The Feasibility Test of "COVID" Learning Strategy: An Alternative Approach to Learning Process during Pandemic of COVID-19

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Abstract

Introduction: The COVID-19 outbreak requires spread prevention strategies that affects the education system at all levels. Consequently, appropriate and relevant learning strategies are required. The study aimed to examine the feasibility of "COVID" learning strategy as an alternative online learning system during pandemic COVID-19.

Methods: The study applied a pre-experimental design with a one-group pretest-posttest approach. The sample size (34 participants) was determined using G*Power 3.1.9.7 software. The open recruitment of the participants was announced through WhatsApp. Students who were willing to be the participants were asked to fulfill the enrollment link. As the intervention, nursing students were taught using the "COVID (Creative, Outcomes-oriented, Valuable, Innovative, and Desire)" learning strategy. Two variables i.e. critical thinking and learning environment satisfaction were measured using the Diagnostic Thinking Inventory (DTI) and the Dundee Ready Education Environment Measure (DREEM), respectively. The paired t-test was used to analyze the DTI and DREEM data before and after the intervention.

Results: The results show that the Flexibility Thinking dimension of DTI was significant with t-value of (30) = 7.025, p = .000. Likewise, with the assessment of the learning atmosphere using DREEM, a significant result was obtained with t (33) = -457,263, p = .000. The respondents' satisfaction with the "COVID" learning strategy was 8.5 on average.

Conclusion: The "COVID" learning strategy can improve flexible thinking and student satisfaction with the online learning process. The "COVID" learning strategy can be an alternative learning strategy that is effective in the online learning process.

Keywords

COVID; critical thinking; learning environment; learning strategy; nursing students

INTRODUCTION

The curriculum of the Association of Indonesian Nurse Education Center (AINEC) has been officially applied according to the official letter from AINEC No. 131/AINEC.Ka.Sr/VI/ 2016 dated 17 June 2016. This curriculum developed from the previous Competency-Based Curriculum (KBK) which is adjusted to the National Standards of Higher Education (SNPT) guidelines and the

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Indonesian National Qualifications Framework (KKNI). The new curriculum emphasizes the learning outcomes that must comply with national standards competencies. By this standardized curriculum, the Indonesian nurses will have the same competencies. The quality control of this competency standardization is the implementation of a national board examination.

The implementation of the national board examination is the final objective of the learning process of the institution. The passing rate of the national board exam is an indicator of learning quality carried out from the academic to internship stages. The passing rate in 2019 was low that many institutions have passing rates below 50% (Ristekdikti, 2019). This phenomenon is worrying. Even though the learning process delivered face-to-face/offline and nursing students have been exposed in clinical practice, their competencies are still low. Furthermore, self-evaluation of the learning process and the learning strategies that have been used are crucial to determining an appropriate strategy.

There have been various well known learning strategies, such as Problem Based Learning (PBL), Case-Based Learning (CBL), peer learning, e-learning, contextual teaching and learning, cognitive style, Student-Centered Learning (SCL), the integrative curriculum, reflection, concept mapping, and Computer-Aided Instruction (CAI) (Rochmawati & Wiechula, 2010). Several studies have been conducted to evaluate the effectiveness of these learning strategies. PBL is proven to be able to increase competencies (Khatiban & Sangestani, 2014) and also student motivation (Indriasari, 2016). Students' critical thinking skills can also be improved with CBL (Ferawati & Rosa, 2016). By providing cognitive stimuli in learning, it can improve understanding and retention of what is learned (Yudierawati, Setyosari, Degeg, & Rudianto, 2015). Traditional and conventional learning strategies are starting to be abandoned. Especially during the current COVID-19 pandemic, where all education systems are carried out in a network (online). So, a strategy that involves students as a learning center (SCL) in the learning process and the use of technology (CAI) is highly recommended (Wilson et al., 2019). In line with this, the internet can be employed as the main support in order to increase students' knowledge and skills (Azlan et al., 2020; Cook et al., 2008; Huang, Teo, & Zhou, 2020; Lahti, Hatonen, & Valimaki, 2014; Männistö et al., 2020).

Based on these phenomena, the researchers are interested in developing a new, innovative, and integrated learning strategy, namely the "COVID" learning strategy. The term "COVID" is taken as it reflects the momentum of the COVID-19 pandemic that has hit all countries in the world, including Indonesia. Whereas in this study, "COVID" stands for Creative, Outcome-oriented, Valuable, Innovative, and Desire. The study aimed to evaluate the feasibility of the "COVID" learning strategy as an alternative online learning strategy during pandemic COVID-19.

