Conference Paper

Implementation of Chinese Folklore Virtual Content Using an Expert System

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Abstract

The COVID-19 pandemic has led to increased use of information technology in all community activities, especially in the field of education. One technology used for learning is the virtual laboratory with online learning media. The use of virtual laboratories in Revolution 4.0 was very effective, especially in the current COVID-19 pandemic. Usually, virtual laboratories do not provide feedback to users, especially on how to develop their skills. This study developed a virtual laboratory with personalized Chinese folklore content using artificial intelligence. The ability and willingness of the user are processed by artificial intelligence to determine the model, media and material that the user wants. When tested, this virtual laboratory's personalization methods obtained an accuracy value of 89.2% according to the users.

Keywords: virtual content, Chinese folklore, expert system

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1. Introduction

The COVID-19 pandemic has led to an increase in the use of information technology in all community activities. This influences the human interaction model. The impact of the pandemic has an impact not only on manufacturing, management, business but also on education [1].

In the field of education, the impact of the COVID-19 pandemic which demands an online learning system is a challenge for educational institutions in Indonesia. For this reason, an effective and efficient Mandarin learning innovation is needed. As in teaching Chinese on the topic of Chinese folklore. This topic is one of the elective courses for 5th-semester students of the Mandarin language education study program [2].

Learning Mandarin is always closely related to culture and literature[3, 4], therefore graduates of the Mandarin language education study program are required to master the basics of Mandarin linguistics, Chinese culture, and literature, and be able to work by utilizing relevant and adaptive scientific insights. That is for the development of

learning mandarin language. So it is suitable for the Vision of the Mandarin Language Study Program in University.

Currently, the State University of Malang Mandarin Education Study Program does not yet have laboratory supporting facilities. This certainly affects the results of the Mandarin learning process. Various learning innovations regarding folklore and virtual laboratories have been widely carried out, but the innovations developed in previous studies were limited to text, videos, and images, without providing interactive and communicative media between users, namely students, lecturers, and native speakers [5].

This learning innovation makes this virtual laboratory can be used specifically for Chinese Language Education students and can be used by all students of the State University of Malang. Virtual Laboratory Integration uses the Expert system, where users, namely students, lecturers, and native speakers, can create models, media, and learning materials as desired. In addition, this innovation can be accessed by lecturers and students anywhere and anytime so it is very suitable if applied to an ongoing pandemic.

2. Method

This study uses the Borg and Gall method, this method is a product development method. The product development method has 10 steps starting from data collection to producing products that have been tested by users [6] - [7]. The stages of this development method are as follows: (1) Literature Study; (2) Initial Product Design; (3) Initial Product Implementation; (4) Product testing; (5) Product Improvement; (6) Testing of products in small groups; (7) Product improvement (8) Operational testing; (9) Product Improvement; and (10) Distribution. The research stages of this method are as shown in Figure 1.

This study uses research tools such as the development research method, namely the questionnaire research instrument. Raise has several questions about the product that will be developed to get input for product improvement. This lift is for the product improvement process with input from material experts, media and Virtual Laboratory learning models, and is also used to get input from virtual laboratory users. The questionnaire model in this study was to use a closed questionnaire system. The closed lift in this study is a questionnaire that provides alternative answers to each question so that the questionnaire chooses the existing answer. The method of calculating the score in this questionnaire is that each answer has a different score. The value of the answer uses a Likert scale. The linker scale has 4 categories of choice.

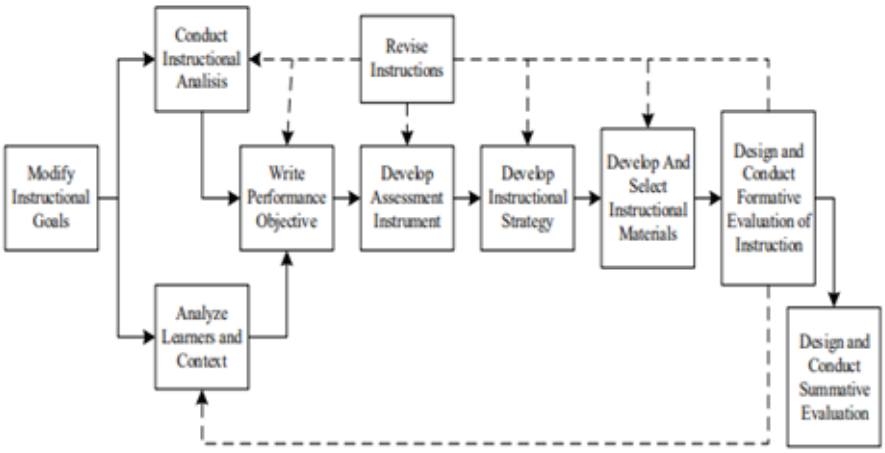

Figure 1: The Method of Development.

