第 48 卷 第 8 期
2021 年 8 月

湖南大学学报（自然科学版）
Journal of Hunan University（Natural Sciences）

Vol. 48. No. 8.
August 2021



# Effect of Hybrid Learning Strategy and Self-Efficacy on Learning Outcomes

**Widdy H.F. Rorimpandey[1], Hendrikus Midun[2]***

[1] Universitas Negeri Manado, Indonesia

[2] Universitas Katolik Indonesia Santu Paulus

**Abstract:** Teachers and prospective teachers in the 21st century need pedagogical and technological literacy in implementing science teaching and learning strategies in elementary schools, especially education during the coronavirus pandemic. Hybrid learning strategy (HL) is a product of learning technology. It is a combination of online and face-to-face learning. Students need to have independent learning skills, such as self-efficacy (SE), to improve online learning skills. This study aimed to examine the effect of HL and SE on learning outcomes in understanding and applying the concepts of science education courses. This study involved 124 elementary school teacher education students at Manado State University, Indonesia, divided into experimental and control classes. Each class consists of 62 students. The data analysis technique used Multivariate Analysis of Variance (MANOVA). Based on the data analysis, the results showed that: 1) the HL strategy had a significant effect on improving learning outcomes in understanding and applying concepts; 2) the SE level of students has a significant effect on learning outcomes in understanding and applying concepts; 3) there is no interaction effect of HL and SE strategies on concept understanding; 4) there is an interaction effect of HL and SE strategies on the application of the concept. Thus, this study confirms that HL is one of the best learning models that can be used for students who are still adapting to the development of internet technology. Based on these findings, recommendations for further study and learning practices can be explained.

**Keywords:** hybrid learning, learning outcomes, self-efficacy, understanding and application of concepts.

## 混合學習策略和自我效能感對學習成果的影響

**摘要:** 21 世紀的教師和準教師需要具備教學和技術素養，以在小學實施科學教學和學習策略，尤其是在冠狀病毒大流行期間的教育。混合學習策略是學習技術的產物。它是在線學習和麵對面學習的結合。為了提高在線學習技能，學生需要具備自主學習技能，例如自我效能。本研究的目的是檢驗 HL 和东南對理解和應用科學教育課程概念的學習成果的影響。這項研究涉及印度尼西亞萬鴉老州立大學的 124 名小學教師教育學生。分為實驗班和對照班。每個班級由 62 名學生組成。數據分析技術使用多元方差分析。基於數據分析，結果表明：1）策略對提高理解和應用概念的學習成果有顯著影響； 2）學生的水平對理解和應用概念的學習成果有顯著影響； 3）和策略對概念理解沒有交互作用； 4）和 策略對概念的應用有交互作用。因此，本研究證實， 是最好的學習模式之一，可用於仍處於適應互聯網技術發展過程中的學生。基於這些發現，可以解釋進一步研究和學習實踐的建議。

**关键词：** 混合學習，學習成果, 自我效能感, 概念的理解和應用。

## 1. Introduction

Teachers are agents of change to apply technology in the classroom [1], including teachers at the basic education level. Puspitarini and Hanif [2] emphasize the importance of using technology in learning as an alternative to implementing learning. Therefore,

Received: May 23, 2021 / Revised: June 6, 2021 / Accepted: July 21, 2021 / Published: August 30, 2021

About the authors: Widdy H.F. Rorimpandey, Universitas Negeri Manado, Indonesia; Hendrikus Midun, Universitas Katolik Indonesia Santu Paulus

Corresponding author Hendrikus Midun, hendrik.m2002@gmail.com

students majoring in elementary school teacher education are required to have the ability to use pedagogical technology in science learning in elementary schools. Based on the Indonesian National Qualification Framework for science education courses, prospective teachers must have the knowledge and ability to design and implement science learning based on information and communication technology. These abilities need to be taught to prospective elementary school teachers in universities.

Thus, the strategy most likely to be used is an online learning strategy. This strategy is flexible. Learning activities can be done anytime, anywhere, and by using various media and learning resources with the help of this strategy. Currently, online learning can take mixed or HL, namely learning that combines face-to-face and online learning. This strategy can facilitate students to learn science concepts that have not been fully understood during traditional or face-to-face classes. The strategy used in this research is HL.

HL proposes an innovative learning strategy using multimedia. This strategy is very flexible, in terms of both time, place, delivery of material, and student participation. Previous studies have revealed that HL is effective in increasing participation, satisfaction, learning community, and student learning outcomes [3,4,5]. Furthermore, [6, 7, 8] have conducted a study on the use of hybrid and face-to-face learning. The results showed that students who were taught using HL strategies obtained better learning outcomes than those taught using face-to-face learning.

