Kasetsart Journal of Social Sciences 45 (2024) 113–120

Kasetsart Journal of Social Sciences

journal homepage: http://kjss.kasetsart.org

# Strategies for biological lesson plan designing and applying: A case study at Cai Nuoc High School in Ca Mau Province, Vietnam

**Lam Thi Thao Vo, Anh Ngoc Tran, Thu Quynh Phan, Phuc Le Hoang Nguyen, Ly Thi Cam Tran, Quang Minh Dinh***

*Biology Teacher of Education, Department of Biology, School of Education, Can Tho University, Ninh Kieu, Can Tho 900000, Vietnam*

**Article Info**

*Article history:*
Received 21 April 2023
Revised 7 June 2023
Accepted 9 June 2023
Available online 15 December 2023

*Keywords:*
competency,
high school,
lesson plan designed,
questionnaire,
teaching process

**Abstract**

The purpose of the study was to evaluate whether the lesson plan designed by the research team is suitable for teachers and students at Cai Nuoc High School, Ca Mau province, Vietnam. Data were collected through survey results from Google Forms and observations and lesson plan assessments from teachers participating in the experiment. The results show that the lesson plan designed based on the research team process is effective; it helps teachers save time and be more confident when applying it to the teaching process in the classroom. In addition, the lesson plan designed from this process not only helps students master the knowledge and develop competence but also practice many necessary skills such as problem-solving, creativity, communication, etc.



## Introduction

The lesson plan is a specific design and guide for implementing the task of teaching a subject or lesson, including defining teaching objectives and expected learning resources, designing teaching and learning activities, and inspecting and evaluating the results of teaching and learning activities.

On December 26, 2018, implementing the goal of the Central Government and the National Assembly to focus on forming qualities and competencies in students, the Ministry of Education and Training signed Circular No. 32/2018/TT-BGDDT promulgating the General Education Program consisting of 27 programs of different subjects and the Master Program. In particular, there is a clarification of specific manifestations of general capability at all levels of education (Ministry of Education and Training [MET], 2018). Two years later, on 18/12/2020, the Ministry of Education and Training issued official letter No. 5512/BGDDT-GDTrH with the general goal of implementing teaching methods and testing and evaluating according to the requirements of developing students' qualities and capacity (MET, 2020).

On December 26, 2018, the Ministry of Education and Training issued the General Education Program 2018 together with Circular No. 32/2018/TT-BGDDT, including the Master Program and curriculum with objectives and requirements to be achieved towards forming capacity and quality for learners (MET, 2018). This is also an important milestone, marking the beginning of implementing the MET (2018).

* Corresponding author.
E-mail address: dmquang@ctu.edu.vn (Q. M. Dinh).

https://doi.org/10.34044/j.kjss.2024.45.1.12
2452–3151/© 2024 Kasetsart University.

Not only Vietnam but also the countries with advanced education, such as UK, USA, Japan, and Singapore have been applying teaching in the form of approaching students' capacity. The objective of this teaching model is to pay attention to forming and developing the necessary capacity for lifelong learning associated with daily life, focusing on general competencies such as self-study capacity, learning how to learn, personal ability, information and communication technology capacity for students (Central Steering Committee, 2013). Accordingly, teachers create opportunities for (1) students to be creative in class; (2) students to have time to brainstorm, plan, build work, and collaborate on creative problem-solving; and (3) teachers who present themselves in class as moderators can explain why students need to learn their style and create work in a social context through interaction with others (Pimthong et al., 2017).

The general education program in Biology aims to form and develop specialized competencies for students and simultaneously contribute to other subjects and educational activities to create and develop critical qualities and common competencies (MET, 2018).

Cai Nuoc High School is one of the largest high schools in Ca Mau province, with highly qualified teachers and good-quality students. In recent years, the transformation of educational goals from content to competency approaches has caused many Biology teachers at Cai Nuoc High School to encounter many difficulties. Therefore, the research team proposed designing lesson plans and experimented on the subject of Biology teachers at Cai Nuoc high school, Ca Mau, to investigate the effectiveness and thereby assist in solving difficulties in designing lesson plans for teachers in the Mekong Delta provinces.

