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# Online Teaching and Learning Ecology in Thai Higher Education during the COVID-19 Pandemic

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## Abstract

The chapter presents the impact of COVID-19 on Thai higher education the national, and university reactions and policies to cope with the situation. Parallel with the technology disruption, most universities have been attempting to promote online teaching due to the new learning environments and learning style of students, while faculty members are still reluctant. However, the COVID-19 has inevitably changed the ways the faculty members handle their classes. In this chapter, the findings on the components of online teaching and learning ecology (OTLE) in Thai higher education during the COVID-19 is summarized and proposed, covering the following topics: learning and teaching method, technology and learning resources, teacher roles, and student roles and responsibilities. Finally, the key success factors for the development of learning ecology at the higher education level are also covered.

**Keywords:** online teaching, online learning, learning ecology, higher education, COVID-19, Thailand

## 1. Introduction

### 1.1 The context of Thai universities in the digital age

There are 155 universities in Thailand, which are governed by the Ministry of Higher Education, Sciences, Research and Innovation (MHESRI). The universities are categorized according to the structural and administrative systems into 3 groups, namely, 26 autonomous universities, 57 governmental universities, and 72 private universities [1]. Additionally, certain other higher education institutions offer their programs in specialized fields. These institutions are affiliated with governmental organizations such as the Ministry of Public Health, the Ministry of Defense, and the Ministry of Interior. Almost all universities in Thailand run a closed instructional system, while only two universities offer an open or distance system.

The presently emerged disruptive technology has brought great impact on the management of higher education in Thailand. It is caused by several environmental changes both internally and externally: (1) The total change of employment in the government and the private sectors due to the need for digital transformation leads to decreasing job positions and employment rates. Required knowledge as well as skills of applicants to the jobs changed. Meanwhile, universities so far have not been able to prepare manpower who possess the competency required by the job

markets. (2) Under the digital university policy, universities receive impact from disruptive technology, and adjustments become a must by applying technologies in the administration, operation, service, and instruction. (3) The attitudes toward higher education have changed because recruitment of people in the industrial sector no longer emphasizes degree certificates, but working competency. In addition, the population aged 18–22 years or the Gen z have unlimited channels to acquire knowledge and develop themselves in the digital world, and have more chances to build incomes from online businesses or from independent jobs without having to rely on mainline higher education programs [2].

Besides the need for adjustments to face disruptive technology, Thai higher education institutions are also confronted with threats related to reputation building and work outcomes at the international level. The 2020 report of the Office of National Higher Education Science Research and Innovation Policy Council stated that IMD World Competitive Rankings 2020 placed Thai universities at the 49<sup>th</sup> order from 64 countries, in terms of educational qualities [3]. It can be seen that the ranking of Thailand is among the low group when compared to other countries in Asia, especially when the quality is related to economic competition. This means that Thai universities fail to prepare graduates with the requisite qualifications of the industrial sector. The expected traits of personnel by the job market include skills in creating innovation besides academic knowledge and competence. This fact corresponds to a report by the World Economic Forum, in which the most essential 10 skills for 2025 employment are as follows: (1) analytical thinking and innovation, (2) active learning and learning strategies, (3) complex problem solving, (4) critical thinking and analysis, (5) creativity, originality and initiative, (6) leadership and social influence, (7) technology use, monitoring and control, (8) technology design and programming, (9) resilience, stress tolerance and flexibility, and (10) reasoning, problem-solving, and ideation [4].

## **2. Adjustments prior to Covid pandemic**

The impact of disruptive technology results in a lot of transformation of education and instructional operations in Thai universities. Many universities have turned to rely on education transformation strategies in order to expedite the changes. Khon Kaen University, for instance, sets the strategic educational transformation by enhancing outcome-based curricula instead of the former content-based curricula, and by changing from teaching to learning in the instruction system [5]. At the national level, the MHESRI has come up with the new species of graduates project to respond to the needs for manpower in the industrial sector. This is also an important mechanism for the national economic propulsion, which has been put into action through the transformation of instructional and curricular methods and from the collaboration between the higher-education institutions and the industrial sector, government, the civil society, or community toward the university education for the future. The said sectors joined in prototype program design that emphasizes the transformation of content, elements, and curricular structure. The collaboration also involves instructional management that essentially builds learning experiences through working in the “real situation” [6].