The success of online learning through HL is determined, among other things, by the independence that students have. Learning independence is strongly supported by the level of SE. SE is a person's confidence to do something and get optimal results [9] and cognitive behaviors in many ways [10]. Previous studies reveal that SE is an indicator of the confidence of novice teachers in the technology integration process to perform a particular task, operating online platforms and encouraging online practices [11, 12]. Teachers who have a high level of SE tend to be more successful than teachers who have low SE. Long before these studies, SE influenced motivation, resilience in completing tasks, and learning outcomes.

Learning outcomes that have been measured in this study are the understanding and application of concepts according to Anderson and Krathwohl, namely the mental process of knowledge adaptation and transformation [13]. People who understand a concept are shown by their ability to apply, analyze, and synthesize something, both in the same context and in different contexts. Learning outcomes related to applications are the student's ability to use concepts that have been learned in new and real situations [14]. In the context of this research, students understand the concept of science education comprehensively and can apply it when they practice teaching science.

HL's strong and weak effect on student learning outcomes is thought to be due to the variation in the level of SE they have. This study wants to reveal the effect of HL strategies as independent variables and SE as moderating variables on learning outcomes as the dependent variable. The research questions are whether HL strategies affect student-learning outcomes without involving SE? Otherwise, does SE affect student-learning outcomes by ignoring HL strategies?

## 2. Method

This study used a quasi-experimental method with a non-equivalent factorial version 2 x 2 group design [15]. Both the experimental and control classes were given treatment. The experimental class was taught using HL strategies, while the control class was taught using face-to-face learning strategies. All groups were given a pretest before being given treatment and a post-test after being given treatment. The experimental design is shown in Figure 1.

O1 X1 O2
---
O1 X2 O2
*Notes:*
X1: Treatment by HL strategy
X2: Treatment by face-to-face strategy
O1: First observation through pretest
O2: Second observation through post-test

### 2.1. Research Subject

The subjects of this study were 124 students majoring in Elementary School Teacher Education, Manado State University, Indonesia. They were divided into experimental and control classes. Each class consists of 62 students. The determination of the sample class was randomly selected using a random sampling technique from the number of classes that attended the Science Education course. This is because each student (class) has relatively the same character, academic ability (preliminary test results), and access to information and digital technology.

### 2.2. Research Procedure

There are three stages in this research:

1) Designing online learning with the Moodle application, developing teaching materials and evaluation tools, carrying out a pretest to determine students' prior knowledge and identifying students' SE levels;

2) The treatment (the experimental class uses an HL strategy and the control class uses face-to-face learning) and carry out observations;

3) Measuring student-learning outcomes through post-test.

### 2.3. Research Instruments

The research instrument consisted of a questionnaire and a test: 1) the questionnaire. The questionnaire was

used to identify students' SE. The questionnaire used adapts the Computer User Self Efficacy (CUSE) scale developed by [16].

Furthermore, the process of answering the questionnaire by students is carried out through the Google Form application. 2) Test. The test is conducted to measure the learning outcomes of understanding and application concepts. Tests to measure understanding of concepts in the form of multiple choices, but tests to measure the application of concepts in the form of descriptions or essays. The design and development of a test instrument based on science education content in the PGSD study program and refers to Bloom's Taxonomy as modified by Anderson and Krathwohl [13].

### 2.4. Data Analysis Technique

Multivariate Analysis of Variance (MANOVA) consists of a multivariate test, an inter-subject effect test, a comparison test between the estimated mean, and the interaction between independent variables on the dependent variables [17]. MANOVA fulfills the assumptions of data normality and homogeneity of variance between groups. Therefore, assumptions were tested before carrying out the MANOVA analysis (data normality and variance homogeneity). Thus, the research conclusions can be generalized. The level of significance of this study is 95% or $\alpha = 0.05$.

## 3. Findings

### 3.1. Description of Students' Self-Efficacy

There are 30 questionnaire statements to identify students' SE. Each statement has four alternative answers, namely strongly disagree, disagree, agree, and strongly agree. Students who answered strongly disagree for negative statements and strongly agreed for positive statements were given a score of four. Then, students who answered disagree for negative statements and agreed for positive statements were given a score of three.

Furthermore, students who answered agree, both negative and positive statements, were given a score of two, and students who answered strongly agreed for negative statements and disagree for positive statements were given a score of one. Thus, the maximum score for all statements is 120, and the minimum score is 30. For all statements, the highest mean score is four, and the lowest score is one. The score of students' SE in the experimental and control classes is shown in Table 1.

Table 1 Identification of self-efficacy

| SE | Control class (face to face strategy) | Experimental class (HL strategy) |
|---|---|---|
| Low | 34 | 37 |
| High | 28 | 25 |
| Total | 62 | 62 |

Table 1 reveals that 34 students in the control class have low SE and 28 students with high SE. Furthermore, 37 students had low SE in the experimental class, and 25 students had high SE. In both the experimental and control classes, students with low SE are more than students with high SE are.