## Literature Review

According to Songserm (2019), the lesson plan is now a document prepared by teachers to check and evaluate work results. Most lesson plans are instant materials analyzed by the publisher and developed into lesson plans according to each learning area. Consequently, some teachers forget that quality lesson plans are essential materials that teachers have to do for planning activities, means, and assessments. The lesson plan needs to have teaching content and goals that closely follow the primary curriculum and incorporate the teaching needs of students. In addition, good lesson plans should be checked by experts before learning, continuously improving the lesson plan with contemporary suggestions suitable for the teaching context.

The Herbart Method (Fredrick Herbart) has eight lesson planning stages designed to provide "ample opportunities for teachers to recognize and correct students' misconceptions while expanding understanding for future lessons". These stages are introduction, foundation, brain activation, new information content, clarification, practice and evaluation, independent practice, and closure (Cunningham, 2009).

The UDL-designed lesson plan helps students with disabilities with enormous differentiating abilities such as seeing, listening, speaking, moving, reading, writing, understanding English, paying attention, organizing, participating, or remembering to participate more fully in inclusive environments (Burgstahler & Cory, 2008; Casper & Leuchovius, 2005).

Preparing lesson plans is an important step teachers must perform before teaching. Through careful planning, the learning process will be more organized. However, not all activities compiled in the lesson plan are carried out. It is difficult to apply if the lesson plan is designed without orientation (Emiliasari, 2019). A well-designed lesson plan will make the lesson more effective. This shows that the curriculum design process plays an important role in teaching.

## Methodology

### *Research Subjects and Time*

This study surveyed eight biology teachers and 48 students of the class participating in the experimental lesson plan design process at Cai Nuoc High School, Ca Mau. This study was conducted from May 2022 to December 2022.

This study was carried out using the cross-sectional survey model with quantitative and qualitative research forms.

### *The Research Instrument*

The research instrument is the questionnaire. The question was designed as a list question to gather information, according to Quyet & Thanh (2011). In addition, the Likert scale was used to measure consent/satisfaction/response (Allen & Seaman, 2007). To give relatively accurate judgments about the level, the Likert scale range of 5 with an interval of (5–1)/5 = 0.8 was applied (Narli, 2010; Yavuz et al., 2013). Accordingly, the meanings of the scale were determined as follows: $1.0 \leq M < 1.8$ (strongly inefficient),

$1.8 \leq M < 2.6$ (inefficient), $2.6 \leq M < 3.4$ (neutral), $3.4 \leq M < 4.2$ (effective), and $4.2 \leq M \leq 5.0$ (strongly effective). In addition, the research team also used the scale of Likert 4 (4-1)/4 = 0.75 to survey the level of application of knowledge and skills of students after each lesson with values including $1.00 \leq M < 1.75$ (poor application), $1.75 \leq M < 2.5$ (fair application), $2.50 \leq M < 3.25$ (good application), and $3.25 \leq M \leq 4.00$ (very good application).

### *Sample Collection*

The survey form after the design was conducted to adjust the survey before conducting the official survey (Dinh et al., 2011a; 2011b).

### *Measuring The Reliability of Questionnaires*

The Cronbach Alpha was used to assess the reliability of survey questionnaires (Cronbach, 1951). This method is successfully used in evaluating the quality of human resources according to the requirements of enterprises in the Mekong Delta trained at Can Tho University (Nhut et al., 2012).

### *Data Analysis*

Data after the collection were encrypted and processed by SPSS v.21 software. The Mann-Whitney U test was applied to qualify the different views between male and female teachers, two groups of working seniority (teachers with ≤10 yrs and >10 yrs of teaching), and teachers and students with a significance level of $p < .05$.

## Results and discussion

### *Lesson Plan Design Process*

Summary of lesson plan development process is presented in Figure 1.

### *Step 1: Define the Objectives of the Lesson Plan*

The grounds for formulating the objectives of the lesson include: (1) The standard outcome of the lesson; (2) The current qualities and competencies of the student in the class being taught; and (3) Characteristics of knowledge content, means, equipment, and teaching methods and techniques.

The requirement when defining the lesson's goal is to write the goal according to the quality and competence; the purpose is expressed in specific, quantifiable verbs and must cover the standard outcomes of the lesson.