It can be said that before the spread of Covid, Thai higher education already altered the system to the smart education, which means the system that targets preparation of manpower with knowledge and abilities to lead their lives and work that responds to the needs of the present digital market [7]. Glasco [8], in addition, explained that smart education is the genre of education for the new generations of digital natives. Compared to the former instructional methods, smart education

emphasizes interaction, collaboration, and engagement between the teacher and learners and between learners and learners so that sustainable and continuous learning skills will be acquired by the learners. Moreover, outcome-based education has been introduced, in which the learning competency development in learners is the keyword. The instruction emphasizes learning from practices rather than from theories or learning from doing activities to obtain real experiences and from doing the job (work-integrated learning) [9, 10].

McLellan [11] explained that the high-capability Internet technology allows people from every corner of the world to communicate and work together efficiently. Thus, the production sector needs people who are able to use technologies to contact customers or colleagues that are from multiple backgrounds and culture. Manpower building does not, therefore, target only the learning outcomes in terms of knowledge and advanced thinking, but also, the process has to set the competency that incorporates multi-dimensional capabilities. What has been said agrees with the OECD Learning Framework 2030, in which the concept for essential competencies for the future is mentioned. The word competency is not only composed of knowledge and skills, but it also integrates bodies of knowledge, skills, attitudes and values that enable one to move on until one achieves his mission [12].

For the instruction that is based on competency development, the teacher, besides having to answer the important question, “What are the necessary knowledge, skills, attitudes, and values for learners and entrepreneurs?”, must be able to answer the question, “How can instruction be designed that will effectively develop knowledge, skills, attitudes, and values of the learners?” [13]. In this respect, the instructional design that develops learner’s competency and the said qualities necessitates multiple sorts of activities, which, more importantly, learners should be learning in a real situation. The knowledge content must be accurate and up-to-date, and can be applied in real contexts. Development of skills should be performed in the situation similar to the real workplace, not confined within a laboratory or a simulated venue. It is certain that incubation for good attitudes and values toward what learners do or act depends on the social context of real working condition. Therefore, many Thai universities have been enhancing and provoking outcome-based curriculum and encouraging teachers to apply competency-developing techniques such as problem-based learning (PBL), task-based learning, experience-based learning, and work-integrated learning. These methods had not caused any problem during the time before the Covid pandemic, since in general, they were conducted in classrooms and through a practicum at workplaces.

### **3. Adjustment after Covid pandemic**

When the coronavirus (COVID-19) began to spread in Thailand at the beginning of January 2020, most Thai universities were entering the second semester of the academic year. The MHESRI [14] announced that all universities had to carry out instruction online only. However, during that time, each university had not prepared any facilities for online teaching. It became the responsibility of lecturers to acquire tools, equipment, and technologies for their teaching, not to mention that they had to learn how to use the technology on their own. The most controversial issue was online examination administration. Since the time was approaching the end of the semester, many courses stopped class meetings and were at the stage of learning evaluation. Normally, all universities schedule the final exam week, which is based on on-site administration, where identification of students taking the examination is strict according to the university’s regulations. Online examination, on the contrary, has certain constraints. The interesting phenomenon thus



emerged; that is, most lecturers had to change their student assessment and evaluation method, by relying on various authentic assessment approaches that measure the students' learning achievement. Tools have been developed for measuring the learning outcomes under the authentic assessment method according to the Thai Qualification Framework for Higher Education (TQF) [15].

Most of the learning assessment and evaluation tools are the evaluation platforms modified from the surveying technology, for example, Google Form [<https://docs.google.com/forms/u/0/?tgif=d>] or Microsoft Form [<https://www.office.com/launch/forms?auth=1>]. Some rely on the testing system, which is an integrating function in the learning management system (LMS) such as Moodle LMS. These tools can only assess the learning achievement in terms of knowledge content. They still have limitations in assessing learners' skills, which require observation or following up of students' practices. Moreover, there is no regulating or administering system for the examination that prevents copying or cheating in an examination. Universities, therefore, find it necessary to develop a technology or tool for the administration of examinations that does away with cheating and results in efficient examination and assessment.

Since the COVID-19 pandemic is still ongoing, and together with threats from the disruptive technology, universities have to change and become prepared for organizing online instruction. Analyses of data from the Web sites and media of different universities showed that the implementation related to the transformation from an on-site to the online system involves many aspects: (1) Improvement of technological infrastructures that support online teaching and learning; (2) Procurement and development of platforms for online teaching and learning; (3) Teacher training so that they are able to use the technology and tools, and are able to organize online teaching and learning (including design of learning management, development of learning media, management of online classrooms, arranging learning activities, and assessment of learning outcomes). As far as the students are concerned, most universities had to prepare their students for the online system that they join from home. As a result, some universities such as Khon Kaen University offer a computer-lending system, with a sim card for the internet use that allows them to have access to different learning sources. The training was organized for all students to be able to use the learning technology and tools as well as research and production of learning outcomes in different forms. It can be said that the COVID-19 pandemic and the building of online learning platforms for the learners [16] are the stimulants for total education transformation in all universities from classroom instruction to online instruction.

