

Effectiveness of chain whispering learning method assisted by online chat messaging

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ABSTRACT

The online learning process cannot fully explore the potential of students, mainly due to monotonous learning methods. This makes students less enthusiastic in participating in online learning. Students' learning motivation and achievement become less optimal. This study initiated an alternative online learning method that can be used during the COVID-19 pandemic. This was a research and development (R&D) using ADDIE model with the steps including analysis, design, development, then continued with implementation and ended with evaluation. The learning method developed was the chain whispering method which was carried out online. The developed method was a valid and effective learning method in increasing understanding and motivation.

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1. INTRODUCTION

At the end of 2019, the world was shocked by the COVID-19 virus that quickly spread [1]–[3]. One of the effects of COVID-19 is the issuance of World Health Organization (WHO) instructions regarding changes in human behavior to become cleaner through health protocols and recommendations to avoid crowds [4]–[6]. This affects various lines of life, from trade, industry, to education [7], [8]. The effect of this on the education sector is the transformation of the face-to-face learning process into a distance learning process through an online system [9]–[11].

Facts in the field are known that many online learning findings tend to be in the form of lectures via video conference and independent assignments to students [12], [13]. The online learning process cannot explore the potential of students to the maximum and theoretical learning tends to make students bored so that it is less effective [14], [15]. In addition, some health complaints such as fatigue, headache, or fever are often reported by students when they interact too much with assignments or carry out online learning in front of computer screens or cellphones [16]. This makes students less enthusiastic in participating in online learning. As a result, students' learning motivation becomes less than optimal and learning achievement will not be optimal [16].

Based on the results of previous research, it is known that the spirit of learning is influenced by motivation [17]–[19]. Motivation is the tendency and intention to guide one's behavior to achieve goals [20], [21] with a pervasive tendency to perform tasks successfully [22], [23]. Contextually, motivation can arise from within students which is known as intrinsic motivation [24], [25]. Motivation can also come from outside the learner, such as from the environment or learning conditions, which is known as extrinsic motivation [26], [27]. These two forms of motivation play a role in increasing students' enthusiasm for

learning in learning teaching materials and achieving the desired learning outcomes [28]. Various things can be done to increase students' learning motivation, one of which is the implementation of cooperative learning as found from previous studies [29], [30].

One of the learning methods with the cooperative learning model is chain whispering. The chain whispering method is a learning method that integrates learning in games in the form of delivering messages from one student to another to be active and stimulate verbal interaction [31]. This method has been widely used by educators and is effectively implemented offline, such as the findings of various previous research results [32], [33]. However, so far this method has never been applied to online learning.

Based on the explanation, this study aims to initiate an alternative learning method that can be used in online learning during the COVID-19 pandemic. The learning method developed is the chain whispering method which is carried out online. The developed method is expected to be a valid and effective learning method in increasing student learning motivation.

2. LITERATURE REVIEW

2.1. Motivation

Motivation is an incentive of professional behavior that is beneficial for individual development which is influenced by intrinsic and extrinsic motivation factors [28]. Learning motivation is a three-dimensional phenomenon consisting of a set of individual beliefs about abilities, intentions, goals, and relevant emotional responses needed to perform certain activities [22]. Extrinsic motivation can be a psychological mechanism that points to dynamic actions and supports individual actions to meet social expectations [34]. Extrinsic motivation is about a concrete rewards such as salary and benefits, promotions, service contracts, security, work environment and working conditions which are beyond the individual's control [24]. Intrinsic motivation is a determinant of action involvement that comes from inner interest [34]. Intrinsic motivation is about to unconcreted rewards like opportunities to use one's abilities, acceptance of rewards, achievements and challenges, positive recognition, and being treated in a caring manner [24].