Specific steps to determine the goal of the lesson.

*Step 1.1 Define knowledge content*

In each of the ten biology textbooks of the 2018 General Education program, the beginning of each lesson unit has a GOAL section (or standard outcome) right after the lesson name. The knowledge content is determined by dropping the verbs at the beginning of the target sentence. Take, for example (Figure 2), from lesson 7, biology textbook 10–Kite, page 38, we have:

*Step 1.2 Define standard outcome content*

Standard outcome is mentioned in the General Education Program in Biology corresponding to each lesson unit or immediately after the lesson name in each textbook.

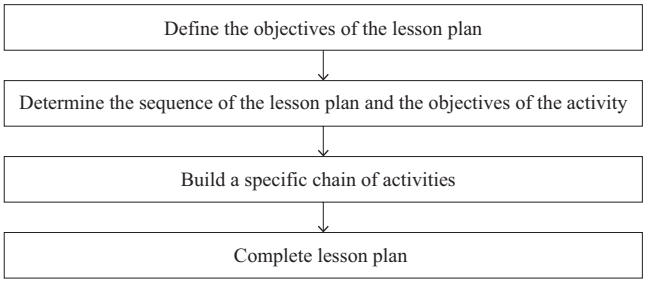


**Figure 1** Lesson plan designing process diagram

| Goal | Contents |
|---|---|
| - Describe the size of the structure and function of the cell components.<br>- Make a comparison table of prokaryotic cells and eukaryotic cells.<br>- Make a comparison table of plant and animal cell structure. | → - The size of the structure and function of the cell components.<br>- Comparison of prokaryotic cells and eukaryotic cells.<br>- Comparison of plant and animal cell structure. |

**Figure 2** Example of how to write learning outcome

It is necessary to select and use appropriate, measurable verbs to describe standard outcomes (limit the use of stated or understood verbs because these words cannot be measured but should use phrases that can be presented and explained).

*Step 1.3 Determination of qualities*

Compared with standard outcomes, teaching methods, and techniques to identify expressions of quality.

### *Step 2: Determine the Sequence of the Lesson Plan and the Objectives of the Activity*

A teaching process consists of 4 activities

1. Activity 1: Identify the problem/Learning Task/ Opening.
2. Activity 2: Forming new knowledge/Solving problems/Executing tasks.
3. Activity 3: Practice.
4. Activity 4: Application.

Method of proceeding: (1) Determine the objectives of the activities; (2) Orient the form, methods, teaching techniques, and assessment methods to meet the general objectives of the lesson; and (3) Determine the duration for each activity.

### *Step 3: Build a Specific Chain of Activities*

Specific design methods for each activity

*Activity 1 (Problem Identification/Learning Task/Opening)*

Engagement: This activity identifies the task (problem-topic name-lesson name) that needs to be solved. Therefore, this activity needs to be designed to maximize students' knowledge and experience to help them actively participate in the lesson. Warm-up exercises should be prepared to be close and familiar to students, limiting the introduction of sentences and questions of an imposing and academic nature.

Some ways to enter the article to interest students are such as (1) Opening with a story; (2) Preamble with the continuation of the early hour inspection; (3) Preamble with entanglement when solving an exercise; (4) Opening with curiosity; (5) Preface with a questionable question; (6) Open with an update from the press, television; (7) Preface with a quote; (8) Preface with a picture relevant to the content of the article; (9) Preamble with the learner's understanding; (10) Preamble with a local, social reality; (11) Begin with a simple experiment; (12) Open with a folk song; and (13) Open with a friendly attitude towards students

*Activity 2 (Forming new knowledge/Solving problems/ Executing tasks)*

This activity aims to solve problems/tasks and help students learn core knowledge and skills. This is the "Teaching Process". Teachers need to use active teaching methods/techniques to build this activity well.

The learning theories commonly used to construct the "Teaching Process" are:, Constructivism Theory (Goldie, 2016; Kop & Hill, 2008), Connectivism Theory (Bordwell, 1989; Staats, 1990), Theory of Multiple Intelligences (Brualdi Timmins, 1996; Gardner & Hatch, 1989).