MATERIALS AND METHODS

Design, Setting, and Sample

This is a pre-experimental study with a one-group pretest-posttest design. The study was conducted in the Bachelor of Science in Nursing Program, Faculty of Health Sciences, University of Muhammadiyah Pekajangan Pekalongan. The sample size was determined using G*Power 3.1.9.7 software, which considered the use of t-tests analysis, effect size 0.5, α 5%, power β 0.8, and alteration rate 20%. Accordingly, the sample included 34 participants. The participants were nursing students in the seventh semester who passed the medical and surgical nursing course and were registered as an active student. Students who enrolled as a participant, but did not make any progress in module achievement for three times will be excluded. The participant open recruitment was announced through WhatsApp for two weeks. Students who were willing to be participants were asked to fulfill the enrollment link. When the sample size was obtained, the recruitment was closed.

Measurements

Two variables were measured, including critical thinking and the educational environment in the application of the "COVID" Learning Strategy. Critical thinking was assessed using the Diagnostic Thinking

Inventory (DTI). The Dundee Ready Education Environment Measure (DREEM) was used to evaluate the education environment. The details of these two measurements are described below. The participants' satisfaction with the "COVID" learning strategy was measured using a scale from 1 to 10, in which 1 represents "strongly dissatisfied" and 10 represents "strongly satisfied".

Diagnostic Thinking Inventory (DTI)

DTI was developed by Bordage, Grant, and Marsden (1990). DTI consists of 41 items distributed in flexibility thinking (21 items), and structure of memory (20 items). The DTI uses a 6 Likert scale, ranging from 1 to 6. DTI has been proven to have good psychometric properties, with a Cronbach's alpha of an overall score of 0.84 that 0.72 of the flexibility thinking domain, and 0.74 of the structure of memory domain (Kicklighter, Barnum, Geisler, & Martin, 2016). It takes 15 to 20 minutes to complete this questionnaire.

The Dundee Ready Education Environment Measure (DREEM)

The DREEM was developed by Roff et al. (1997). There are five subscales, namely perceptions of learning, perceptions of teachers, academic self-perceptions, perceptions of atmosphere, and social self-perceptions. DREEM comprises 50 questions with a Likert scale scoring system which ranges from 0 = strongly disagree to 4 = strongly agree. DREEM has nine negatively-worded items including item number 4, 8, 9, 17, 25, 35, 39, 48, and 50 that need to reverse code to scoring. The internal consistency of the DREEM Indonesian version has been proven, with a Cronbach's alpha of 0.88 (Leman, 2016). It takes 30 minutes to complete this questionnaire.

Research Procedures

The ethical clearance for the study was obtained from the university ethics committee (902/PT.01.04/FIKES/VIII/2020). After obtaining the permission letter from the Dean of the faculty of health sciences, the participant open recruitment was announced to the student through WhatsApp. The "COVID" learning strategy was explained in detail to studentss who enrolled in this study. Then, the respondents were asked to sign an informed consent. Furthermore, baseline data were collected, which included demographic data, DTI, and DREEM. The "COVID" learning strategy was applied in six-module with the topic of diabetes mellitus nursing care. After the completion of the six-module, DTI, and DREEM were assessed (Figure 1).

Intervention

The "COVID" learning strategy was implemented to six (6) modules. Each module was designed for around 45 to 60 minutes. At the beginning of each module, students must complete quizzes to identify their level of initial knowledge before attending lectures. In lectures, the students were taught to think critically about cases related to DM and use evidence to formulate appropriate interventions. Students have opportunities to ask in the discussion forum.

Data Analysis

For univariate data analysis, the numerical scale used mean and standard deviation. Meanwhile, the categorical scale data used frequency distribution and percentage. Based on the results of the Kolmogorov-Smirnov test, all variables of DTI and DREEM were normally distributed. Furthermore, a paired t-test was used to test the quantitative data of DTI and DREEM before and after the intervention. The standard of significance obtained p-value of < 0.05. All data were analyzed using SPSS version 23.

RESULTS

Characteristics of Participants

The study involved 34 participants. The demographic characteristics of the participants are presented in Table 1. The average age of the participants was 21 years (standard deviation [SD] = 0.71 years). The Grade Point Average (GPA) was 3.39 (SD ± 0.17). The majority of the participants were female (88.24%). Nearly half of the respondents

