning model is more flexible in its application and will follow the policies issued by the Indonesian government that are possible in an emergency. Face-to-face meetings are not held if the state is in a state of emergency due to the COVID-19 pandemic which of course follows Indonesian government policies. Even if a face-to-face meeting is held, the percentage is very minimal, around one or two meetings following the World Health Organization (WHO) standard health protocol. QR Code barcode generation is carried out in an electronic module as a product of this new learning model. The goal is that students get new learning experiences with a lot of content simultaneously. Table 2 shows the stages of a hypercontent-based learning model with the following ICLCICA syntax.
Table 2. Stages of Hypercontent Based ICLCICA Learning Model

| ILCICA syntax | Learning Stages |
|---------------|-----------------|
| Teacher       | Student         |
| **Introduction** | • The teacher embeds learning content by explaining the goals and results to be achieved from learning.  
• The teacher makes apperception by showing slides and giving questions.  
• The teacher provides motivation by displaying physical phenomena and informing the benefits of the concepts to be studied.  

**Connection** | • Connecting new knowledge with previous knowledge.  
• The teacher demonstrates the concept map while providing an explanation  
• The teacher instructs students to carry out activities according to the application example in a hypercontent-based real-world context  

**Learning Resources** | The teacher conveys the use of learning resources from the Web of the Hypercontent Learning Model  
Students understand how to use Learning Resources which include:  
1. Tutorial on Using Hypercontent Learning Model  
2. Module material  
3. Online test  

**Collaboration** | The teacher facilitates students to discuss online (chat forums) and posts comments. Students are expected to understand what the problems are and share roles in the study group. On the web, there is  
Students discuss online. Students must be able to understand what the problems are and share roles in the
also a Question and Answer facility where there may be questions or explanations of material that students may not fully understand. Q and A facilities allow students to ask questions and do not need to meet face to face with the teacher. Likewise, teachers who allow it to be online and provide answers or explanations to provide reinforcement with a choice of time that does not interfere with their activities. Study group. Students use web facilities in the form of Question and Answers which may have questions or explanations of material that students may not fully understand. Q and A facilities allow students to ask questions and do not need to meet face to face with the teacher. Likewise, teachers who allow it to be online and provide answers or explanations in the form of reinforcement at any time as long as it doesn't interfere with their activities.

| Independent | Celebration | Assessment |
|-------------|-------------|------------|
| The teacher instructs students to study independently online using: school books, online Hypercontent modules: material on the web, e-books/digital books, studying examples of interactive link questions using QR Code, doing in-depth tests. Online groups: material on the web, e-books/digital books, related links. | The teacher asks each group to present the assignment given by the teacher. Then the teacher assesses the assignment and assigns a grade. Students celebrate the success of online learning. In the final stage, the teacher provides practice questions and online tests as homework assignments | The teacher provides practice questions and then tests online |
| Students learn independently (individually) online using: school books, online Hypercontent modules: material on the web, e-books/digital books, learn examples of interactive link questions using QR Code barcodes, do in-depth tests. Online groups: material on the web, e-books / digital books, related links | Each group presented the assignment given by the teacher whose answers were recorded by students in the form of videos. The teacher assesses the assignment and students celebrate their success online. | Students do practice questions and online tests |

4.2. Results of Instrument validation

The development model is used as a systematic guide for the steps taken by researchers so that the design product has a standard of feasibility. Borg and Gall [13] describe ten steps for implementing a research and development strategy, namely: 1. Identification of the instructional of goals; 2. Conduct instructional analysis; 3. Analyze of Learners and Contexts; 4. Write performance objectives; 5. Develop assessment instrument; 6. Develop instructional strategy; 7. Develop and select instructional materials; 8. Design and conduct formative evaluation of instruction; 9. Revise instruction; 10. Design and conduct the summative evaluation.