In addition to the above six theories, there are several other theories such as Cognitive Flexibility (Anderson et al., 1996; Boger-Mehall, 1996), Cognitive Load (Wenger, 2010), Elaboration (Paas & Ayres, 2014), etc.

*Activity 3 (Practice)*

After acquiring new core knowledge and skills, it is necessary to organize activities aimed at two goals: strengthening core knowledge, practicing new skills, and continuing to equip other new knowledge/skills. In this activity, teachers can have students redraw diagrams or summarize the main content of the lesson. This is a normal neurophysiological process of humans; the combination of learning and practice will help students inculcate knowledge. A practice exercise is a minimal system of activities to reinforce the knowledge just learned, usually at the level of knowing and understanding on the Bloom scale.

Note:

1. Activity 3 should not be understood because the theory in activity two has been completed, and this activity is only for homework.
2. Not for many exercises is good, but such exercise must help students consolidate and deepen the knowledge learned in activity 2.
3. The objectives corresponding to the activities must meet the lesson's Standard Outcome (= Competence + Quality).

*Activity 4 (Application)*

When students have knowledge and skills, organizing them to apply them to solve learning and life problems to develop their abilities and qualities is necessary. This is an extended application exercise, not an advanced exercise, and it should be a homework exercise to help students see that the knowledge they have learned is helpful in practice.

This activity is built according to the 3N principle: No digression-No single answer-Not too long.

*Step 4: Complete the Lesson Plan*

After designing the content of each activity, it is necessary to have a formal pre-teaching workout time to consider how reasonable the content is and how to allocate time to adjust.

*Evaluate the Effectiveness of the Lesson Plan Development Process in Designing Lesson Plans for Biology Teachers of Cai Nuoc High School, Ca Mau*

The Cronbach Alpha analysis showed that the teacher and student questionnaire matched the reliability condition because the Cronbach Alpha of the teacher and student questionnaire was 0.75 and 0.89, respectively, and was more significant than the standard value of 0.60. Cai Nuoc High School is the 2nd largest school in Ca Mau province, although it is a suburban school adjacent to urban and rural areas. It is also a leading school in the innovation of teaching methods and is home to three excellent teachers of Biology at the provincial level, where one teacher is on the Provincial Biology Professional Council. Eight biology teachers of Cai Nuoc High School (two male and six female teachers, accounting for 25% and 75%, respectively) have applied and evaluated the process proposed by the research team. Regarding seniority, the number of teachers with ≤10 yrs and >10 yrs accounts for 37.5 percent and 62.5 percent, proving that the survey participants are diverse and have relatively high skills and solid experience. In addition, the team surveyed 48 grade 10 students of Cai Nuoc High School to have a more objective view of the efficiency of the process.

Regarding the feasibility of lesson plan design according to the process proposed, the survey results of 8 teachers showed that after approaching and designing activities according to the lesson plan, most teachers said that this process makes it easy for them to design an effective lesson plan. After applying the strategy proposed by the group, the teachers surveyed said that the process was effective for determining the standard outcome (4.14±0.06 *SE*) and the activity of forming new knowledge (4.14±0.04 *SE*), while startup operations, practice activities, and application activities are rated as "Very effective" with startup activity design (4.29±0.06 *SE*), practice activities (4.28±0.04 *SE*) and application activities (4.43±0.07 *SE*) (Table 1). This difference can be explained by identifying standard outcomes and designing activities to form new knowledge depending on the teacher's experience and creativity. Each lesson unit has various content with different levels of awareness, so the design of activities needs to be flexible, depending on the teaching class's competence. In addition, each lesson plan after design needs time for testing and adjusting to suit each teaching object.