2.2. Cooperative learning model

Cooperative learning model is an arrangement of teaching and learning strategies used to improve student collaboration to combine peer education into student learning [35]. This model is based on the instinct of human cooperation and is described as a method characterized by the cooperation of students in small groups and being rewarded and recognized based on their group performance [36]. Important characteristics of cooperative learning include: i) Resources and roles of students involved and interacting with each other; ii) Interactions between individuals; iii) Individual responsibility; iv) Interpersonal and small group work skills; and v) The process of identifying behaviors that manifest during the development and completion of tasks in groups [37].

2.3. Conventional chain whispering learning method

The chain whispering learning method is a form of cooperative learning based on linguistic games that can improve listening skills and train students' concentration on learning materials [33]. Chain whispering is the delivery of the main ideas of the material in a truncated manner [38]. Chain whispering method can improve interpersonal intelligence which is described as the ability to understand the behavior and thoughts of others [39].

The benefits of chain whispering are increasing the spirit of healthy competition, encouraging student involvement, and motivating learning through working together in a team [31]. With the chain whispering method, students will be involved in the message transfer process so that they will be more active in the learning process [38]. The basic syntax of the conventional chain whispering method implemented offline [33], [39], [40] is as: i) Students are divided into several groups; ii) Each group is lined up in rows; iii) The teacher whispers a sentence or several messages to the front group member; iv) The group member in the front transmits what he has heard to the next group member in a whisper; v) Sentences or messages continue to be conveyed in a whisper to the last member of the group; vi) The last group member mentions the information obtained aloud.; vii) The game is continued until all groups have a share, or if possible, the process is run at the same time on all groups; and viii) The teacher gives feedback.

2.4. Previous research

Hung's research stems from the lack of research related to cooperative learning in Vietnamese higher education [35]. This study determined the positive impact of cooperative learning as a pedagogical practice in teaching English as a foreign language and its challenges [35]. The findings of this study indicate that: i) The most common benefits of cooperative learning are group work skills, problem solving skills, and

communication and ii) Students with high motivation have academic results and self-confidence in foreign languages than their low-motivated peers [35].

Susilawati and Supriyatno's research originated from the COVID-19 pandemic which encouraged online learning [41]. This study described the online learning process during the COVID-19 pandemic using WhatsApp media [41]. The results showed an increase in student motivation while using online learning through WhatsApp [41].

Mukarrama's research originated from the difficulty of listening material in English subjects [32]. The study is to explained the improvement of students' listening skills by using the Chain Whispering Technique and students' attitudes towards using the technique [32]. The results showed that the Chain Whispering Technique can improve students' listening skills with the importance of: i) The technique can improve students' listening skills; ii) The technique can improve students' ability to pronounce English words; and iii) The technique is easy to apply [32].

Handayani and Huda's research stems from the low grades of Arabic lessons due to the lack of teacher creativity in teaching and the methods used by teachers the majority are conventional methods [33]. The tested the effectiveness of the chain whispering method and the measured differences in the achievement of Maharah Istimah and kalam between the experimental class and the control class [33]. The results showed that the chain whisper method could effectively increase students' Maharah Istimah and kalam [33].

3. RESEARCH METHOD

3.1. Research design

This article is a research and development (R&D) using ADDIE model with steps including analysis, design, development, then continued with implementation and ended with evaluation [42], [43]. The delineation of these steps can be seen in Figure 1.