Somabut [17] conducted a survey on the condition of and students' opinions towards online instruction at Khon Kaen University in 2020, during the spread of COVID-19. The sample group that answered the questionnaire administered online comprised 1,339 students and 253 lecturers. The following information was found: The equipment and technologies mostly used by the students were: Windows laptops (46.45%), smartphone operating system (iOS) (43.76%), and android operating system (40.33%). The most wanted media and learning activities included lecture videos (74.91%), live lectures via video conference (66.77), and discussion forums with teachers (49.51%). In terms of lecturers, it was found that most relied on lecturing by means of video conference (87.65%), followed by assigning students to study for additional content and draw the conclusion from it (76.34%), and video-recording the lecture, assigning students to pre-study the topic and present their work or discuss by means of video conference (45.32%). Most of the media used by lecturers were slides that conclude the content to accompany the lecture (93.25%), handouts produced by the lecturers (76.5%), and retrieved documents from various sources (67.43%). The technology for instruction included

video conference (85.34%), social media (71.55%), and LMS as the learning management systems (67.48%).

It can be said that most of the online instruction does not differ from the former approach, for most lecturers still lecture. The popular platforms are: Zoom, Meet, Microsoft Teams, and WebEx. The learning management systems (LMS) that are mostly relied on are Moodle LMS (which is installed in the server of many universities), Google classroom, Microsoft teams, which are used by most lecturers to make announcements for the course, assign learning projects, and for students to submit their learning missions. Most of the media were slides that accompany lectures and videos describing the content so that students can prepare before class or listen to it after class. Textbooks or sheets have been made as digital documents for ease of uploading to the LMS for the learners. The tools for learning assessment have just been developed. Many universities have procured platforms made in the market and subscribe to these per year or many years. The lecturers can thus use these platforms. Some universities (few) have developed their learning assessment method, including data management for examination and preventive systems against rule-violating actions or cheating. Khon Kaen University has developed an examination administering system along with the learning management system, called: KKU Exam [<https://exam.kku.ac.th/>]. This has been installed in the university's Moodle LMS and has a capacity of at least 8000 people per test.

#### **4. Online teaching and learning ecology (OTLE) for higher education**

For the instruction that is principally based on online systems, drawbacks in practices are unavoidable. For instance, distance communication has a limitation in expressing emotion, feeling, and empathy, especially when problems are consulted, explanations that required empathetic and close talks, changing the mindset of learners to stimulate interest and participation. These can be a complicated task of online channels [18]. However, with the capabilities of technologies, opportunities can be gained from online instruction such as rapid communication, multiplicity, and vastness of information, reduction of travel, and time for learning. These opportunities can be used in managing the learning ecology for efficient online education [19].

The higher education paradigm has been changed for some time, especially the concept in curricular design and instruction, which was formerly based on knowledge and understanding of contents more than applying the knowledge in the work or working skills that are separated from knowledge and context of the workplace, towards the design of curriculum that emphasizes competency. The first question formerly asked when designing a course was, "What are the contents to be taught?", whereas now, the question is, "What competency should be incorporated in the course instruction?" Answering the new question is challenging, as it involves also the competency required by a workplace or the job market. It is the same question for which the lecturer must analyze and classify into at least 3 sub-questions that clarify what is needed for learners to acquire the said competency: (1) What knowledge is necessary? (2) What skills are necessary? Or what should the learner be able to do? (3) What are the required traits learners should have? Nevertheless, whatever is the instruction system, online or onsite, the competency objective must be met [12].

Although the paradigm in curricular design and instruction has changed, the design and promotion of learning still are principally based on the constructivist theory. This theory explains that learning or knowledge is built by an individual from perception of new information or data, which is then interpreted using the

former schema or experience as the base in order to construct the new meaning. Constructivists believe that even though people receive the same information from various channels, interpretation or construction of new knowledge may differ, and for former knowledge, experience of each is different [20, 21]. In short, the learning concept of constructivist is the fact that knowledge and learning is an individual's matter; thus, learning and knowledge construction arise from that individual. Learning in constructivist's perspective is believed to be enhanced and stimulated from the inner process of the learner and the surrounding society that helps the learning process to be complete [21, 22]. Therefore, instruction based on constructivist can be used as the basis for developing knowledge, skills, attitudes, and values of the learner. It emphasizes learning by learner's action or acquisition from experiences in the real context.