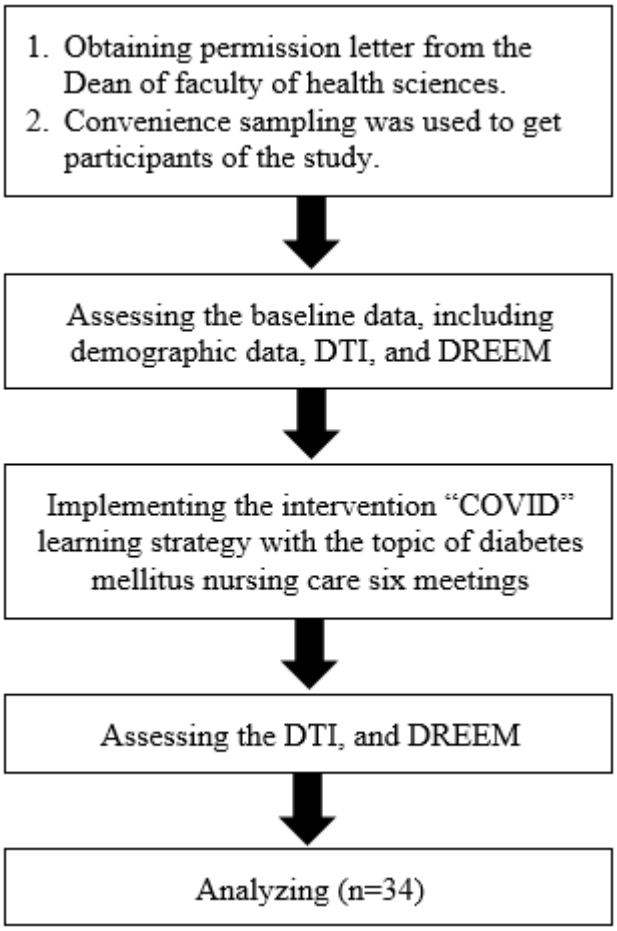

Figure 1. Study Procedure

Table 1. Characteristics of Participants

Characteristic	Mean	SD
Age (years)	21	0.71
Grade Point Average	3.39	0.17
Characteristic	**n (34)**	**%**
Gender:		
Female	30	88.24
Male	4	11.76
Education Background:		
Senior High School-IPA	15	44.12
Senior High School-IPS	8	23.53
Senior High School-Nursing	7	20.59
Senior High School-Pharmacies	2	5.88
Senior High School-Allied Health	2	5.88

(44.12%) had a high school education background with a major in Science.

Diagnostic Thinking Inventory (DTI)

The results show that all dimensions of Diagnostic Thinking Inventory which include Flexibility Thinking and Structure of Memory are normally distributed p> 0.05. Based on the Paired t-test, there was a significant increase in the Flexibility Thinking dimension from the baseline data (M = 76.76, SD = 6.40) and after the intervention (M = 78.09, SD = 8.19) with t (30) = 7.025, p = .000. Meanwhile, the Structure of Memory dimension is not significant, with the values before intervention, namely (M = 74.59, SD = 9.99), after

Table 2. The Distribution of Diagnostic Thinking Inventory Dimensions

Dimensions	Pre-test (n=34) M ± SD	Post-test (n=34) M ± SD	t
Flexibility thinking	76.76 ± 6.40	78.09 ± 8.18	7.025***
Structure of memory	74.59 ± 9.99	77.21 ± 10.82	-1.420^{NS}

Note: M: mean; SD: Standard Deviation; ^{NS}: Non-Significant

***p < .001

Table 3. The Distribution of Dundee Ready Education Environment Measure Dimensions

Dimension	Pre-test (n=34) M ± SD	Post-test (n=34) M ± SD
Students' perception of teaching	33.24 ± 3.48	34.76 ± 3.69
Students' perception of teachers	30.59 ± 3.45	31. 74 ± 3.33
Students' academic self-perceptions	23.06 ± 2.30	23.29 ± 2.86
Students' perception of atmosphere	31.85 ± 3.81	33.68 ± 4.52
Student's social self-perceptions	19.71 ± 2.47	19.41 ± 2.88

Note: M: mean; SD: Standard Deviation; ^{NS}: Non-Significant

***p < .001

Table 4. A paired t-test of DTI and DREEM

Variable	Pre-test (n=34) M ± SD	Post-test (n=34) M ± SD	t
DTI	151.35 ± 13.64	155.29 ± 17.46	1.692^{NS}
DREEM	138.44 ± 12.42	142.88 ± 14.56	-457.263***

Note: M: mean; SD: Standard Deviation; ^{NS}: Non-Significant

***p < .001

intervention (M = 77.21, SD = 10.82), and t (30) = -1.420, p = .166 (Table 2).

Dundee Ready Education Environment Measure (DREEM)

The results show that the five dimensions of DREEM which include students' perceptions of teaching; teachers; academic self-perception; atmosphere, and social self-perception are normally distributed (p> 0.05). The value before intervention from each of these dimensions was (M = 33.24, SD = 3.48), (M = 30.59, SD = 3.45), (M = 23.06, SD = 2.30), (M = 31.85, SD = 3.81), and (M = 19.71, SD = 2.47), respectively. Meanwhile, the value after intervention was (M = 34.76, SD = 3.69), (M = 31.74, SD = 3.33), (M = 23.29, SD = 2.86), (M = 33.68, SD = 4.52), and (M = 19.41, SD = 2.88), respectively (Table 3).