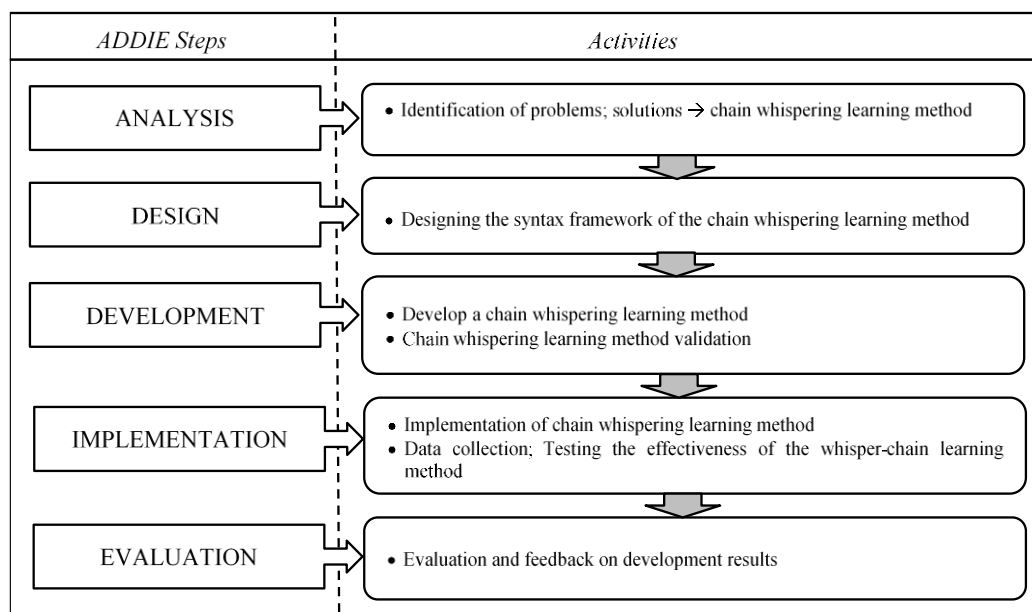


Figure 1. ADDIE research and development flow

3.2. Population and sample

This research was conducted on 162 student population of Informatics Engineering National Institute of Technology Malang, Malang, Indonesia which enrolled in the Multimedia System course. The minimum research sample measured based on the Taro Yamane formula [44], [45]:

$$n = \frac{N}{Nd^2+1} = \frac{162}{162 \times 0,05^2+1} = 115,302 \approx 115$$

It is known that based on the formula, the minimum sample is 115 students, and the returned questionnaire data is 150 students.

3.3. Research instruments

The instruments of this study were test sheets and a closed questionnaire. The test sheet was used to measure the level of students' understanding of learning outcomes. Student motivation was measured by closed questionnaire with a 4-Likert scales, including very bad or very inappropriate, bad or unworthy, good or worthy, and very good or very decent accordingly [46].

3.4. Data collection

This article used questionnaires and test as data collection techniques. Questionnaires are developed in two stages: i) Development, namely in the validation process to be able to determine the feasibility of the developed method and ii) implementation, which is to measure the level of learning motivation of respondents. The questionnaire framework used at the validation stage refers to aspects that must be considered in the development of the learning model including syntax, social system, principles of reaction; support system, and instructional and nurturant effect [47]. The questionnaire framework used in the measurement of motivation includes motivated behaviors, sociocultural factors, motivated behaviors, and classroom environmental factors [48]. At the implementation stage, the test is used to measure the level of students' understanding of learning outcomes using the developed method.

3.5. Data analysis

At the implementation stage, the test is used to quantify the effectiveness of the developed chain whisper method. The effectiveness of the whisper chain method was quantified using a posttest-only control group on the research sample which was divided into two groups, namely: i) Control group, with learning using conventional online teaching methods and ii) Experimental group, with learning using the chain whisper method. The data was analyzed using independent sample t-test in 5% significance using IBM SPSS Statistics 25. If significance value is less than 5%, it is concluded that there is a significant effect between the use of the chain whisper method on students' understanding and learning motivation [49].

4. RESULTS AND DISCUSSION

4.1. Step 1: Analysis

At the analysis stage, problem identification showed that students of online Multimedia Systems courses tended to hard to understand the learning materials. This is partly due to the monotonous teaching materials and learning methods. During the COVID-19 pandemic, students tend to study independently or listen to lectures from lecturers via Zoom or Google Meet. As a result, students become less enthusiastic and less motivated to learn the learning material. The solution offered from these problems is the development of alternative learning methods that can be used during the COVID-19 pandemic in the form of the chain whisper method which is carried out online. The method developed in this Multimedia System course is expected valid and effective.