Besides, when the research team surveyed some other questions about the feasibility of the process such as: "Does the process proposed by the team help you design a better lesson plan?", "Are you more confident when applying the lesson plan designed according to the process proposed by the research team?", "Between the previous lesson plan and the lesson plan designed according to the process proposed by the team, which one is more effective?", the survey results obtained from the above questions were very positive, with 100 percent of teachers testing the process and thinking about the process. This lesson plan designer helps them save time and be more confident when using lesson plans designed according to this process to apply in the teaching process. This is because most teachers today have too many things to do outside of teaching hours, such as marking tests, making records, books, etc., so they do not have much time to invest and design an effective lesson plan. In addition, although the conversion of teaching goals to competency approach teaching has been issued and disseminated by the Ministry of Education and Training for a long time, most teachers at Cai Nuoc High School are teachers with a working seniority of 10–20 years. They are familiar with the traditional teaching model (using the teaching method). Lectures are mainly for a long time, so updating new teaching methods to build an effective lesson plan is difficult. On the other hand, training sessions on guiding lesson plan design take place regularly, but the content and form have not attracted teachers (Huynh & Thathong, 2017). Therefore, when approached with the lesson plan design process proposed by the research team, teachers at Cai Nuoc High School

**Table 1** Evaluation of the feasibility of the process of building a teacher lesson plan at Cai Nuoc high school, Ca Mau

| Contents | Mean±*SE* | Level of opinion |
|---|---|---|
| The feasibility of the process when defining the objectives and standard outcomes of the lesson | 4.14±0.06 | Effective |
| Process feasibility when designing startup operations | 4.29±0.06 | Very effective |
| Process feasibility when designing activities that form new knowledge | 4.14±0.04 | Effective |
| Process feasibility when designing practice activities | 4.28±0.04 | Very effective |
| Process feasibility when designing application activities | 4.43±0.07 | Very effective |

*Note:* $1.0 \le M < 1.8$: Strongly inefficient; $1.8 \le M < 2.6$: inefficient; $2.6 \le M < 3.4$: Neutral; $3.4 \le M < 4.2$: Effective; $4.2 \le M \le 5.0$: Very effective.

have more a specific guide to easily follow each step without spending much time. This model helps teachers develop more ideas for building a lesson plan tailored to students' competencies because diverse lesson plans can serve as a framework for providing pedagogical information and also help teachers meet the challenges of having a diverse group of students by incorporating flexible teaching materials, techniques, and strategies (Center for Applied Special Technology, 2009; King-Sears, 2009; Morra & Reynolds, 2010; Samuels, 2007). This shows that teachers will design lesson plans more quickly if they have a good orientation or a specific and clear process (Emiliasari, 2019).

Based on the educational plan of the professional team developed from the beginning of the school year under the guidance of Official Letter No. 5512/BGDDT-GDTrH of the MET (2020), we experimented on two biology lessons, including Lesson 1. The organizational levels of the living world; and Lesson 2: Cell Biology. We conducted experiments in two grade ten classes at Cai Nuoc High School, Ca Mau province, in the school year 2022–2023. Eighty students participated in the experiment with relatively uniform qualifications, life circumstances, a sense of responsibility, and active activity participation. The manifestations of the ability to apply the knowledge and skills learned to solve practical problems were evaluated as follows (Table 2).

Assign points to the indicative levels of competence: 0–0.5 points for level 1; 0.5–1.0 points for level 2; 1.0–1.5 points for level 3 and 1.5–2.0 points for level 4; assign assessment slips and instructions to groups of students for self-assessment, peer assessment, and teacher evaluation after experimentally teaching two biology ten lessons under the general education program 2018. The results are summarized in Table 3.

**Table 2** Manifestations of the ability to apply learned knowledge and skills

| Capacity | Level |
|---|---|
| Capacity 1. Identify and raise practical issues about lesson content | Level 1. Do not realize the practical problem or the problem raised is not really related to the content of the lesson |
| | Level 2. Recognize and raise practical issues related to the content of the lesson but not really clear and reasonable |
| | Level 3. Recognize and raise practical issues related to the content of the lesson, but there is one unclear or unreasonable score |
| | Level 4. Recognize and raise practical issues related to the content of the lesson clearly and reasonably |
| Capacity 2. Apply knowledge and skills to solve problems | Level 1. Have not stated the relevant knowledge and skills to solve problems or solve problems that are not reasonable. |
| | Level 2. State the relevant knowledge and skills to solve the problem, but there are some unreasonable points |
| | Level 3. State relevant knowledge and skills to solve reasonable problems but do not cite specific evidence |
| | Level 4. State relevant knowledge and skills to solve reasonable problems and cite specific evidence |
| Capacity 3. Propose and implement some solutions to the problem to be solved | Level 1. Haven't mentioned solutions to solve the problem or raised but not yet able to solve it |
| | Level 2. Stating solutions to solve the problem but not yet clear and reasonable |
| | Level 3. Stating solutions to solve the problem is clear and reasonable, but there is no specific evidence |
| | Level 4. State the solutions to solve the problem clearly and reasonably and with evidence |
| Capacity 4. Conclusion on the problem to be solved | Level 1. Failure to summarize conclusions about the problem to be solved |
| | Level 2. The summary is conclusive but not clear, scientific |
| | Level 3. The summary is concluded, but there is 1 point that is not really clear, scientific |
| | Level 4. The summary is concluded in a clear, scientific way |
| Capacity 5. Your attitude to the practical problem to be solved | Level 1. Failure to express a view on the problem is resolved |
| | Level 2. Express your opinion on the problem but are not confident |
| | Level 3. Confidently express your views on the problem solved but sometimes unclear |
| | Level 4. Confidently express your views on the problem in a clear way |

