

Contextual Based E-learning (CBE): A New Model for Online Teaching in Public Health Department for Learning During the Covid-19 Pandemic

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Reno Renaldi¹(✉), Aldiga Rienarti Abidin¹, Yuda Irawan¹,
Abdurrahman Hamid¹, Rizky Ema Wulansari²
¹Universitas Hang Tuah Pekanbaru, Pekanbaru, Indonesia
²Universitas Negeri Padang, Padang, Indonesia
renorenaldi03@htp.ac.id

Abstract—In order to support physical distancing activities in the teaching and learning process during the Covid-19 pandemic, an appropriate and effective learning model to fit the learning objectives must be developed. The CBE (Contextual Based on E-learning) learning model, developed from the Contextual Teaching Learning (CTL) model, was integrated with e-learning. This CTL learning model was chosen because this model is an innovative learning model where the process can assist students to connect learning with the context of their lives. This study aims to describe the model's effectiveness which was measured based on three aspects, namely: a) significant difference between students' achievement in CBE model compared to that in traditional model; b) The effectiveness of CBE syntax in learning; c) Students' perception on the new CBE model. This study is quantitative research with quasi experimental method. The results of the CBE model showed that the CBE model is significantly effective in improving students' abilities. Therefore, it can be concluded that the CBE model is proven to be effective to be implemented as new teaching model in online learning. The implication of this research is to contribute to new existing knowledge for education, and computer science and to add references to new online-based models. The limitation of this research is the effectiveness of this model described the cognitive knowledge through students' learning outcomes.

Keywords—contextual learning, online learning, public health

1 Introduction

Education is the key to human resource development and the core to the nation's future whether to be a great, civilized, intelligent and ready-to-adapt nation to changing times, or otherwise to be a giant country immersed in its own problem [1]. Without education, a country will lose in global competition, cannot have a proper development, and even cannot attract randomized various short-term interests, both from within and outside the country [2].

Regarding quality, the quality of teaching staff, the education curriculum, the quality of learning and teaching must be improved to the level of national education competitiveness [3][4]. There are a lot of homeworks to do in improving the quality of education, especially during the Covid-2019 pandemic. A number of critical problems must also be addressed immediately as they concern the continuity and quality of education of students and the welfare of both students and teachers [5][6][15].

The impact of the corona virus outbreak has also been felt by the world, especially the world of education, scientific education organizations, and The United Nation Educational, Scientific and Cultural Organization (UNESCO). According to UNESCO, nearly 300 million students around the world have been affected by their learning loss and school activities and are threatened with their future educational rights. In an effort to reduce the spread of the COVID-19 pandemic [16][17], the Indonesian government decided to close all schools by March 2020. As such, schools and teachers are rapidly and abruptly adapting to what can only be described as an unprecedented educational emergency response [18][19].

This situation raises a number of challenges, the most critical of which is the imbalance of access to electronic means like electronic devices and internet access to ensure adequate online teaching for all children and adolescents alike. Internationally, it is possible to identify contributions and recommendations to support teachers and schools in implementing distance teaching [7]. This is carried out in order to support physical distancing measures enforced around the world during the pandemic.

Regarding to this problem, in order to support physical distancing activities in the teaching and learning process during the Covid-19 pandemic, it is necessary to have an appropriate and proper learning model to effectively achieve learning objectives. The CBE (Contextual Based on E-learning) learning model was later developed. This model was developed from the Contextual Teaching Learning (CTL) model which was integrated with e-learning. This CTL learning model was selected because this CTL model is an innovative learning model as the process can assist students to connect learning with the context of their lives [8].

Hudson (2011) also adds “CTL is characterized as a way to induce content using a variety of active learning techniques, designs to help students conduct what they already know to what they are expected to learn and to construct new knowledge from the analysis and synthesis of this learning process”. To summarize, CTL is a platform for active learning that strives to assist students in connecting their prior information with new knowledge so that they can get new knowledge from the analysis process while learning. CTL is an active learning approach in which students not only acquire information but actively manage it by applying it to real-life situations to develop new knowledge.

CTL will undoubtedly be a strategy and a method for improving the learning process in the health policy analysis course, allowing students’ abilities to improve from previous levels. Nasrun (2004) conducted previous study at the State University of Medan, where the CTL learning model was adopted with the goal of strengthening the critical thinking skills of guidance and counseling students. According to the findings, the CTL learning approach was able to improve students’ critical thinking skills by 98 percent. The usefulness of the CTL learning model on student accomplishment in entrepreneurship education at the university level was investigated by Lotulung, Ibrahim,

and Tumurung (2018). The capacity of students in the midwifery of entrepreneurship increases, as evidenced by their understanding, application of principles, and ability to solve a problem, according to this study. As a result, the findings of the study suggest that the CTL model can assist students improve their critical thinking skills and aid them in the learning process, both in terms of grasping concepts and finding solutions to problems they confront.