### 3.2. Description of Students' Prior Knowledge

Students' prior knowledge of concept understanding was measured by a multiple-choice test, while an essay test measured the ability to apply concepts. The multiple-choice test consists of 30 questions. Students who answered correctly to the questions were given a score of one, while students who answered incorrectly were given zero. Furthermore, there are ten questions to measure the concept application. Each question has a score range of five to zero—each question provided an assessment rubric to avoid the subjectivity of the assessment. The recapitulation of the pretest results (to measure the prior knowledge) of students, both the experimental and control classes, is shown in Table 2.

Table 2 Results of students' prior knowledge

| SE | Control group (face to face strategy) | | | | Experimental group (hl strategy) | | | |
|---|---|---|---|---|---|---|---|---|
| | Concept Understanding | | Concept application | | Concept understanding | | Concept application | |
| | Mean Score | SD | Mean Score | SD | Mean Score | SD | Mean Score | SD |
| Low | 42.76 | 12.01 | 55.29 | 8.36 | 44.97 | 14.74 | 57.43 | 7.15 |
| High | 39.14 | 10.36 | 55.00 | 6.55 | 45.52 | 12.78 | 56.92 | 7.63 |
| Mean | 40.95 | 11.185 | 55.145 | 7.455 | 45.245 | 13.76 | 57.175 | 7.39 |

Based on Table 2, it can be explained as follows:

1) The mean score of concept application is higher than concept understanding, both in the experimental and control classes;

2) Students in the experimental class have a higher mean score than the control class, both on concept understanding and concept application;

3) In the experimental class, students who had higher SE obtained a higher mean score than students who had low SE; in the control class, students with low SE obtained a higher mean score than students who had high SE, both in understanding concepts and in concept application.

### 3.3. Description of Post-Test Results

Post-test is a process to determine changes in student knowledge after being given treatment, both changes in understanding and application concepts. The results obtained by the students are thought to be the impact of different treatments, where students in the experimental class are taught by HL strategies, while face-to-face learning strategies teach students in the control class. The post-test scores of students' understanding and application concepts in the experimental and control classes are shown in Table 3.

Table 3 Post-test mean score of understanding and application of concepts

| SE | The control group (face to face strategy) | | | | The experimental group (HL strategy) | | | |
|---|---|---|---|---|---|---|---|---|
| | Concept understanding | | Concept application | | Concept understanding | | Concept application | |
| | Mean score | SD | Mean score | SD | Mean score | SD | Mean score | SD |
| Low | 48.32 | 10.97 | 58.12 | 6.56 | 75.08 | 13.12 | 72.43 | 6.22 |
| High | 58.07 | 12.53 | 62.89 | 5.16 | 81.72 | 11.26 | 90.28 | 4.61 |
| Mean | 53.20 | 11.75 | 60.51 | 5.86 | 78.40 | 12.19 | 81.36 | 5.42 |

Statistically, Table 3 can be explained as follows:

1) The mean score of concept application is lower than concept understanding, both in the experimental and control classes;

2) Students in the experimental class have a higher mean score than the control class, both on concept understanding and concept application;

3) In the experimental class, students with higher SE obtained a higher mean score than students with low SE, both in understanding concepts and concept application.

Tables 2 and 3 have revealed that statistically, there is a difference (or increase) in students' understanding and application of concepts before and after treatment, both in the experimental and control classes. After being given the treatment, there was an increase in the mean score of student learning outcomes in both groups. However, are those differences significant? Through hypothesis testing, this question will be answered in the following description.

### 3.4. Effect of HL and SE on Learning Outcomes

Before testing the effects of HL and SE on learning outcomes of understanding and application of concepts, a test for data normality and homogeneity of variants must be done. The data normality test aims to determine whether the sample data is normally distributed or not, while the variance homogeneity test was carried out to determine whether the variance in each category was homogeneous or not. The decision to accept or reject H0 depends on the significant value of the Kolmogorov-Smirnov One-Sample Test and Levene's Test of Equality of Error Variances. H0 is rejected if the significance value is lower than alpha (α). The alpha level used in this study was 0.05.

The "Kolmogorov-Smirnov One-Sample Test" results obtained the significance of understanding the concept of 0.150 for the high SE group and 0.950 for the low SE group. Meanwhile, the significance of applying the concept for the high SE group is 0.390, and the low SE group was 0.334. Thus, it can be said that the post-test scores (understanding and application of the concept) are normally distributed, both for the high and low SE groups. Furthermore, the results of "Levene's Test of Equality of Error Variances" show that the significance of understanding the concept is 0.112, and the application of the concept is 0.238. These values are greater than alpha (P > 0.05). Thus, it can be concluded that the post-test results of understanding and application of the concept are homogeneous, both in the experimental and control classes.

After fulfilling the assumption of data normality and homogeneity of variances, hypothesis testing was carried out. The research hypothesis (there is an effect of HL strategies and SE on learning outcomes) is accepted if the significance value (P-Value) of "effect tests between subjects" is smaller than alpha (0.05). The results of effect tests between subjects are shown in Table 5.