**Table 3** Results of the assessment of the ability to apply the knowledge and skills learned by teachers and students when participating in an experimental teaching Lesson plan designed according to the research team's process

| Levels manifestation | Mean±*SE* | | Level of opinion | |
|---|---|---|---|---|
| | Teacher | Student | Teacher | Student |
| Capacity 1 | 3.75±0.16 | 3.06±0.10 | Very good application | Good application |
| Capacity 2 | 3.88±0.13 | 3.04±0.12 | Very good application | Good application |
| Capacity 3 | 3.75±0.16 | 3.00±0.14 | Very good application | Good application |
| Capacity 4 | 3.88±0.13 | 3.02±0.11 | Very good application | Good application |
| Capacity 5 | 3.63±0.18 | 2.86±0.13 | Very good application | Good application |

*Note:* $1.00 \leq M < 1.75$: Poor application, $1.75 \leq M < 2.50$: Fair application, $2.50 \leq M < 3.25$: Good application, $3.25 \leq M \leq 4.00$: Very good application.

In conducting a non-parametric test to compare the level of expression of the ability to apply knowledge and skills learned from the point of view of teachers and students, we see a difference in the assessment of teachers and students, specifically: in capacity 1, average teacher rating (3.75±0.16 *SE*) and average student rating are (3.06±0.10 *SE*) (Mann-Whitney U, Z = -2.47, $p$ = .01). In capacity 2, the teacher's rating was 3.88±0.13 *SE*, and the students' was 3.04±0.12 *SE* (Z = -2.74, $p$ = .01). Competency 3 with a teacher's assessment average of 3.75±0.16 *SE* and a student's 3.00±0.14 *SE* (Z = -2.03, $p$ = .04). Competency 4 with the teacher and student assessment averages of 3.88±0.13 *SE* and 3.02±0.11 *SE*, respectively ($Z$ = -2.93, $p$ < .001). And finally, capacity 5 with a significant difference of 3.63±0.18 *SE* and 2.86±0.13 *SE* result from teacher and student evaluations (Z = -2.25, $p$ = .02). From the assessment results, it can be seen the average teacher's assessment is higher than the average assessment of students in all five competencies. In these five competencies, teachers evaluate the expression of the ability to apply knowledge and skills learned at the "Very good application" level, while students rate at the level of "Good application".

Although teachers and students have different views on teaching effectiveness according to the lesson plan designed based on the research team's process, in general, the evaluation results of both subjects are pretty positive. Most teachers assess level 3 or higher in all competencies, and students rate from level 2 and above (in which level 3 predominates), which indicates that there is a development in the application of student's knowledge and skills after a period of participation in learning through lesson plans designed according to the process of a group. This difference comes from teachers' and students' different teaching and learning perspectives. When creating the lesson plan, the teacher developed the appropriate standard outcome for each knowledge content of the lesson unit. In teaching, testing, and evaluating each branch of knowledge, teachers have seen that students meet the standard outcome they have set, so they assess students' performance at level 3 or higher. And students who have different assessments than teachers may have higher expectations than the level of knowledge they acquire, so they assess their level of performance mainly at levels 2 and 3.