The availability of video in e-learning learning allows students to immediately witness how the learning process takes place, which can aid students' grasp of the subject delivered. If the learning process is linked or related to the real world of students in their lives, such as through the CTL approach [9], understanding will be considered ideal and have favorable values.

2 Related works

CTL will undoubtedly be a strategy and a method for improving the learning process in the health policy analysis course, allowing students' abilities to improve from previous levels. Nasrun [10] implemented the CTL learning model in a previous study to help guidance and counseling students at the State University of Medan improve their critical thinking abilities. The result shows that the CTL learning paradigm improved students' critical thinking skills by up to 98 percent.

Furthermore, CTL learning model research is conducted not only at the university level, but also at the senior high school (SMA) and junior high school (SMP) levels. Piowant to (2015) did the first study in Bangkok, Thailand, at one of the high schools. The goal of this study was to see how effective the CTL learning paradigm is in Statistics classes. The study's findings show that the CTL model can improve high school students' aptitude in statistical topics, as seen by increased cognitive, emotional, and psychomotor scores. Fadilah's research (2017) looked at the efficiency of the CTL learning paradigm in high school chemistry learning process in collaboration with mind-mapping media. In comparison to students taught using traditional learning models, the CTL learning model using mind-mapping media was shown to improve student achievement in chemistry learning.

Surdin [11] conducted research on the impact of the CTL learning model on student achievement in university-level entrepreneurial instruction. This study shows the capacity of students in entrepreneurship midwives improves as seen from their understanding, application of principles, and ability to solve a problem. As a result, the findings of the aforementioned study suggest that the CTL model can assist students in the learning process by facilitating them in both grasping a concept and finding a solution to a problem they are facing.

Contextual Teaching and Learning in a conception of teaching and learning helps teachers relate the content of subject matter to real world situations. In other words, CTL is defined as an innovative learning concept where the process can help students relate learning to the context of their lives. Based on the results of the research mentioned above, the CTL learning model can therefore be implemented at all levels of education and the results of this study also prove that CTL learning model can improve students' understanding and achievement in a learning process.

3 Methodology

3.1 Research type and procedures

This research section is a quantitative study with a quasi-experimental method in Figure 1, to be conducted for 12 weeks. The students were divided into two groups, on the first week, both groups will take the pretest. On the second week until the eleventh week, both groups went through different treatments. Group A was given learning treatment using CBE model, while Group B was given learning treatment using conventional method.

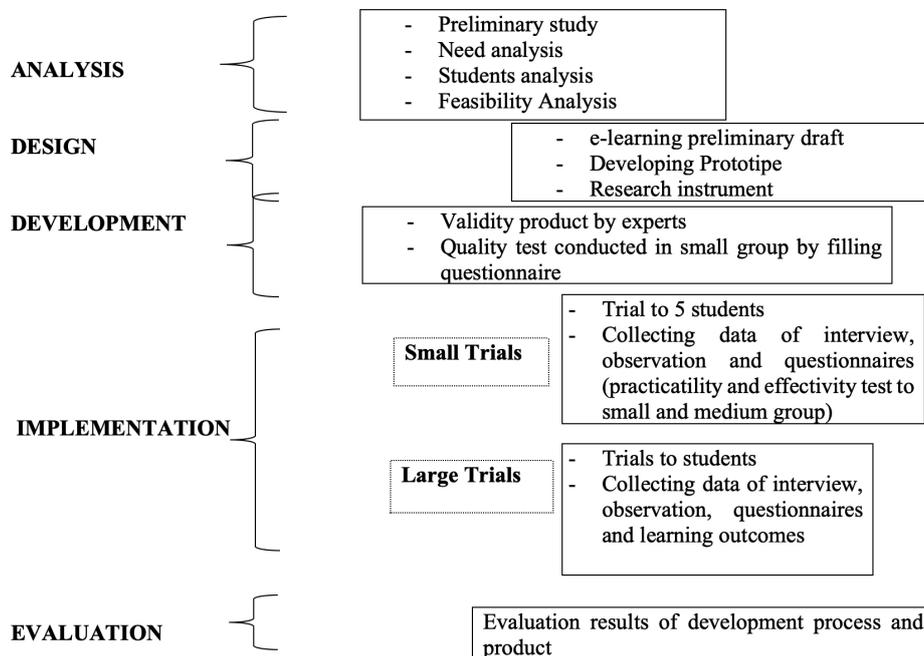


Fig. 1. Research methodology

3.2 Research questions

The research questions intended was to measure the effectiveness of the new CBE model in Public Health Department. The model's effectiveness was measured relating to three aspects [12], namely:

Research Question 1. The significant difference between students' achievement in CBE compared to traditional or conventional model?