During the spread of COVID-19, students have to learn from their dormitory, home, or apartment. They cannot learn in classrooms or on campus as usual. Online learning is a new experience for students. Most have never been exposed to 100% online learning. Some problems may arise among learners such as responsibility, self-regulations, planning of their studies, self-assessment of their learning, and time allocation for their learning mission. Nevertheless, most students are digital natives; therefore, they do not have a problem with the use of technology and learning tools. Besides, university students are the Gen z, who already possess the following behaviors: learning by doing and learning from seeing and listening. Because they grow in parallel to YouTube and moving learning media, they enjoy communications via social media and are able to communicate or work with others whom they do not know by using different technologies [23]. Therefore, online instruction management should take into account the learning behaviors of the learners as the important element.

From the discussed learning management and learning behaviors, curricular design and online instructional management at the higher education level should be based on the following online teaching and learning ecology (OTLE) (Figure 1).

4.1 Learning and teaching method

In order to be in line with the development of learners' competency, where knowledge, skills, and required traits must be developed, the methods and learning

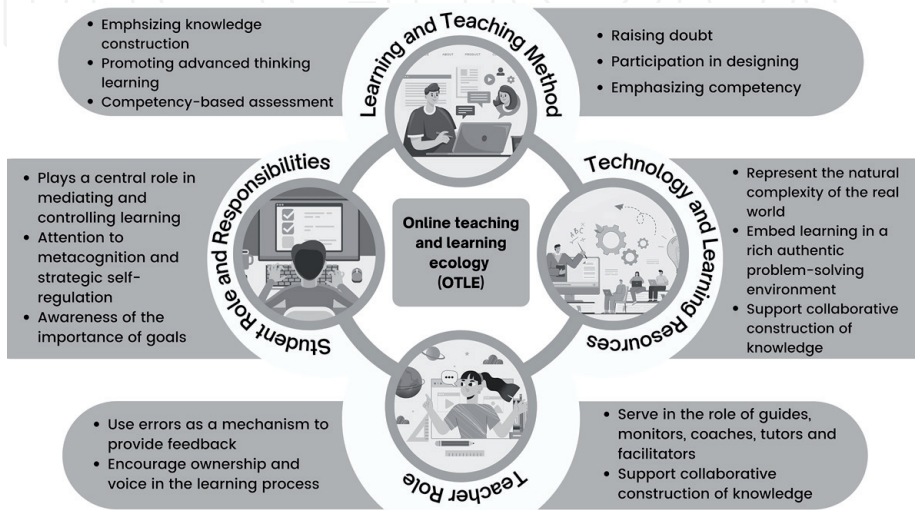


Figure 1. Online teaching and learning ecology (OTLE).



activities must correspond to each competency enhancement. The instructional management approaches may be as follows:

1. Raising doubts of students from giving a problematic situation, a real event, or a problematic context that students have encountered. The story used for raising doubts should be complex and necessitates advanced thinking to solve the problem. More importantly, it must be in a real situation [24].
2. Presenting and informing the goal and learning approaches to students, opening up the chance for students to voice their opinions, negotiate, and set the target and learning activities together.
3. The design of learning activities and assessment must be associated with the stimulation and enhancement of knowledge construction, development of skills, and required traits of learners.
4. Arranging learning activities that emphasize the roles, learning actions, and self-regulation of learners. It needs to be emphasized that knowledge and skill construction is not a reproduction of content or knowledge [25].
5. The learning activities, besides developing knowledge and skills according to the learning objectives, must develop problem-solving skills and advanced thinking as well as profound understanding [26].
6. The learning assessment and evaluation should be designed and made in accordance with the framework of competency, that is, assessing the knowledge, skills, and traits [27, 28].

#### **4.2 Technology and learning resources**

Classroom management in the new era, especially during the disease pandemic has resorted to the so-called virtual classroom, which in fact has been developed for some time. Now, it has to be used concretely, that is, in the form of an online virtual classroom. From an online virtual classroom, various functions must be usable as they are in on-site classes. For instance, the teacher and students must be able to carry out learning activities, and the followings must be doable: assignment, grading, exchanging of opinions, presentation, preparation of media, content, or information useful for learning. The content and learning resources should be in agreement with the behaviors, requirements, or the learning context of the present-day learners. Followings are suggestions for technologies and learning resources preparation [29–31].