There are five research instruments to measure the suitability of ICLCICA’s hypercontent-based learning model which was developed based on the assessment of design experts, material experts, media experts, teacher responses, and student responses. A brief explanation of the five components of the research instrument is as follows. 1. the expert research instrument of expert learning design used in this study was a questionnaire. This questionnaire is used to obtain data on the feasibility of developing learning models, teaching materials (modules), teacher manuals, student manuals, and learning media in this hypercontent-based learning model. Each statement in the questionnaire represents material criteria. The results of the material experts assessment are used as material for the revision of learning resources before field trials are carried out; 2. the research instrument for material
experts used in this study was a questionnaire. This questionnaire was used to obtain data on the feasibility of developing learning models, teaching materials (modules), teacher manuals, student manuals, and learning media in the hypercontent-based learning model. Each statement in the questionnaire represents material criteria. The results of the material expert's assessment are used as material for the revision of learning resources before field trials are carried out; 3. The research instrument for media experts used in this study was a questionnaire. This questionnaire is used to obtain data on the feasibility of developing learning models, teaching materials (modules), teacher manuals, student manuals, and learning media in the hypercontent-based learning model. The results of the media expert assessment are used to revise learning resources before conducting field trials; 4. This instrument is to determine the benefits of usability and convenience experienced by users; 5. The research instrument for the trial of one-of-one students used in this study was a questionnaire. This questionnaire is used to obtain data about the feasibility of developing electronic module learning media and devices in this Hypercontent-Based Physics Learning Model. Followed by using research instruments for small group trial students used in this study is a questionnaire. Furthermore, using the research instrument for field trial students used in this study was a questionnaire. This questionnaire is used to obtain data about the feasibility of developing electronic module learning media and devices in this hypercontent-based learning model. Each statement in the questionnaire represents material criteria. This research has reached the level of validation by design experts, material experts, and media experts.

In this research, only three instruments were carried out, namely: instrument design expert, material expert, and media expert. The first step is instrument validation to measure the feasibility of the learning model design. Table 2 shows the feasibility of the instrument used to measure the model design involving three experts as previously mentioned.

| Table 3. Instrument Validation Test from Three Experts |
|-------------------------------------------------------|
| No. | Aspect             | Maximum Score | Result Scores | Percentage of Achievement Level | Explanation |
|     |                    |               | Validator Design | Validator Materi | Validator Media |            |
| 1.  | Construction       | 25            | 24              | 25             | 21             | 93.3%       | No revise  |
| 2.  | Language           | 30            | 29              | 30             | 24             | 92.2%       | No revise  |
| 3.  | Material / Content | 25            | 24              | 24             | 20             | 90.7%       | No revise  |

The eligibility results in table 2 were carried out after two revisions were made. After the instrument is suitable for use, validation of the learning model design is carried out using the instrument. Table 3 shows the feasibility of the resulting learning model design after three revisions.

| Table 4. Feasibility of Learning Model Design Development |
|----------------------------------------------------------|
| No. | Expert Name       | Maximum Score | Result Scores | Percentage of Achievement Level | Categories | Explanation |
|     |                    |               |               |                                      |            |
| 1.  | Design Expert 1   | 150           | 143           | 95.33%                                 | V. feasible | No revise   |
| 2.  | Design Expert 2   | 150           | 142           | 94.67%                                 | V. feasible | No revise   |
| 3.  | Material Expert 1 | 110           | 104           | 94.55%                                 | V. feasible | No revise   |
| 4.  | Material Expert 2 | 110           | 105           | 95.45%                                 | V. feasible | No revise   |
| 5.  | Media Expert 1    | 75            | 71            | 94.67%                                 | V. feasible | No revise   |
| 6.  | Media Expert 2    | 75            | 70            | 93.33%                                 | V. feasible | No revise   |

5. Conclusion and Suggestion
Research is a type of research and development by considering the design of the Dick and Carey learning model, while the instructional model development uses Borg and Gall. Based on the research
results, it shows that the design of the hypercontent-based ICLCICA learning model is feasible to be used as an alternative in online learning. This is indicated by the validation of six expert validators, where the instrument to validate the design of the learning model is validated by three validators. The results of the expert validators showed the instrument was feasible to use Further research is suggested to examine the feasibility of a model based on users, namely teachers and students. After the feasibility is carried out, it is necessary to continue a study on the effectiveness of the hypercontent-based ICLICA learning model. The measure of the effectiveness of the ICLCICA learning model uses the learning outcomes of students. To measure the effectiveness, it is necessary to develop learning tools as required in the hypercontent-based ICLCICA learning model.

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