Research Question 2. The effectiveness of CBE syntax in learning.

Research Question 3. Students' perception of the new CBE model.

1. Sample

The subjects of this study were Public Health students who were divided into two groups, namely group A and group B. Group A used the CBE model while group B used the conventional model [13].

2. Instrument

Tests were used as the study instrument. The test was used to collect data on the effectiveness of the new CBE model and to see how the group taking the CBE model differed from those that did not [14]. The test was created using the study materials and included higher-order thinking skills. There are 30 questions in the test, after validity, 27 questions were valid. The test’s reliability was evaluated using the KR-21 algorithm. The test’s reliability score was 0,7, which is in very high standard criteria.

3. Data analysis technique

In this study, two data analysis methodologies were applied. To compare the learning outcomes of groups A and B and to assess the effectiveness of the CBE Model, an independent sample t-test was utilized. The mean score of group A and B learning outcomes was described using statistical descriptive methods.

4 Results and discussion

The treatment used in this research is the new learning model called CBE. The CBE learning model is a learning model developed based on the Contextual Teaching and Learning model [8], in which the syntax of the CBE learning model is still correlate to the components contained in the CTL learning model, The syntax of the CBE learning model can be seen in Figure 2 below.

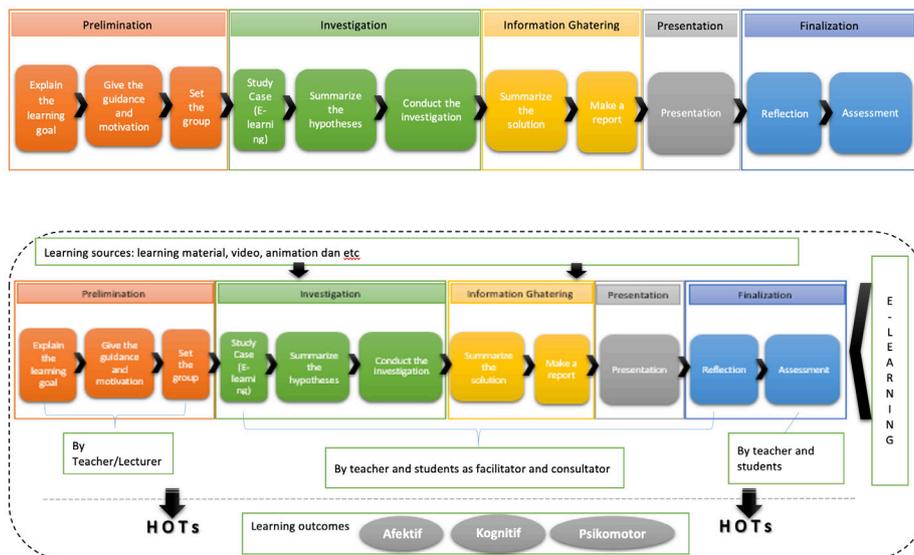


Fig. 2. CBE model

4.1 Prelamination

The first syntax, called prelamination, is the first step educators do when they begin teaching. This prelamination consists of: a) Explaining the learning aim; at this stage, educators articulate the learning objectives so that students understand what they are learning. b) Providing guidance and motivation, educators also provide guidance to students on the learning to be done, explain what to do in the learning, and provide motivation to students before they begin learning, because students must build knowledge through their experiences when using the CBE learning model. c) Setting the group, meaning that educators also distribute students into groups, with students evenly divided in each group, including mixing both smart and less bright students. Thus, the students can communicate their key ideas, discuss and exchange ideas, and ultimately create a comprehension of new knowledge through group learning.