Table 5 Effect tests between subjects

| Source | Dependent Variable | F | Sig. |
|---|---|---|---|
| HL | Understanding concepts | 132.236 | .000 |
| | Application Concepts | 390.840 | .000 |
| SE | Understanding concepts | 13.976 | .000 |
| | Application Concepts | 115.022 | .000 |
| HL* SE | Understanding concepts | .503 | .480 |
| | Application Concepts | 38.406 | .000 |

Based on Table 5, it can be explained as follows: 1) The significance of the effect of the HL strategies on concept understanding and concept application is 0.00; 2) The significance of the effect of SE on concept understanding and concept application is 0.00; 3) The significance of the interaction effect of HL strategies and SE on concept understanding is 0.48 and 4) The significance of the interaction effect of HL strategies and SE on concept application is 0.00.

Based on these significance values, several things can be disclosed. First, there is a significant effect of using HL strategies on student learning outcomes, both understanding and application of concepts (P < 0.00). Students taught by HL strategies get better learning outcomes than students taught by face-to-face learning strategies. Second, SE has a significant effect on the understanding and application of concepts (P < 0.05). This means that students who have high levels of SE get better learning outcomes than students who have low levels of SE.

Third, HL strategies and SE have no interaction effect on concept understanding (P > 0.05). This means

that the use of HL strategies affects learning outcomes in understanding the concept apart from the SE. On the other hand, SE affects the learning outcomes of conceptual understanding apart from the HL strategies (Degeng, 2019). Fourth, HL strategies and SE have an interaction effect on learning outcomes in concept application ($P < 0.05$). Students who are taught using HL strategies and have high SE are superior in applying the concept of science education than students who are taught using face-to-face learning strategies, and students have low levels of SE.

# 4. Discussion

### 4.1. Effect of HL on Understanding and Application of Concepts

In science education lectures, understanding the concept is very important to be mastered by students as prospective teachers. Through this lecture, students are taught to master various strategies, models, methods, approaches, and evaluations of science education. Wisudawaiti and Sulistyowati [18] have explained that pedagogical competence in science education is related to the ability of teachers to carry out the science education process. The process is carried out in three stages of activity: planning, implementing, and evaluating learning. Students who understand the concept of science education will help him/her to apply science education in the classroom.

The effectiveness of applying the HL strategy (experimental class) confirms that the hybrid strategy is suitable for millennial students (generation Z), students born from 1995 to 2010. This strengthens several previous studies [19]. These studies have reported that the HL strategy is superior to the traditional classroom or face-to-face class, both active learning, learning satisfaction, and student learning outcomes.

However, as a relatively new strategy, HL is not without its problems. Research conducted by [7] revealed that students who took web-hybrid lectures showed a higher level of fear than students who took learning in traditional classes. Previous studies [20] have also reported similar results. They have found that students who do face-to-face collaboration have shown higher learning participation than students who do collaborative online.

They have found that using HL strategies is more effective (in ethical learning) than traditional learning strategies. Concerning the professional development of teachers using geographic information systems, Moore et al. [19] have found that HL can increase teacher professionalism, both in planning and implementing Science and Mathematics learning. Other studies [21,22] also show similar results; HL strategies positively influence student-learning outcomes.

Concerning the professional development of teachers using geographic information systems, [19] have found that HL can increase teacher professionalism, both in planning and implementing Science and Mathematics learning. Other studies [21, 22] also show similar results; HL strategies positively influence student-learning outcomes.

The results of research [21] support this research. They have found that the learning model hybrid can also make it easier for students to understand learning material, and blended learning can increase learning satisfaction for students. Furthermore, [22] have developed a blended learning system by applying the synectic learning model and the “TRINGO” model applied by Ki Hadjar Dewantara (Father of Indonesian Education). They found that the blended learning model could encourage students to think creatively and innovatively. When compared to fully online learning, HL is superior [23]. Lasfeto [24] conducted a study on applying the concept of a network operating system using online learning based on Fuzzy Expert while considering SE factors. He has found that online learning strategies based on Fuzzy Expert System are more effective than conventional online learning strategies.

Thus, it can be said that the findings of this study (HL has a positive effect on learning outcomes of understanding and application of concepts) are supported and strengthened by the findings of previous studies. HL strategies are superior to conventional (face-to-face) learning strategies.

### 4.2. Effect of SE on Understanding and Application of Concepts

This study found that SE significantly affected learning outcomes, both learning outcomes understanding concepts and concept application. Theoretically, these findings are supporting the theories that have been found previously. The paper [25] states that learning confidence is caused by strategy and condition factors.

Self-efficacy and self-regulation are two of the conditions that greatly affect student-learning activities. Furthermore, they further explained that self-confidence affects task choice, effort, persistence, endurance, and learning achievement. The level of SE determines whether a behavior is carried out or not, whatever efforts are made, and how long these efforts will be supported in facing challenges [26].

