"E-Matching Card" to Improve Cooperation and Cognitive Abilities Among Nursing Students

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Abstract

One of the learning models that can help students is the cooperative learning model (cooperative learning). Cooperative learning is a group learning method that makes students active in groups. They are expected to work together and discuss the tasks given by the lecturer. One type of cooperative learning model is making a match. Students make a matching learning model using learning cards can increase student activity so that this model is expected to be able to improve learning outcomes. The purpose of this research is to build a learning model using the student make a match approach's learning cards to enhance nursing and midwifery students' comprehension, interprofessional communication, and collaboration. The research method used was a pretest–posttest control group design. This research was conducted at one nursing education institution in Yogyakarta among fourth semester students totaling 60 within two months. The findings of this study are that learning using games creates an atmosphere that reduces student stress and facilitates student learning by increasing understanding, interprofessional communication, and collaboration among students (p-value = 0.000). The conclusion of this study is that learning card games can improve students' knowledge and teamwork/cooperation skills.

Keywords: cognitive, cooperation, learning card, matching card, nursing

Abstrak

"E-Matching Card" *untuk Meningkatkan Kerjasama dan Kognitif Mahasiswa Keperawatan. Salah satu model pembelajaran yang dapat mengaktifkan siswa adalah model pembelajaran kooperatif* (cooperative learning). *Pembelajaran kooperatif merupakan metode pembelajaran kelompok yang menjadikan siswa aktif, dalam kelompok diharapkan dapat bekerja sama dan berdiskusi menyelesaikan tugas-tugas yang diberikan oleh dosen. Salah satu jenis model pembelajaran kooperatif adalah membuat kecocokan. Model pembelajaran "make a match" menggunakan kartu pembelajaran dapat meningkatkan aktivitas siswa sehingga model ini diharapkan mampu meningkatkan hasil belajar siswa. Penelitian ini bertujuan untuk membangun model pembelajaran dengan pendekatan "Make a Match Learning Cards" untuk meningkatkan pemahaman, komunikasi* interprofessional*, dan kolaborasi mahasiswa keperawatan dan kebidanan. Metode penelitian yang digunakan adalah* Pretest-Posttest Control Group Design. *Penelitian ini dilaksanakan di salah satu institusi pendidikan keperawatan di Yogyakarta pada mahasiswa semester IV yang berjumlah 60 orang dalam waktu 2 bulan. Temuan penelitian ini adalah pembelajaran menggunakan* game *menciptakan suasana yang mengurangi stres siswa dan memfasilitasi pembelajaran siswa dengan meningkatkan pemahaman, komunikasi* interprofessional*, dan kolaborasi antar siswa (nilai p = 0,000). Hal ini dapat disimpulkan bahwa pengetahuan dan kerjasama tim dalam mempelajari model permainan kartu pembelajaran pada mahasiswa keperawatan lebih baik daripada mereka yang tidak mempelajari model permainan kartu pembelajaran. Kesimpulan dari penelitian ini adalah pembelajaran dengan permainan kartu dapat meningkatkan pengetahuan mahasiswa dan keterampilan kerjasama tim.*

Kata Kunci: kartu belajar, kartu mencocokkan, keperawatan, kerjasama, kognitif

Introduction

Nursing education has evolved with the incorporation of information technology and the recognition of the importance of scholarly communication and informatics (Miller & Neyer, 2016). These changes have led to the development of various tools that aid in teaching and learning processes in nursing education. Using standardized tools in nursing education can provide valuable insights into the teaching-learning experiences of nursing students (Hosseini et al., 2022). This can help nursing educators plan and implement effective teaching strategies, ultimately enhancing the overall quality of nursing education. The use of educational technologies, such as hypermedia and social media, in nursing education has also been shown to be beneficial (Edwards et al., 2021). Educational hypermedia, when supported by scientific evidence of its effectiveness, can be a valuable resource for teaching in nursing education (Frota et al., 2018). Social media, on the other hand, can be used as a tool for professional development and networking in the field of nursing (Sousa-Uva et al., 2018).

As nursing and midwifery is a practice-based discipline, the majority of learning in it occurs in a clinical setting in which the clinical learning environment contributes to socializing students not only for their future profession but also for their role as learners (Kennedy et al., 2019; Liljedahl et al., 2015). This culture generates a robust learning environment and has a substantial effect not only on learning but also on patient care (Irby, 2018).