4.2. Step 2: Design

The design of the chain whispering learning method developed is derived from the conventional chain whispering syntax. The chain whispering method designed will be implemented by using online chat messaging such as WhatsApp chat. The resulting chain whispering method syntax design is as: i) The lecturer creates a chat group containing all students. This group is known as the main group; ii) Students are divided into several groups. Each group is collected in a chat group and the lecturer gives a secret word that must be discussed in the group; iii) The group gets a partner to play in a series of whispers. One member of the group whispers an explanation of the secret word to members of the opposing group through a voice note. Voice notes can only be played once; iv) The first group member whispers what he has heard to the next group member through a voice note; v) Sentences or messages continue to be conveyed through voice notes to the last group member; vi) The last group member typed the information obtained by typing a sentence or message that was heard in the main group; vii) The game is continued until all groups have a share, or if possible, the process is run at the same time on all groups; and viii) Lecturers give feedback. Students are required to make a report on the implementation of the lesson at the end of the lesson.

4.3. Step 3: Development

The resulting chain whispering method syntax was developed specifically for the Multimedia Systems course on the topic of Audio and Image-Based Media. The final products of this method design are: i) The syntax of the serial whisper method assisted by online chat messaging and ii) Lesson plans and learning supporting documents. The syntax of the chain whispering method assisted by online chat messaging that has been adapted for the Multimedia System course is as: i) The lecturer creates a WhatsApp group with the name "SisMulmed Room" which contains students who take Multimedia Systems courses; ii)

Students are divided into 13 groups. Each group is collected in a group chat and the lecturer gives a secret word that must be discussed in the group for 15 minutes. The secret words provided are (Digital picture, Pixel, Grayscale level, Spatial resolution, Color encoding, Bitmap, Vector, Sound wave, Wave period, Sound amplitude, Sound frequency, Analog to digital conversion, Digital to analog conversion) The results of the discussion are sent to the lecturer via WhatsApp chat; iii) The group gets an opponent to play in a series of whispers. One member of the group whispers an explanation of the secret word to members of the opposing group through a voice note. Voice notes can only be played once; iv) The first group member whispers what he/she has heard to the next group member through a voice note; v) Sentences or messages continue to be conveyed through voice notes to the last group member; vi) The last group member typed the information obtained by typing a sentence or message that was heard in the "SisMulmed Room"; vii) The process is run at the same time on all groups; and viii) Lecturers give feedback. At the end of the lesson, students should make a report on the implementation of the lesson.

Validation is conducted to establish the validity of the product design method with expert validation rules. The feedback of the validation results is in the form of revision of the method design if there are suggestions for improvement as an improvement in the chain whispering assisted by online chat messaging. The pilot test was carried out to determine the feasibility of the serial whisper method assisted by online chat messaging with students of the Informatics Engineering study program as respondent. The pilot test design used was a field trial in small groups [42]. The revision of the method design was carried out to improve the chain whispering assisted by online chat messaging as follow up from the pilot test questionnaire. The results of filling out the validation questionnaire from each expert and pilot test are shown in Table 1 and Table 2.

Table 1. Learning model validation results

No.	Aspect	Mean score	
		Expert validation	Pilot test
1.	Syntax	3.75	3.14
2.	Social system	3.60	3.44
3.	Principles of reaction	3.63	3.13
4.	Support system	3.63	3.59
5.	Instructional and nurturant effect	3.71	3.45
	Average	3.66	3.35

Table 2. Lesson plan validation results

No.	Aspect	Mean score expert validation
1.	Clarity of course identity	3.75
2.	Learning achievement	3.50
3.	Learning objectives	3.50
4.	Material	3.83
5.	Learning scenario	3.88
6.	Evaluation	3.75
	Average	3.70

Table 1 and Table 2 illustrate the mean of expert validation results in the range of 3.01 to 4.00 which indicates that the resulting method design is very feasible or very good. This result is in line with the results of the small group trial which resulted in a mean of 3.35. From these results it can be said that the method designed can be said to be very feasible and very good. Although the overall design of this method is declared to be very valid, improvements still need to be made to produce a better method design. Some of the revisions made included general revisions based on the findings obtained during the development of learning media products. General revisions made include addition of learning outcomes derived from learning outcomes of study program graduates and improvement of performance assessment rubrics.