Apart from theoretical support, the findings of this study also support several empirical studies. Martins, Costa, and Onofre [27] have found that students with high SE get better or higher learning outcomes (application of research methodology concepts) than students with low SE.

Further, Retno [28] found significant differences in understanding and application of the concept of hydrology between students who have high and low SE. Students with high SE are more confident in using information technology (in flipped classroom learning) than students with low SE. The paper [29] notes that

SE is one factor that influences an individual's ability to use ICT and the quality of performance.

### 4.3. Interaction Effect of HL and SE on Understanding and Application of Concepts

This study found no effect of the interaction of HL strategies and SE on learning outcomes in understanding concepts. The use of HL strategies has a significant effect on the learning outcomes of understanding the concept of science education, both students who have high or low SE. In other words, HL (as a strategy factor) and SE (as a learning condition factor) have positive effects on learning outcomes (understanding and application of concepts) independently of each other [30].

The findings of this study were also shown in several similar studies [29, 31] Retno [29], in her research, found no effect of the interaction of the flip classroom strategy and SE on understanding the concept of hydrology. Research conducted by Meydanlioglu and Arikan [31] revealed that hybrid learning is more effective than online or face-to-face models in higher education. Sutisna and Vonti [32] have also found relatively similar research results; through hybrid learning, students and lecturers can interact to overcome space and time. However, Mukhid, in his research, did not find the interaction effect of using HL and SE on learning outcomes [33].

However, there is an interaction between HL strategies and SE for the second dependent variable (application of the concept of science education). This means that the HL strategy and SE conditions together affect applying the concept of science education.

Thus, the skills of students operating computers can foster their self-confidence to apply science education concepts and encourage them to be more enthusiastic about learning.

The findings of this study follow the previous studies [27, 34]. Studies conducted by Martin, Costa, and Onofre (2015) on the pre-service teacher of physical education have reported that SE has a strong relationship with HL strategies. Furthermore, Olmez and Ozbas [34], who examined 200 science teachers in Turkey regarding the relationship of SE and the ability to use learning strategies, revealed that SE and science teaching strategies were strong predictor variables of good learning interactions in class, between teachers and students, among students and learning resources.

These findings reveal that learning success and the use of HL strategies cannot be separated from the effect of SE as a learning condition factor. In other words, SE is one of the factors that greatly influence the effectiveness of using HL. By having high SE, individuals are more confident about planning and carrying out learning activities. They believe that what they do will get optimal learning outcomes.

## 5. Conclusion

Based on the research results, several conclusions can be formulated:

1) There is a significant effect of using the HL strategy and SE level on science learning outcomes, both conceptual understanding, and concept application; Students who study with the HL strategy get higher learning outcomes than students who learn with the traditional learning strategy;

2) There is no interaction effect of using HL and SE strategies on concept understanding; neither the experimental class nor the control class had a significant difference in understanding the concept of science education;

3) There is an interaction effect of using HL and SE strategies on applying the concept; Students who were taught using the HL strategy and had high SE levels had significantly higher scores than students taught using the face-to-face learning strategy and had low SE levels.

Thus, this study reveals that SE is a learning condition that greatly affects using HL as a recommended learning strategy during the Covid-19 pandemic. During the Covid-19 pandemic, every educational institution (required) using online learning strategies or at least the HL strategy, every student needs to have a good SE level. Many students who did not have a high SE level caused the failure and various problems of online learning during the COVID-19 pandemic, especially the problems experienced by students in Indonesia, among other things. Thus, the findings of this study provide an imperative for educational institutions and teachers to analyze learning conditions before using online learning or HL strategies. SE is one of the learning conditions that need to be analyzed. This study (and other previous studies) revealed that SE is a learning condition that encourages students to carry out independent learning activities and has a significant effect on learning outcomes. The learning outcomes measured in this study were understanding and applying the concepts of science education courses. Science education course is the content used in this study. The results of the studies are predicted to be the same if applied to different courses but have the same level and characteristics of the research subjects.

Based on these conclusions, suggestions for further research are the need to test students' online learning interest or ICT mastery before implementing the HL strategy. Thus, the learning outcomes they get are assessed as the impact of the treatment given, not other factors. In addition, there is an influence of SE level on learning outcomes, so that in future educational practices, teachers or lecturers need to make pedagogical efforts to improve students' SE. Thus, the innovative learning strategies applied will effectively achieve student-learning outcomes and will not improve their cognitive abilities.

This study was conducted in universities. Therefore, the findings of this study certainly cannot be

generalized to all levels of education, especially at the level of basic education, where students' self-confidence and study habits are still very low. In addition, the implementation of HL requires the use of online media and online tools that require the users' technical skills. Therefore, the HL strategy's effectiveness cannot be applied to all learning conditions, especially educational institutions that do not have a stable internet network. These are the limitations and weaknesses of our study. This weakness would encourage other researchers to research in the future.