4.2 Investigation

The second syntax in this CBE learning model was investigation, the activities carried out on this investigation syntax were: a) Studying cases based on E-learning. Educators present study cases to students linked to the learning that is taking place at this stage, and the study cases must be based on real-world problems. Educators will supply these study cases through an e-learning application, in which they will present difficult study examples together with videos, animations, and other learning resources. b) Making a summary of the hypotheses Students can now begin the investigation phase, which entails compiling a hypothesis based on the study examples provided, making further observations, and building theories and concepts based on evidence and knowledge. c) Carrying out the investigation. Students gather material relating to the study cases that have been assigned, and they also build their understanding through fresh experiences based on their prior knowledge and beliefs at this level. Students must apply FIAP (Fact Identification & Action Plan) principles at this level of the research. Students must assess the facts contained in the problem and collect what information needed to be learned and what students require for the investigation during the fact identification step. The action plan requires students to construct a list of activities they will carry out during the inquiry process based on the fact identification they have completed. These FIAP rules are used to avoid students being confused while beginning investigations and to make it easier for students to conduct investigations systematically and effectively.

4.3 Information gathering

The third syntax of the CBE learning model is information gathering, activities on information gathering consist of: a) Summarizing the solution. Students summarize their findings from the investigative process at this point. b) Write a report about your findings. Students write reports regarding solutions discovered through investigation at this stage, in which they express their ideas, opinions, and knowledge clearly.

4.4 Presentation

The fourth syntax of the CBE learning model is presentation. at this stage, students present a report on the solutions they have found at this stage, students learn how to ask questions about phenomena, to arrange questions that can be tested and to ask each other about evidence, interpretation and explanation. These questions can be used by educators to encourage, guide and assess the students’ thinking skills.

4.5 Finalization

The fifth syntax of the CBE learning model is finalization, the activities carried out in this finalization are: a) Reflection. At this point, the educator pauses to reflect at the completion of the lesson. Students express their opinions and comments about today’s learning, debates, and work results at this level. b) Assessment. An authentic assessment is carried out at this level, which includes a performance appraisal, a creative aspect assessment, a collaboration abilities assessment, a craft or a personal assessment.

The score for the course “Policy Analysis” was produced to analyze the differences between students’ achievements in both forms (Conventional and CBE). In order to see if these differences are statistically significant, an Independent Samples T-test ($\alpha = 0.05$) was used.

One of the basic assumptions that must be met before performing a parametric statistical test is the normality test. This test is used to see whether the data collected were distributed spread out following a normal distribution or not. The normality of the data can be seen in the Table below.

Table 1. Normality test of control group

		Value
N		36
Normal Parameters	Mean	68.08
	St. Deviation	13.586
Most Extreme Differences	Absolute	.086
	Positive	.086
	Negative	-.084
Kolmogorov-Smirnov Z		.515
Asymp. Sig. (2-tailed)		.954

Table 1 shows the normality using the Kolmogorov-Smirnov Test of control group, the KSZ value was 0.515 ($p\text{-value} = 0.954$) is greater than 0.05. Because of $p\text{-value}$ is greater than 0.05, the decision is that the data is normally distributed. This means that the data normality assumption is fulfilled. The normality test of experimental group can be seen in Table 2 below.

Table 2. Normality test of control group

		Value
N		36
Normal Parameters	Mean	80.17
	Std. Deviation	12.211
Most Extreme Differences	Absolute	.143
	Positive	.072
	Negative	-.143
Kolmogorov-Smirnov Z		.858
Asymp. Sig. (2-tailed)		.453

Table 2 shows the normality using the Kolmogorov-Smirnov Test of experimental group, the KSZ value was 0.858 (p-value = 0.453) is greater than 0.05. Because of p-value is greater than 0.05, the decision is that the data is normally distributed. This means the data normality assumption is fulfilled.

In addition to the normality test, the homogeneity test was also carried out in the independent sample T-test requirements. The homogeneity test is a test conducted to determine that two or more groups of sample data from populations with the same variants (homogeneous).

Table 3. Levene test of homogeneity

Levene Statistic	df1	df2	Sig.
.011	1	70	.919

Table 3 shows that the homogeneity using the Levene Test of sample both control group and experimental group, the Levene value was 0.011 (p-value = 0.919) which is greater than 0.05. Because p-value is greater than 0.05, it is concluded that the data is homogeneous.

Table 4. Posttest mean score of control and experimental group

	Group	N	Mean	Std. Deviation	Std. Error Mean
Value	Control	36	70.08	13.586	2.264
	Experimental	36	80.17	12.211	2.035

The Table 4 above shows that the two groups each had 36 samples. The post test of both groups, the control group and the experimental group showed that the experimental group had a higher mean score than the control group (control group = 70.08, experimental group = 80.17). Therefore, it is concluded that students using CBE model achieve the higher learning outcomes than do the students using conventional model.