Feasibility of Implementing "COVID" Learning Strategy

The feasibility test for implementing the "COVID" learning strategy was carried out by examining two factors, namely the achievement of student competencies and evaluation of the learning environment. The test is to test the values before and after the intervention of the DTI and DREEM variables. For the overall DTI value before the intervention was 151.35 (SD = 13.64) and after the intervention was 155.29 (SD = 17.46). There is no significant different in DTI with t-value = 1.692, p = .101. Meanwhile, the overall DREEM values before and after the intervention were 138.44 (SD = 12.42) and 142.88 (SD = 14.56), respectively. There is a significant improvement of DREEM with t-value = -457.263, p = .000 (Table 4).

DISCUSSIONS

Diagnostic Thinking Inventory consists of two dimensions i.e. flexible thinking, and structure of memory. The study results show that implementing the "COVID" learning strategy can improve students' ability to think

flexibly in accordance with the cases they encounter. In contrast, the structure of memory was not significantly improving. Flexibility thinking is more applicable to determining nursing diagnoses and intervention (Rahayu & McAleer, 2008). In the "COVID" learning strategy, students are always given a case as a stimulus according to the learning topic. So, the students can learn comprehensively about how to provide nursing care to patients with DM. The cases given at the beginning of each lecture as an apperception can lead students to learning topics to be discussed. This is a possible reason why students' flexibility thinking improved since the learning process gave experiences to students in handling cases related to determining nursing diagnosis and intervention. The learning process using the "COVID" learning strategy aligns with Prakash, Sladek, and Schuwirth's (2019) and Schaye, Eliasz, Janjigian, and Stern's (2019) statement that learning that presents cases and discusses how to enforce nursing diagnoses, interventions, and also evaluations is proven to be effective in improving students' critical thinking skills. Moreover, learning that is structured and delivered systematically can enhance students' knowledge (Elasrag & Elsabagh, 2020). Various case studies given can encourage students to think creatively, which improves their flexibility of thinking (Durning et al., 2016).

Another DTI dimension is the structure of memory. The structure of memory is related to the availability of knowledge stored in memory that affects adequate knowledge organization (Salles, Ferreira, Lima, & Orides da Silva, 2020). Accordingly, the structure of memory was influenced by students' learning style, learning habit, and capability to memorize. The "COVID" learning strategy requires students to study actively and independently. The modules were given to increase their curiosity. Accordingly, they will search supported resources. In this study, the "COVID" learning strategy is designed as online learning that is feasible for the students who have motivation to learn. Unfortunately, six modules in this study could not improve students' structure of memory. The ineffectiveness of the online learning method in the structure of the memory dimension was also found in medical students at the Mahatma Gandhi Institute of Medicine Science India (Jain, Rao, & Jinadani, 2019).

The learning environment evaluation was significant ($p < .05$). The great improvements are in the students' perceptions of teaching, teachers, and atmosphere dimensions. These results are in line with research conducted by Hamid, Faroukh, and Mohammadhosein (2013) and Prashanth and Ismail (2018). In this "COVID" learning strategy, learning is supported by a millennial, sophisticated, and flexible learning management system that can be accessed by students. By using "Open Learning" students feel more comfortable and can study according to their conditions/moods. This Open Learning System is arranged interactively even though it is online. The material is given in a structured and detailed manner supported by visualization of the material so that students are more interested. In addition, the quiz, which is a prerequisite for each module, is a stimulus for students. The learning process which consists of six modules that have been arranged in an open learning system has been well-prepared, showing that this learning has been prepared properly. Lecturers can monitor students' learning progress so that they can warn students who are progressing slowly. After the respondents have completed all modules, they are awarded a certificate from the university. This motivates students to be active and learn so that the grades meet the standards for getting a certificate.

Two dimensions of DREEM that did not experience improvement were the dimensions of students' academic self-perceptions and students' social self-perception. The low dimension of students' academic self-perceptions is in line with the insignificant structure of the memory dimension in DTI. The "COVID" learning strategy does not interfere with the social and personal lives of the students so that the dimensions of students' perceptions of academic abilities and social conditions/personal life do not increase. Even so, all respondents gave a positive comment of this "COVID" learning strategy. Quantitatively, the average respondent's satisfaction is 8.5 from a range of 0 - 10.

This study has several limitations. The DTI and DREEM did not identify each respondent so that the progress of each respondent cannot be identified. In addition, because of the

COVID-19 pandemic, learning was carried out online. The obstacle faced by the respondents is an unstable signal. This is because the respondents live in various regions, including mountains. So, they experienced problems related to bad internet network/signal. This research still needs to be improved with a larger number of samples and from several levels/batches.

CONCLUSION

This study suggests that the "COVID" learning strategy is feasible and it has a significant effect on flexibility thinking and students' satisfaction with the learning environment. Thus, the "COVID" learning strategy can be used as an alternative learning strategy during the pandemic or even in-class learning process.

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Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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