The data collection is based on the results of the questionnaire in this study according to the development method, namely the percentage. The percentage of the questionnaire processing is to determine the feasibility of the learning aspects that are assessed based on the results of the questionnaire distribution to experts and product users. The determination of eligibility is based on the percentage of each question item in the questionnaire using Equation 1. [8, 9]

$$P = \frac{\sum x}{\sum x_i} \; x \; 100 \; \%$$

In equation 1, P value is the score, x is the number of respondents in an item, and xi is the ideal total value. Determination of eligibility criteria or not based on the results of the percentage score as shown in Table 1.

TABLE 1: ELIGIBILITY LEVEL CRITERIA

Percentage	Qualification	Information
80 - 100	Valid	No Revision
60 - 79	enough	No Revision
50 - 59	less authentic	Revision
0- 49	not valid	change

The processing of virtual laboratory in this research shown in Figure 2. The contents of this virtual laboratory use basic hanzi learning. This application provides interaction between instructors and students. Instructors on virtual content act as providers of learning material. Students are users, students must be registered in the Virtual Content. Instructors can interact and evaluate online and offline learning.

The workings of virtual content are as follows:

1. The user interacts with a virtual laboratory in which the material contains Chinese folklore.
2. Chinese Folklore content is stored in a database. Some material can be customized.
3. Chinese Folklore that can be customized is included in the virtual content module.
4. Users, students, teachers, or other parties can customize content by utilizing AR technology.
5. Customize results are verified by media experts, models, and hanzi material. If valid content is created using virtual content with AR technology, then the content can be used in a virtual laboratory and tested on users and stored
6. Users use content that is valid and provides feedback on the results of hanzi material that is made by users, students, teachers, or other parties. Figure captions should be centred below the figures, as shown in this example.

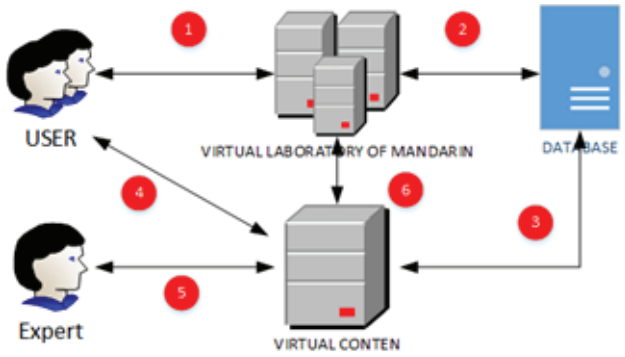

Figure 2: The processing of the virtual content.

3. Results and Discussion

The product is shown in Figure 3. This application consists of 1 folklore modules which can be customized by the user. Before users customize modules and join modules, users conduct pre-tests to verify the understanding of each module in the virtual laboratory [10]. The user accesses the module then customizes the module with virtual content with AR technology. The results of the customized modules are evaluated by media, model, and content experts. The results of this evaluation are tested on users who use the Post Test module in field trials of users.

Animation contain the story explains about a detailed of the implied meanings of the folklore along with the stories and cultural elements of the culture behind the story.

Figure 3: Virtual Folklore Content in Virtual Laboratory

The questionnaire instrument used in the Virtual content for this test uses the instrument testing model for learning, namely Walter Dick and Lou Carey. This questionnaire instrument is integrated in the virtual content product. Filling out questionnaires by instructional media experts, namely lecturers, material experts, namely lecturers, learning model experts, namely lecturers. Meanwhile, registered users or students are given a small group questionnaire and a questionnaire for field trials and the feasibility of virtual content products.

3.1. Experimental Results from Learning Media Experts

TABLE 2: EXPERIMENTAL DATA FROM MEDIA EXPERT

Evaluation	Aspect	Amount Percentage
Effectiveness	8	89
The interests	5	97,5
The efficiency	4	91
Amount	17	92,5

Data validation from media experts was obtained from Virtual Laboratory media which were recorded as lecturers or material providers through a web-mobile questionnaire on the Chinese folklore instructors from 2 instructors. The results of expert of the media learning are shown in Table 2.