## References


[1] LANE JL, SWEENY SP. Understanding Agency and Organization in Early Career Teachers' Professional Tie Formation. *Journal of Educational Change*, 2019, *20*(1), 79–104.

[2] PUSPITARINI YD, HANIF M. Using Learning Media to Increase Learning Motivation in Elementary School. *Anatolian Journal of Education*, 2019, 4(2): 53-60.

[3] SCHABER P, MCGEE C, JONES T. The building student community in a hybrid program. *Occupational Therapy in Health Care*, 2017, 29(2): 102–114.

[4] GIL-ARIAS A, HARVEY S, CÁRCELES A, PRÁXEDES A, DEL VILLAR F. Impact of a hybrid TGfU-Sport Education unit on student motivation in physical education. *PLoS ONE*, 2017, 12(6): 1–18.

[5] NOLLENBERGER K. On-Campus versus Hybrid Courses in a Master of Public Administration Program. *Journal of Public Affairs Education*, 2017, 23(1): 625–636.

[6] CHINGOS MM, GRIFFITHS RJ, MULHERN C, SPIES RR. Interactive Online Learning on Campus: Comparing Students' Outcomes in Hybrid and Traditional Courses in the University System of Maryland. *Journal of Higher Education*, 2017, 88(2): 210–233.

[7] DAVIS JA. Counselor Education Students ' Fear in Online and Traditional Research Courses Counselor Education Students' Fear. *Online and Traditional Research*, 2019, 12(2).

[8] BURROLA-MENDEZ Y, BONILLA-ESCOBAR FJ, GOLDBERG M, PEARLMAN J. Comparing the effectiveness of a hybrid and in-person courses of wheelchair service provision knowledge: A controlled quasi-experimental study in India and Mexico. *PLoS ONE*, 2019, 14(5): 1–26.

[9] KUSTYARINI K. Self-Efficacy and Emotional Quotient in Mediating Active Learning Effect on Students' Learning Outcome. International Journal of Instruction, 2020, 13(2): 663-676.

[10] WILDE N, HSU A. The influence of general self-efficacy on the interpretation of vicarious experience information within online learning. *International Journal of Educational Technology in Higher Education*, 2019, 16.

[11] KUND A. Toward a framework for strengthening participants' self-efficacy in online education. *Asian Association of Open Universities Journal*, 2020, 15(3): 351-370.

[12] UGWUANYI CS, OKEKE CIO, AGEDA TA. Motivation and Self-efficacy as Predictors of Learners' Academic Achievement. *J Sociology Soc Anth*, 2020, 11(3-4): 215-222.

[13] ANWAR C.*Teori-Teori Pendidikan Klasik Hingga Kontemporer*, 2017. Yogyakarta: IRCiSoD.

[14] LUBIS RR, IRWANTO I, HARAHAP MY. Increasing Learning Outcomes and Ability Critical Thinking of Students through Application Problem Based Learning Strategies. *International Journal for Educational and Vocational Studies*, 2019, 1(6): 524-527.

[15] SUNG Y-T, CHANG K-E, LIU T-C. The Effects of Integrating Mobile Devices with Teaching and Learning on Students' Learning Performance: A Meta-Analysis and Research Synthesis. *Computers, Education*, 2015, 94: 252–275.

[16] CASSIDY S, EACHUS P. Developing the Computer User Self Efficacy (Cuse) Scale: Investigating the Relationship between Computer Self Efficacy, Gender, and Experience with Computers. *Journal of Educational Computing Research*, 2002, 26(2): 133–153.

[17] CHUA YP. *Univariate and Multivariate Tests (book 4) 2nd Edition*, 2018. University of Malaya: McGraw-Hill Education.

[18] WARDOYO C, SATRIO YD, RATNASARI DA. An analysis of teachers' pedagogical and professional competencies in the 2013 Curriculum with the 2017-2018 revision in Accounting subject. *Research and Evaluation in Education*, 2020, 6(2): 142-149.

[19] MOORE S, HAVILAND D, MOORE W, TRAN M. Preparing Teachers to Use GIS: The Impact of a Hybrid Professional Development Program on Teachers' Use of GIS. *Journal of Science Education and Technology*, 2016, 25(6): 1-17.

[20] COMAN C, TÎRU LG, MESES AN, SCHMITZ L, STANCIU C, BULARCA MC. Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*, 2020, 12: 1-24.

[21] GIL-ARIAS A, HARVEY S, GARCÍA-HERREROS F, GONZÁLEZ-VÍLLORA S, PRÁXEDES A, MORENO A. Effect of a hybrid teaching games for understanding/sport education unit on elementary students' self-determined motivation in physical education. *European Physical Education Review*, 2020.

[22] KUSWANDI D, PRAHERDIONO H, TOENLIOE AJE. Synectics Learning and Tringo Model for Blended Learning. *System Application*, 2017, 128(Icet): 126–131.