## Conclusion and Recommendations

The lesson plan design process proposed by the research team is suitable for teaching and learning practices at Cai Nuoc High School, Ca Mau. A lesson plan designed from this process not only helps students master knowledge but also practice many skills related to practical problem-solving of lesson content. The lesson plan design from the process consists of 3 stages introduced and applied in teaching to demonstrate the organization in teaching at Cai Nuoc High School, Ca Mau. The experimental results assess the development of students' ability to use the knowledge and skills learned in a research-oriented manner. However, more in-depth studies of this process are needed for different types of students to provide appropriate options in each teacher's specific teaching conditions.

## Conflict of Interest

The authors declare that there is no conflict of interest.

## Acknowledgments

This research was funded by Can Tho University (Project number: TSV2022-144). We thank biological teachers and students at Cai Nuoc High School for the questionnaire completion.

## References

Allen, I. E., & Seaman, C. A. (2007). Likert scales and data analyses. *Quality Progress*, *40*(7), 64–65.

Anderson, J. R., Reder, L. M., & Simon, H. A. (1996). Situated learning and education. *Educational Researcher*, *25*(4), 5–11. https://doi.org/10.3102/0013189X025004005

Boger-Mehall, S. R. (1996). Cognitive flexibility theory: Implications for teaching and teacher education. In B. Robin, J. Price, J. Willis & D. Willis (Eds.), *Proceedings of SITE 1996—Society for Information Technology & Teacher Education International Conference* (pp. 991–993). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/46962/

Bordwell, D. (1989). A case for cognitivism. *IRIS*, *9*, 11–40. http://www.hfs.hr/doc/ljetopis/hfl19-20-web.pdf#page=210

Brualdi Timmins, A. C. (1996). Multiple intelligences: Gardner's theory. *Practical Assessment, Research, and Evaluation*, *5*(1), 10. https://doi.org/10.7275/7251-ea02

Burgstahler, S. E., & Cory, R. C. (2008). Universal design in higher education: From principles to practice. In S. E. Burgstahler, & R. C. Cory (Eds.), *Institutionalization of universal design in higher education* (pp. 23–45). Harvard University Press.

Casper, B., & Leuchovius, D. (2005). *Universal design for learning and the transition to a more challenging academic curriculum: Making it in middle school and beyond (NCSET Parent brief)*. National Center on Secondary Education and Transition (NCSET), University of Minnesota.

Center for Applied Special Technology. (2009). *Universal design for learning guidelines (Version 1.0)*. Retrieved from https://udlguidelines.cast.org/binaries/content/assets/udlguidelines/udlg-v1-0/udlg_graphicorganizer_v1-0.pdf

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

Cunningham, G. (Ed.). (2009). Lesson plans and unit plans: The basis for instruction. In *The new teacher's companion: Practical wisdom for succeeding in the classroom*. Association for Supervision and Curriculum Development

Dinh, Q. M., Tran, B. T., & Nguyen, T. T. K. (2011a). Kết quả khảo sát bước đầu về tình hình sử dụng "hai giờ tự học" của sinh viên Trường Đại học Cần Thơ [The primary survey results on the using of "two self-study periods" by students at Can Tho University]. *Can Tho University Journal of Science*, *20a*, 183–192. https://ctujsvn.ctu.edu.vn/index.php/ctujsvn/article/view/1109

Dinh, Q. M., Tran, B. T., & Nguyen, T. T. K. (2011b). Kết quả nghiên cứu bước đầu về việc xây dựng "mô hình sinh hoạt chi đoàn" theo học chế tín chỉ tại Trường Đại học Cần Thơ [The primary results of the survey about the way to form "an activity model of the youth branch" based on the credit-based system at Cantho University]. *Can Tho University Journal of Science*, *20a*, 176–182. https://ctujsvn.ctu.edu.vn/index.php/ctujsvn/article/view/1108

Emiliasari, R. N. (2019). Lesson planning in EFL classroom: A case study in lesson plan preparation and implementation. *Wiralodra English Journal*, *3*(2), 367–375. https://doi.org/10.31943/wej.v3i2.67

Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. *Educational Researcher*, *18*(8), 4–10. http://dx.doi.org/10.2307/1176460

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age?. *Medical Teacher*, *38*(10), 1064–1069. https://doi.org/10.3109/0142159x.2016.1173661