Table 5. Pretest mean score of control and experimental group

	Group	N	Mean	Std. Deviation	Std. Error Mean
Value	Control	36	64.78	15.063	3.550
	Experiment	36	65.50	15.016	3.832

The Table 5 above shows that the two groups each had 36 samples. In the pretest of both groups, the control group and the experimental group showed same mean score (control group = 64.78, experimental group = 65.50). This means that the both of group have the same initial ability.

Table 6. Independent sample t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Value	Equal variances assumed	.382	.541	-2.095	34	.004	-8.444	4.030	-16.635	-.254
	Equal variances not assumed			-2.095	33.588	.004	-8.444	4.030	-16.639	-.250

Relating to the Table 6, there was significant difference between students used conventional and CBE model (T-test, p-value = 0,04). It means that there was a significant difference between the control and experimental groups. Based on the descriptive value, it is evident that the experimental group using the CBE model scored higher than did the control group using the conventional model.

Furthermore, the effectiveness of this CBE model can be seen from the results of students which can be seen in Table 7 below.

Table 7. The results of students' test

Group	Meeting			
	1	2	3	4
Control	63,5	66,8	74,4	77,1
Experimental	72,9	75,7	85,1	86,2

The effectiveness of the CBE learning model in terms of improving student learning outcomes. According to Table 7 above, students who utilized the CBE model had higher post-test scores than those who did not use the CBE model. Furthermore, more than

85% of students have achieved the traditional level of achievement. At each meeting, the students' learning outcomes increase. As a result, the CBE learning paradigm can be said to be effective in enhancing student learning outcomes.

CBE model was designed for students' online learning, it is one of various way developed by educational institution to face the challenge in teaching and learning process during the Covid-19 pandemic. The results of this study showed that CBE model was effective to increase students' cognitive knowledge. This research was supported by Jonson [8] and Surdin [11], who declared that contextual learning combining with e-learning platform can be effective in increasing students' cognitive knowledge.

Because students' attention may be diverted from studying content, the CBE model can help create a structured environment. In the CBE model platform, there is structured learning material as well as a video tutorial. CBE, which combines CTL with e-learning, is a powerful strategy for focusing students' attention and motivation [12][13].

Based on students' and instructors' perceptions, the CBE approach has the following instructional impact for pupils: Students are expected to learn by 'experiencing' experiences by building/constructing knowledge and applying it to real-world situations, learning can be done regardless of time or space, and students are expected to learn by 'experiencing' experiences by building/constructing knowledge and applying it to real-world situations [20]. This learning model can stimulate the development and expansion of students, the learning process over time (long life learning), as students can be motivated to understand learning material and relate it to the context of everyday life, this learning model emphasizes that learning is not just memorizing but it needs understanding [21]. Moreover, this learning model can emphasize the development of students' interest in experiences, because there are opportunities for collaboration and interaction among students.

5 Conclusion

The Contextual Based on E-learning (CBE) learning paradigm was derived from the Contextual Teaching Learning (CTL) model integrated with e-learning. This CTL learning style was selected because it is an innovative learning paradigm that allows students to integrate their learning to their everyday life. In order to anticipate the pandemic COVID-19, the CBE model is a novel approach for online learning in public health. According to the findings of the CBE model experiment, the CBE model is proven to be effective in improving students' abilities.

The implication of this research is to contribute to new existing knowledge for education and computer science to add references to new online-based models. The limitation of this research was the effectiveness of this model has not been tested in the thinking skill variable; as it just describes the cognitive knowledge seen from students' learning outcomes. Therefore, researchers are invited to analyse the variables that have not been examined in the study, so that the findings can serve as guidelines for refining this CBE model.

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8 Authors

Dr. Reno Renaldi currently works at the Department of Public Health, Universitas Hang Tuah Pekanbaru, Indonesia.

Dr. Aldiga Rienarti Abidin currently works at the Department of Public Health, Universitas Hang Tuah Pekanbaru, Indonesia. Email: abidinaldiga@gmail.com.

Yuda Irawan currently works at the Department of Information System, Universitas Hang Tuah Pekanbaru, Indonesia. Email: yudairawan@htp.ac.id.

Abdurrahman Hamid currently works at the Department of Public Health, Universitas Hang Tuah Pekanbaru, Indonesia. Email: abdurrahmanhamid@htp.ac.id.

Rizky Ema Wulansari currently works at the Department of Engineering, Universitas Negeri Padang, Indonesia. Email: sariema15@gmail.com.

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