Many branches of study have used educational games to impart knowledge to pupils (Barclay et al., 2011). Interprofessional education prepare a student to become professional health workers, enhancing interprofessional communication and collaboration among students in the health sector, and enhancing the competence and performance of future health workers among students. In the past decade, artificial intelligence has been responsible for several technical and scientific advancements, the majority of which are supported by viable deep learning approaches. Despite this quick advancement, there are still numerous unresolved issues on the ground, particularly concerning tasks that require more abstract thought (Vieira, 2019). Consequently, numerous learning programs have developed new techniques of learning that are engaging, applicable, and independent (Zisook et al., 2008).

Educational games are good for learning (Rastegarpour & Marashi, 2012). Many branches of study have used educational games to impart knowledge to students. Educational digital games provide players/learners with opportunities for more engaging, individualized, and immersive experiences as well as efficient learning (Epper et al., 2012). This game also allows health care to create real-life scenarios without real-life consequences that can reduce stress and as an alternative to student learning (Barclay et al., 2011).

Games using learning cards are growing rapidly, because a lot of students more interest with variety in process teaching learning (Bilstrup et al., 2020; Roy & Warren, 2019). Therefore, we provide the learning model game Modified Learning Card, which consists of a card holding phrases or images that are utilized to spark new thoughts during the learning process. Make a Match with Learning Cards is an example of a cooperative learning strategy. To promote student cognition and collaboration in the field of midwifery and nursing, one of the benefits of this strategy is that students search for matching pairs of learning cards while studying a concept or topic in a considered with the environment.

In this study, the game learning card was referred to as the E-Matching Card, students in the same profession and those in different professions, but with the same cases to solve. Students can learn while playing with their peers. A study demonstrated that learning that involves cooperation and solving cases increases learning motivation with feelings of satisfaction

and pride in oneself (Afifah & Syahreni, 2005; Fahrizal & Irmawan, 2023). In addition, students can learn in a gaming atmosphere. This multidisciplinary approach is the E-Matching Card's greatest strength. One of the players may select the case for a given card. The student chooses the case and starts to match the card, each team member can issue their card. If it matches the case, the outcome is "matching"; otherwise, the result is "failure." Based on the explanation above, the researcher is interested in studying more about the development of learning cards to improve the cooperation and cognitive skills of nursing students.

Methods

This research method uses an experimental research design: the pretest–posttest control group design. In this design, both groups were first given a pretest (pretest) with the same test. Then, the experimental group was given a special treatment, namely learning by using learning cards, while the control group was given the usual which involved learning through a cooperative approach. After being given treatment, both groups were tested with the same test as the final test (posttest), and the results of the two final tests were compared, as were the results of the initial test and the final test in each group.

The subjects of this study were 60 students from one nursing education institution in Yogyakarta. The criteria for inclusion were as follows: 1) nursing students in their fourth semester; 2) students who were willing to be respondents; and 3) students present at the time of the study. The exclusion criteria were as follows: 1) students who were absent from the study, and 2) students who did not complete the questionnaire.

Data analysis was carried out by collecting data on the results of the pretest and posttest questionnaires. Multiple choice questions from previous questionnaires went through validity and reliability tests. The validity test was declared valid with $r_{results} > r_{table}$ (0.361) for 20 coopera-

tion variable statements (0.390 – 0.834) and 15 knowledge variable statements (0.368 – 0.730). The reliability test obtained an alpha Cronbach value of 0.891 (>0.6) for the cooperation variable, and an alpha Cronbach value of the knowledge variable of 0.805 (>0.6) was declared reliable. Furthermore, data analysis was carried out with the normality test, homogeneity test, and hypothesis test.

Based on the results of the normality test using the Shapiro–Wilk test, all data were normally distributed. The results of the homogeneity of variance test using Levene's test also showed that the control class and experimental class students came from populations that had the same variance or that the two classes were homogeneous.

Results

This research began by creating an application called the E-Matching Card. The design of the application is illustrated at Figure 1.

On the opening page of the E-Matching Card, two dashboard options are offered to consumers. Users are classified as either players or game producers. Players are students, while game designers are professors who create cases (questions and answers) in the form of JPG and PNG graphics.