4.4. Step 4: Implementation

The fourth phase is marked by the implementation of the learning method design into classroom learning. This stage involves students' activities who enrolled in Multimedia System course. Screenshot of the implementation of learning using the chain whispering method assisted by online chat messaging is shown in Figure 2.

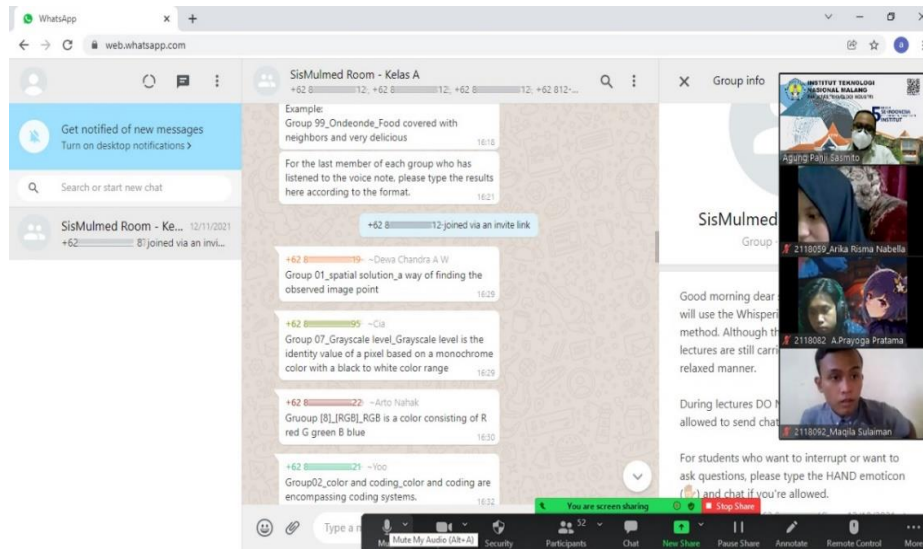


Figure 2. Implementation of chain whispering method

Data collection was performed by conducting student understanding tests using the design of learning methods. The data was used to test the effectiveness of the method design and compared with groups using conventional learning methods, namely lectures and video conferences. There were 150 students were involved in this stage, with 74 students with conventional online learning methods (in the control group) and 76 students with the design of the chain whispering method assisted by online chat messaging (in the experimental group). The test used is a test of students' understanding after being taught by using the chain whispering method design assisted by online chat messaging, then independent sample t-test is performed to each group test results. There are two hypotheses that can be formulated, including: Hypothesis testing of differences in student mastery of understanding and Hypothesis testing of differences in student motivation. The formulation of the hypotheses are:

H_{01} : $\mu_{\text{scoreconventional}} = \mu_{\text{scorechainwhispering}}$

There is no significant difference between the mastery of understanding of students who are taught using conventional methods and mastery of understanding of students who are taught using the design of the chain whispering method assisted by online chat messaging.

H_{a1} : $\mu_{\text{scoreconventional}} \neq \mu_{\text{scorechainwhispering}}$

There is a significant difference between the mastery of understanding of students who are taught using conventional methods and mastery of understanding of students who are taught using the design of the chain whispering method assisted by online chat messaging.

The formulation of the second hypothesis is as:

H_{02} : $\mu_{\text{motivationconventional}} = \mu_{\text{motivationchainwhispering}}$

There is no significant difference between the student's motivation who are taught using conventional methods and students' motivation who are taught using the design of the chain whispering method assisted by online chat messaging.

H_{a2} : $\mu_{\text{motivationconventional}} \neq \mu_{\text{motivationchainwhispering}}$

There is a significant difference between the student's motivation who are taught using conventional methods and students' motivation who are taught using the design of the chain whispering method assisted by online chat messaging.