[23] SIYAMTA. *Pengaruh Strategi Pembelajaran (Online-Blended Learning) dan Self Regulated Learning Terhadap Kemampuan Menerapkan Konsep Mengadministrasi Sistem Operasi Jaringan Pada Guru Sekolah Menengah Kejuruan*, 2018. Disertasi, Program Studi Teknologi Pembelajaran, Pascasarjana Universitas Negeri Malang.

[24] LASFETO DB. *Pemodelan Strategi Online Learning berbasis Fuzzy Expert System dan Pengaruhnya terhadap Hasil Belajar Pemahaman Konsep ditinjau dari Self Directed Learning Readiness*, 2019. Disertasi, Program Studi Teknologi Pembelajaran, Pascasarjana Universitas Negeri Malang.

[25] MIDUN H, BULE O, RORIMPANDEY WHF. The Effect of Scaffolding on Assignment Quality and Procedural Learning Achievement. *Journal of Educational, Cultural and Psychological Studies*, 2020, 22, 143-158.

[26] KURNIAWAN C, SETYOSARI P, KAMDI W, ULFA S. Classification of engineering Students' self-efficacy towards visual-verbal preferences using data mining methods. *Problems of Education in the 21st Century*, 2019,

77(3): 349-363.
[27] MARTINS M, COSTA J, ONOFRE M. Practicum experiences as sources of pre-service teachers' SE. *European Journal of Teacher Education*, 2015, 38(2): 263–279.
[28] RETNO K. *Pengaruh Model Pembelajaran Flipped Classroom dan Self Efficacy Terhadap Hasil Belajar Pemahaman dan Penerapan Konsep Hidrologi*, 2019. Disertasi, Program Studi Teknologi Pembelajaran, Pascasarjana, Universitas Negeri Malang.
[29] IKHROM. The Relevance of self-efficacy, Perception, ICT Ability, and Teacher Performance (Study on Islamic Teachers in Semarang, Indonesia). *Nadwa: Jurnal Pendidikan Islam*, 2020, 14(1): 39-74.
[30] DEGENG INS. Paradigma Penelitan ATI Untuk Pengujian Dan Pengembangan Teori Pembelajaran. In Praherdhiono, H. Setyosari, P, Degeng, INS (Eds). *Teori dan Implementasi Teknologi Pendidikan Era Belajar Abad 21 dan Revolusi Industri 4.0*, 2019, 43-60. Malang: Seribu Bintang.
[31] MEYDANLIOGLU A, ARIKAN F. Effect of Hybrid Learning in Higher Education. *International Journal of Information and Communication Technology Education*, 2014, 8(5): 1292-1295.
[32] SUTISNA E, VONTI LH. Innovation development strategy for hybrid learning-based English teaching and learning. *English Review: Journal of English Education*, 2020, 9(1): 103-114.
[33] MUKHID A. Pengaruh Strategi Pembelajaran dan Tingkat Self-Efficacy terhadap Pemahaman Konsep dan Aplikasi Konsep Metodologi Penelitian, 2017. Disertasi, Universitas Negeri Malang, Indonesia.
[34] OLMEZ C, OZBAS S. Teacher Self-Efficacy According to Turkish Cypriot Science Teachers. *Africa Education Review*, 2017, 14 (3–4): 36–51.