The data collection for Table 1 is as follows:

Based on the eligibility level criteria, the results obtained from the instructional media experts were very good with the average results of all aspects of the assessment obtained from the two media experts amounting to 92.5%. The conclusion on testing based on learning media experts is that it is valid and does not need to be revised.

3.2. Experiments Result from Learning Materials Expert

Table 3: EXPERIMENTAL DATA FROM LEARNING MATERIALS

The Evaluation of learning material	Aspect of Assessment	Amount Percentage
Media	10	83,75
Effectiveness	3	91,7
The efficiency	7	93,75
Amount	20	89,71

The next test in this study is testing the material on the virtual content. The material contained in virtual content is basic learning of Chinese folklore [11-12]. Tests are carried out on material experts, namely lecturers in virtual content. The results of material expert testing on virtual content are as shown in Table 3.

The processing of material testing data on virtual content regarding the eligibility criteria is based on table 3 with references in Table 1 as follows: it is very good with an average percentage of 89.71% in all aspects of the assessment of the two material experts. The conclusion on the material expert test is that it is valid and does not need to be revised.

3.3. Experiments on Experimental Learning Model Experts

The next test on expert testing is testing the design and learning model. This test aims to improve and perfect the virtual content learning model developed based on the methods used [13-15]. Testing using a questionnaire on 3 lecturers as learning model experts.

The test results are as shown in Table 4. Data processing of test results in Table 4 with reference to Table 1 for determining the feasibility level. The results of data processing were obtained that the virtual content had met the assessment criteria with an average percentage of 94.3%. The conclusion obtained in this test is that it is valid and does not need to be revised..

Table 4: EXPERIMENTAL DATA FROM LEARNING MODEL EXPERT

Aspect of Assessment	Purpose (%)	Level (%)	Tech (%)	Design (%)
Potency	100	100	100	100
Interests	75	100	100	90
Usefulness	100	100	83.3	94,3

3.4. Field Trials Results

User testing, namely students as virtual content users. Testing is done using a questionnaire instrument. This is a small group test of 10 students. The test results are as shown in Table 4. The questionnaire instrument is contained in virtual content and students must be registered in the virtual content.

TABLE 5: The results of small group

Evaluation	Aspect	Amount Percentage
LMS	13 aspects of assessment	82,3%
Content of LMS	5 aspects of assessment	78,5%
Amount	18 aspects of assessment	80, 2 %

The conclusions from several trials on virtual content above are obtained as follows:

1. Media experts, aspects of media appeal assessment with a percentage of 92.5%, while for media efficiency with a percentage of 91% due to lack of completeness, and learning effectiveness 89%.

2. Material experts, material evaluation aspects with a percentage of 89.71% due to deficiencies in the use of less communicative language, effectiveness aspects with a percentage of 91.7% caused by the feedback process, while the efficiency aspect with a percentage of 93.75% is caused by interests and motivation, there is 3% improvement after repair.

3. Expert model, the attractiveness aspect with a percentage of 94.3% in objectives is due to lack of targets and the efficiency aspect with a percentage of 94.3%.

4. Field Trials, LMS with a value of 80.2% due to lack of tutorials while LMS with a percentage of 82.3% lack of use of images.

The overall results in the form of a percentage in the testing process and data processing in this study are as follows: media expert 92.5, material expert 89.71, learning model expert 94.3, and user testing of 80.4%. The percentage graph for each test is shown in Figure 4. The conclusion of testing and data processing on virtual content obtained an average result of 89.2% so that the virtual content developed is valid and does not need to be revised..

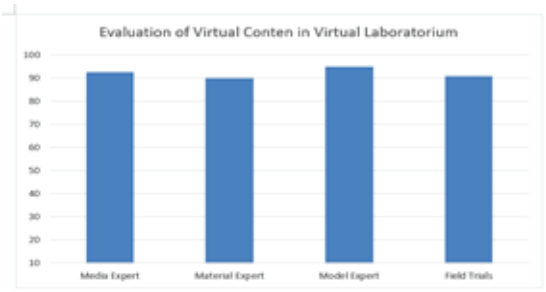

Figure 4: The Results of The Testing

4. Conclusion

This research develops intelligent virtual content based on feedback from all users in the virtual laboratory. Smart virtual content created by all users, including Chinese language lecturers, students and others. The development of virtual content with Chinese Folklore material is validated by experts in the fields of models, media, and learning materials and tested on users. The conclusion of testing and data processing on virtual content obtained an average result of 89.2% so that the virtual content developed is valid and does not need to be revised.

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