The summary of the results of the t-test on students' understanding scores using IBM SPSS Statistics 25 is shown in Table 3. The table shows the t value of 4.106 and sig value on the t-test of 0.000. This shows that there is a significant difference between the mastery of understanding of students who are taught using conventional methods and mastery of understanding of students who are taught using the design of the chain whispering method assisted by online chat messaging, with the average value of understanding of students who use the chain whispering learning method assisted by online chat messaging (81.18) is higher than the average value of student understanding using conventional methods (73.96). This means that the use of the chain whispering method assisted by online chat messaging has a significant effect on student understanding.

Table 3. Summary of t-test results for differences testing in understanding

No.	Group	Sample size	Mean	Standard deviation	t-test for equality of means		
					t	df	sig
1.	Experimental group (chain whispering)	76	81.18	11.478	4.106	148	0.000
2.	Control group (conventional)	74	73.96	9.998			

A summary of the results of the t-test on student motivation using IBM SPSS Statistics 25 is shown in Table 4. The table shows the t value of 2.598 and sig value on the t-test of 0.010. This shows that there is a significant difference between the students' motivation who are taught using conventional methods and the students' motivation who are taught using the design of the chain whispering method assisted by online chat messaging, with the average value of understanding of students who use the chain whispering learning method assisted by online chat messaging (87.03) is higher than the average value of student understanding using conventional methods (83.07). This means that the use of the chain whispering method assisted by online chat messaging has a significant effect on student motivation. The results in Table 3 and Table 4 are in accordance with several previous research results which state that the use of cooperative methods can improve students' understanding [50]–[53] or motivation [29], [30], [54], [55].

Table 4. Summary of t-test results for differences testing in motivation

No.	Group	Sample size	Mean	Standard deviation	t-test for Equality of Means		
					t	df	sig
1.	Experimental group (chain whispering)	76	87.03	10.415	2.598	148	0.010
2.	Control group (conventional)	74	83.07	8.069			

4.5. Step 5: Evaluation

The previous stages showed that the design of the chain whispering learning method assisted by online chat messaging has been successfully developed with eight main syntaxes. The developed method can be applied in online learning based on its validity and effectiveness. T-test showed differences in students' understanding and motivation, with the difference in the average understanding of students using the chain whispering learning method assisted by online chat messaging with those using the conventional method of 7.22 and the difference in the average motivation of students using the chain whispering learning method assisted by online chat messaging with the conventional method is 3.96. This is because this research only focuses on developing learning methods from instructional analysis of Multimedia Systems courses. This study only considers aspects of motivation and increasing student understanding, while other aspects such as locus of control, metacognition, and self-efficacy have not been considered. Previous research showed the same result that all these aspects also have a positive effect on student understanding [27], [56]–[61] and on student motivation [62]–[67]. Therefore, the development of further learning methods can pay attention to these aspects.

5. CONCLUSION

The design of the method that has been developed has evident to be a very decent learning method. This is evidenced by the validity and effectiveness of the method in increasing students' motivation and understanding of the Multimedia System material. The existence of student interactivity and fun activities can increase student motivation in studying Multimedia System material. The result showed there is a significant difference between both of student's mastery of understanding and motivation who are taught using conventional methods and the ones who are taught using the design of the chain whispering method assisted by online chat messaging. In other words, the chain whispering method can improve students' understanding and motivation. In addition, the chain whispering learning method assisted by online chat messaging can be easily applied in online learning.

The limitation of this study is that the practice of the test is finite to two classes with a narrowed number of students and it only centered on the results of the instructional analysis of Multimedia System material. Therefore, further research can be carried out on a wider subject. Besides that, the results of Evaluation stage showed a positive role of locus of control, metacognition, and self-efficacy in online learning, especially in terms of students' understanding and motivation. Hence, further research toward development of online learning method should pay attention to these aspects.

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