After starting the game, the player matches the picture card (question) on the left side of the screen with one of the pictures (answer options) on the right side of the screen by dragging the picture that you believe is the correct response to the side of the picture card (question). If your response is correct, your score will increase and your questions will increase automatically. However, if your response is incorrect, the score will remain, and the question will automatically advance. Following the conclusion of the game, a list of scores and completion times will be displayed. The top score in this game is determined by combining the highest number of points and the quickest playing time.
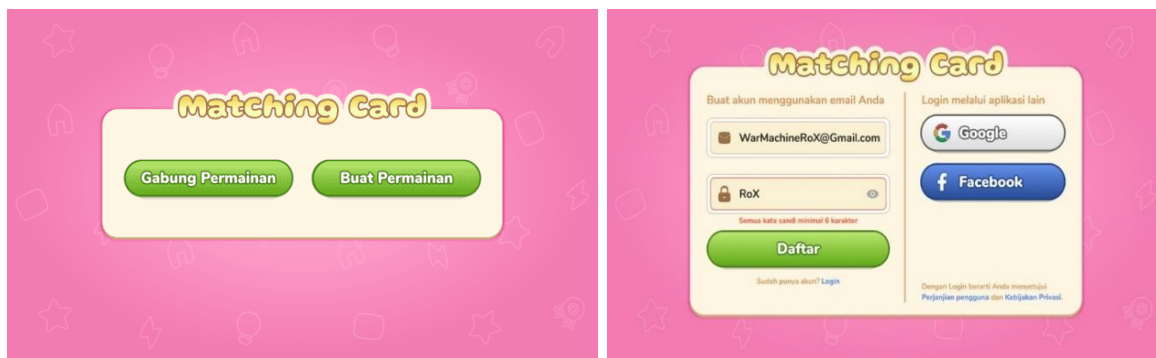
Figure 1. The main page of the E-Matching Card

Table 1. Results of the Teamwork and Knowledge Hypothesis Test

Variable	T-test for equality of means		
	T	df	Sig
Teamwork Equal variances assumed	10.019	57	0,000
Teamwork Equal variances not assumed	10.056	55.213	0,000
Knowledge Equal variances assumed	5.951	58	0,000
Knowledge Equal variances not assumed	5.951	51.282	0,000

In table 1, because *p-value* = 0.000 < α = 0.05, then H0: μ1 = μ2 is rejected and Ha: μ1 > μ2 is accepted so that it can be concluded that having knowledge and using teamwork in learning the learning card game model by nursing students is better than not having knowledge or using teamwork in learning card game model.

Discussion

Nursing students access e-learning tools through various methods, including web- and computer-based programs, online tutorials, and virtual media. The shift to e-learning during the COVID-19 pandemic has led to an increased reliance on digital technology for study sessions in health courses, including nursing education. E-learning tools can be accessed through platforms such as Zoom, Google Classroom, or Google Meet for discussions and virtual media. Addi-

tionally, the use of e-learning requires the necessary infrastructure, equipment, and support systems to ensure effective implementation and student engagement. However, challenges such as unfamiliarity with e-learning platforms and lack of prior orientation to Information and Communications Technology (ICT) tools have been reported, emphasizing the need for preparedness and support for students transitioning to e-learning. Overall, e-learning has been shown to be effective in engaging learners and facilitating self-directed learning in nursing education, but it requires careful consideration and support from educators and institutions to ensure its success.

These e-learning tools offer a variety of methods to deliver knowledge, improve cognitive skills, and enhance the learning experience for nursing students. Digital Educational Techno-

logies (DET): DET, including online tutorials, quizzes, and simulations, are being increasingly applied in health courses, providing a cost-effective and convenient way to deliver knowledge and improve the learning experience for nursing students (Loureiro et al., 2021). Online Learning Platforms: E-learning platforms and resources, including online lectures, interactive activities, and multimedia presentations, are used to deliver nursing education and enhance students' understanding of various nursing concepts (Alshammari & Alanazi, 2023).

The E-Matching Card is utilized for the purpose of organizing and documenting the results obtained from trials. It assists individuals and teams in doing a thorough analysis of their tests and deriving definitive results for their learning. Capturing insights, synthesizing insights, identifying actions, and emphasizing actions include the learning card. The goal is to use these insights to improve future experiments. Learning using an electronic learning card or E-Marching Card tends to instill memories in students regarding collective knowledge and learning experiences and help in avoiding some social barriers to learning in conservative societies (Afzaal et al., 2022; Almohtadi et al., 2023; Smolen et al., 2016).