**参考文:**

[1] LANE JL, SWEENY SP。了解早期職業教師專業關係形成中的代理和組織。教育變革雜誌，2019 年，20（1），79-104。
[2] PUSPITARINI YD, HANIF M. 使用學習媒體提高小學的學習動機。安納托利亞教育雜誌，2019 年，4(2)：53-60。
[3] SCHABER P, MCGEE C, JONES T. 在混合項目中建立學生社區。衛生保健中的職業治療，2017, 29(2): 102–114。
[4] GIL-ARIAS A, HARVEY S, CÁRCELES A, PRÁXEDES A, DEL VILLAR F. 混合 運動教育單元對學生體育教學動機的影響。 公共圖書館一號, 2017, 12(6): 1–18。
[5] NOLLENBERGER K. 公共管理碩士課程中的校園課程與混合課程。公共事務教育雜誌，2017，23（1）：625-636。
[6] CHINGOS MM, GRIFFITHS RJ, MULHERN C, SPIES RR。校園互動在線學習：比較馬里蘭大學系統中學生在混合課程和傳統課程中的學習成果。高等教育雜誌，2017，88（2）：210-233。
[7] DAVIS JA。輔導員教育學生對在線和傳統研究課程的恐懼 輔導員教育學生的恐懼。在線與傳統研究，2019，12(2)。
[8] BURROLA-MENDEZ Y、BONILLA-ESCOBAR FJ、GOLDBERG M、PEARLMAN J。比較輪椅服務提供知識混合課程和麵對面課程的有效性：在印度和墨西哥進行的受控準實驗研究。 公共圖書館一號, 2019, 14(5): 1–26。
[9] KUSTYARINI K. 自我效能和情商在調節主動學習對學生學習成果的影響中。國際教學雜誌, 2020, 13(2): 663-676。
[10] WILDE N, HSU A. 一般自我效能感對在線學習中替代體驗信息解釋的影響。國際高等教育教育技術雜誌，2019，16。
[11] KUND A. 建立一個框架來加強參與者在在線教育中的自我效能感。亞洲開放大學協會學報, 2020, 15(3): 351-370.
[12] UGWUANYI CS, OKEKE CIO, AGEDA, TA。動機和自我效能作為學習者學業成就的預測因素。 J 社會學 國歌, 2020, 11(3-4): 215-222。
[13] ANWAR C. 從古典到現代的教育理論，2017 年。日惹。
[14] LUBIS RR、IRWANTO I、HARAHAP MY。通過基於應用問題的學習策略提高學生的學習成果和能力批判性思維。國際教育與職業研究雜誌，2019 年，1(6)：524-527。
[15] SUNG Y-T, CHANG K-E, LIU T-C。移動設備與教學相結合對學生學習成績的影響：元分析和研究綜合。計算機，教育，2015，94：252-275。
[16] CASSIDY S, EACHUS P. 開發計算機用戶自我效能感量表：調查計算機自我效能感、性別和使用計算機的經驗之間的關係。教育計算研究雜誌，2002, 26(2): 133–153。
[17] CHUA YP。單變量和多變量測試（第 4 冊）第 2 版，2018 年。馬來亞大學：麥格勞-希爾教育。
[18] WARDOYO C、SATRIO YD、RATNASARI DA。會計學科 2017-2018 年修訂 2013 年課程教師教學與專業能力分析.教育研究與評價, 2020, 6(2): 142-149。
[19] MOORE S, HAVILAND D, MOORE W, TRAN M. 教師使用地理信息系统的準備：混合專業發展計劃對教師使用地理信息系统的影響。科學教育與技術學報, 2016, 25(6): 1-17.

[20] COMAN C、TÎRU LG、MESES AN、SCHMITZ L、STANCIU C、BULARCA MC。冠狀病毒大流行期間高等教育的在線教學：學生的觀點。可持續性，2020 年，12：1-24。

[21] GIL-ARIAS A, HARVEY S, GARCÍA-HERREROS F, GONZÁLEZ-VÍLLORA S, PRÁXEDES A, MORENO A. 理解/體育教育單元的混合教學遊戲對小學生體育自主學習動機的影響.歐洲體育評論，2020。

[22] KUSWANDI D, PRAHERDIONO H, TOENLIOE AJE。 集思廣益學習和混合學習的 特林戈模型。系統應用，2017，128：126-131。

[23] SIYAMTA。 在線混合學習和自我調節學習策略對將管理網絡操作系統的概念應用於職業高中教師的能力的影響，2018。論文，學習技術研究計劃，瑪瑯州立大學研究生。

[24] LASFETO DB。基於模糊專家系統的在線學習策略建模及其對自主學習準備中概念理解學習結果的影響，2019。博士論文，學習技術研究計劃，瑪瑯國立大學研究生。

[25] MIDUN H，BULE O，RORIMPANDEY WHF。腳手架對作業質量和程序學習成績的影響。教育、文化和心理研究雜誌，2020 年，22，143-158。

[26] KURNIAWAN C、SETYOSARI P、KAMDI W、ULFA S. 使用數據挖掘方法對工程學生的視覺-語言偏好的自我效能進行分類。 21 世紀的教育問題，2019，77(3)：349-363。

[27] MARTINS M, COSTA J, ONOFRE M. 實習經驗作為職前教師东南的來源。歐洲教師教育雜誌，2015 年，38(2)：263–279。

[28] RETNO K. 翻轉課堂和自我效能學習模式對理解和應用水文概念的學習成果的影響，2019. 瑪瑯州立大學碩士論文，學習技術研究項目。

[29] ICHROM。自我效能、感知、信息通信技術能力和教師表現的相關性（印度尼西亞三寶壟伊斯蘭教師研究）。納德瓦：伊斯蘭教育雜誌，2020 年，14(1)：39-74。

[30] DEGENG INS。測試和學習理論發展研究範式。在。 21 世紀學習時代與工業革命 4.0 下的教育技術理論與實現，2019，43-60。瑪瑯：一千顆星星。

[31] MEYDANLIOGLU A, ARIKAN F. 混合學習在高等教育中的作用。國際信息與通信技術教育雜誌, 2014, 8(5): 1292-1295。

[32] SUTISNA E, VONTI LH。基於英語教與學的混合學習創新發展策略英語評論：英語教育雜誌，2020，9(1)：103-114。

[33] MUKHID A. 學習策略和自我效能水平對概念理解和研究方法概念應用的影響，2017。論文，印度尼西亞瑪瑯州立大學。

[34] OLMEZ C, OZBAS S. 土族塞人科學教師的教師自我效能感。非洲教育評論，2017 年，14 (3–4)：36–51。