Huynh, T. T. D., & Thathong, K. (2017). Applying lesson study among high school biology teacher Vietnam. *International Journal of Educational Science and Research*, *7*(4), 7–18. https://doi.org/10.22144/ctu.jvn.2021.053

King-Sears, M. (2009). Universal design for learning: Technology and pedagogy. *Learning Disability Quarterly*, *32*(4), 199–201. https://doi.org/10.2307/27740372

Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past?. *International Review of Research in Open and Distributed Learning*, *9*(3), 1–13. https://doi.org/10.19173/irrodl.v9i3.523

Central Steering Committee. (2013). *Resolution No. 29-NQ/TW dated November 4, 2013 of the 8th plenum of the 11th Central Committee on fundamental and comprehensive reform of education and training*. Nguyen Phu Trong. https://moet.gov.vn/tintuc/Pages/doi-moi-can-ban-toan-dien-gd-va-dt.aspx?ItemID=3928

Ministry of Education and Training. (2018, December 26). *General education chapter*. Circular No. 32/2018/TT-BGDĐT (p. 3). Phung Xuan Nha. https://moet.gov.vn/tintuc/Pages/CT-GDPT-Tong-The.aspx?ItemID=8421

Ministry of Education and Training. (2020). Organizing the implementation of educational plans in schools. Official Dispatch 5512/BGDDT. Phung Xuan Nha. https://thuvienphapluat.vn/cong-van/Giao-duc/Cong-van-5512-BGDDT-GDTrH-2020-xay-dung-va-to-chuc-thuc-hien-ke-hoach-giao-duc-cua-nha-truong-462988.aspx

Morra, T., & Reynolds, J. (2010). Universal design for learning: Application for technology-enhanced learning. *The Journal of The Virginia Community Colleges*, *15*(1), 43–51. https://commons.vccs.edu/inquiry/vol15/iss1/5

Narli, S., (2010). An alternative evaluation method for likert type attitude scales: Rough set data analysis. *Scientific Research and Essays*, *5*(6), 519–528. https://academicjournals.org/journal/SRE/article-full-text-pdf/891397319354.pdf

Nhut, Q. M., Yen, T. T. B., & Hau, P. L. D. (2012). The assessment of training quality of human resource in the Mekong delta of the universities. *Can Tho University Journal of Science*, *22b*, 273–282. https://ctujsvn.ctu.edu.vn/index.php/ctujsvn/article/view/1256

Paas, F., & Ayres, P. (2014). Cognitive load theory: A broader view on the role of memory in learning and education. *Educational Psychology Review*, *26*(2), 191–195. https://doi.org/10.1007/s10648-014-9263-5

Pimthong, P., Soparat, S., & Chamrat, S. (2017). The constructionist paradigm shift of teachers in 21th century learning. *Kasetsart Journal of Social Sciences*, *38*, 470–481. https://so04.tci-thaijo.org/index.php/kjss/article/view/242645/164874

Quyet, P. V., & Thanh, N. Q. (2011). *Methods of sociological research*. Hanoi National University Publishing House.

Samuels, C. A. (2007). Universal design concept pushed for education. *Education Week, 27*(10), 1–12. https://eric.ed.gov/?id=EJ779504

Songserm, U. (2019). Lesson plan in quality: Teacher's role? or who's role?. *Veridian E-Journal Silpakorn University*, *12*(3), 898–910. https://he02.tci-thaijo.org/index.php/Veridian-E-Journal/article/view/168534s

Staats, A. W., Eifert, G. H. (1990). The paradigmatic behaviorism theory of emotions: Basis for unification. *Clinical Psychology Review*, *10*(5), 539–566. https://doi.org/10.1016/0272-7358(90)90096-S

Wenger, E. (2010). Communities of practice and social learning systems: The career of a concept. In C. Blackmore (Ed.), *Social learning systems and communities of practice* (pp. 179–198). Springer.

Yavuz, G., Günhan, B. C., Ersoy, E., & Narli, S. (2013). Self-efficacy beliefs of prospective primary mathematics teachers about mathematical literacy. *Journal of College Teaching & Learning*, *10*(4), 279–288. https://doi.org/10.19030/tlc.v10i4.8124