Learning strategies to improve teamwork and the cognitive abilities of nurses are challenges for lecturers of nursing students, given that nurses are required to be able to work in teams and have good cognitive skills in providing nursing care for patients in hospitals or other health services. To overcome these challenges, a tool is needed that can make it easier for teachers and students to carry out learning in accordance with the expected target. Active learning provides nurses with an active search for knowledge, which places the student as an active agent of knowledge itself and makes knowledge the center of the teaching–learning process, resulting in significant learning. The integration of theory with practice favors the student's self-confidence—making him/her empathic, safe, creative, and more prepared for the

job market and the preparation for group work, which develops the capacity (Ghezzi et al., 2021).

The experimental class teamwork that was given the learning card treatment had a greater influence. This is seen by the increased average score on the final test, specifically when utilizing the learning card focused on teamwork, compared to the initial test. This means a significant increase in teamwork results. Team building can improve student learning in the following ways: 1) Builds teamwork, team-building activities teach students communication, collaboration, and problem solving; 2) Encourages active learning, team-building activities are often experiential and hands-on, which can help students engage in active learning; 3) Encourages active learning, team-building activities are often experiential and hands-on, which can help students engage in active learning (Marasi, 2019). Team building helps students identify their strengths and weaknesses and learn to work with others who have different strengths and weaknesses.

The significance of team building to foster collaboration and cohesion within a group. Initially, students are introduced to the team development process, which necessitates their participation in team-building training as a second step. Secondly, they get knowledge on constructing a unified class team and cultivating collaboration abilities. Thirdly, they showcase their ability to demonstrate teamwork. Furthermore, they are shown that training can be enjoyable. Furthermore, they get knowledge on how to mitigate any pressures and stress that may arise when presenting the learning project as a cohesive group (Marasi, 2019).

Control class teamwork that is not treated with learning cards has less effect. An electronic learning card or E-Matching Card is not a panacea for the learning ability or motivation of an uninterested student (Almohtadi et al., 2023). This is evidenced by the average score of the final test on teamwork, which was not treated

as lower than the initial test. This means that there is no insignificant increase in teamwork results. There is a difference in the effect of the experimental class and the control class on the development of learning cards to improve nursing students' teamwork.

Teamwork control refers to the comparison between the improvement in the quality of teamwork in the experimental class and the control class. The results indicate that the experimental class demonstrated superior teamwork compared to the control class. The presence of cooperation in both the experimental class and the control class yielded a favorable impact on the students' collaborative performance. The first dimension that can be observed when a teamwork task begins is communication or interaction between all team members. These interactions are present throughout the whole, albeit with different degrees of intensity. If all team members participate, communication occurs privately between the emitter and the receiver, confirming that if teamwork is taking place, a high level of interaction must occur. High levels of interaction are also associated with collaboration, as they encourage an increased number of member contributions to common tasks in co-working spaces. Electronic learning cards or the E-Matching Card are very useful in teamwork between students (El Mhouti & Erradi, 2018).

The knowledge of the experimental class receiving the E-Matching Card intervention showed a more significant effect. This is seen by the greater average value of the final exam scores when utilizing the E-Matching Card for knowledge, compared to the initial test. This indicates a substantial augmentation in knowledge outputs. The knowledge of the control class that was not given the E-Matching Card showed a diminished impact. This is evidenced by the fact that the average score on the final knowledge exam is lower than that of the initial test. This indicates that there is no substantial augmentation in the outcomes of knowledge acquisition. There are disparities in the impacts of the experimental class and control class on the E-Matching Card in terms of enhancing nursing knowledge. This is demonstrated by the larger average value of the difference in the findings between the knowledge experimental class and the knowledge control class. Consequently, the experimental class exhibits superior knowledge gains compared to the control class. Electronic learning cards or E-Matching Card improve the knowledge (Zhou, 2013).

Conclusion

Research conducted on E-Matching Cards as a learning tool through electronic learning card games has demonstrated that it enhances students' cooperative skills in comparison to those who do not utilize electronic learning card games for learning purposes. Nursing students who utilize the E-Matching Card have superior cognitive proficiency compared to those who do not employ this learning tool. Future researchers are encouraged to develop electronic learning cards or comparable tools that can facilitate nursing students' comprehension of lecture material in a more engaging manner.

Acknowledgment

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