1. The technology that promotes and facilitates learning should at least include the following modules: managing user's account, assignment, grading and comment, presentation of content and resource, discussion and exchange of opinion (forum), announcement related to instruction, assessment tool and collaboration tools.
2. The platforms used for learning management must facilitate learners and teachers, and enable them to discuss, share experiences, and work together smoothly with no complication.
3. Information source and content should provide both the primary source and the content summarized by the teacher.



4. The content for the students should be in multiple forms, such as video, text audio graphic, or animation, depending on the nature and characteristics of the content, so as to meet the interest and learning behaviors of learners that can vary.
5. Apart from content and learning sources, the teacher may have to select the problem cases that are close to the content in the lesson so as to facilitate learners whose experience in the content may still be little.
6. If it is necessary to produce a video clip for lecturing the content, each clip should not be longer than 20 minutes. If the content is wide, it should be divided into sub-topics.

### **4.3 Teacher roles**

In the new era of classroom management, what teachers should learn and train to use to the expertise level is digital technology application for teaching, which may not be just online lecturing. Teachers need to learn to use LMS that will be developed into a virtual classroom, technology for assigning work, grading and comment, assessment and evaluation based on digital technology. Besides, teachers must take more roles in planning the learning, presenting the plan to learners so that they can make their own plans and adjust the learning with the teacher. Learning plans may involve many approaches. The teacher has to accept each student's context. The roles of teachers at the higher education level in online instruction management should be as follows: [32, 33]

1. Design and plan learning by analyzing the learning competency goals, learning activities, assessment, and media or learning content.
2. Change the role from content expert to a guide, monitor, coach, tutor, and facilitator. These roles will be acted through the medium of digital technology.
3. Survey and search for new instruction management that corresponds to the learner's learning style, especially the strategy that stimulates students to learn freely according to the goal.
4. Use the mistakes or misunderstandings of the students as the opportunity to change their knowledge concept. They may need advice for revising their former understanding.
5. Give positive feedback to the students. This is an important strategy to enhance individual learning for the new age learners, who want to know which points they need to adjust and by what means. Feedback on a person-to-person basis is essential despite its time consuming.
6. Besides being an expert, a coach, or a monitor, the teacher may change the role and becomes a learner who learns with the students so that the teacher is able to see from the students' multiple perspectives while at the same time, not feeling too distant away.
7. The upskilling of the use of digital technology in instructional management is unavoidable and cannot be refused. From the present stage, learning that relies on technology will be more accepted. Re-skills in terms of teaching and

learning tactics are necessary in order to be in line with learners' changing of context and behaviors. Teachers should not be trapped within the complaints of the students' changes, but have to adjust their methods to accommodate those changes instead.

#### **4.4 Student roles and responsibilities**

Superficially, learning through online platforms seems to offer freedom. Learners can design their learning and do their own learning activities. They are able to set the activity, time, and place by themselves. Formerly, learning was confined according to what had been planned by the teacher, or students learned from the assignment given by the teacher of each course. This resulted in tension, for students had to hand in the assignment within the limited time frame. Students might not be able to plan their learning with the teacher, but just followed what the teacher planned and assigned. In the new learning era, most roles must be played by the students, from the beginning until the conclusion, so that the outcomes will stay with the students. The teacher only designed the course at the beginning, and prepared learning aids and content as seen necessary. Learning activities, knowledge construction and skill training, will be within the scope of the students' role. Therefore, learning management may involve the students' roles as follows [34–36]:

1. Set the goal and plan the learning and assessment activities with the teacher, by taking into account one's own context that will lead to the achievement of the learning objectives.
2. Besides planning the learning with the whole class, each student must plan individual's learning of each subject, which may differ from others. The plan will lead to self-control and self-monitoring to achieve the goal.
3. The skills and personal traits to be used by each student in order to achieve the learning goal should comprise metacognition, self-analysis, self-regulation, self-reflection, and self-awareness.
4. Digital competency must be developed and is each student's responsibility, both including hard skills and soft skills, as the important tools that enable efficient digital learning. Learning is via digital platforms, and thus the learners need the tools for communicating, developing and creating work outcomes, searching, compiling, and managing media and information sources, as well as knowing the rules and courtesy to be used in the digital world, knowledge related to patents and rights to use the media and content in the digital world.
5. The construction of knowledge and skills of the learner requires analysis, interpretation, and decision making by using the former knowledge and experiences. New information may improve the former beliefs, knowledge, and attitudes.
6. Utilize the opportunity in having the learning freedom and the capacity of digital technology by setting the learning target. Students may have to question themselves what they want to know, what they want to be able to do, what for, and what learning tools are necessary.
7. In order for learning to be complete, the constructed concept, knowledge, and understanding may have to be presented to others such as the teacher

or friends in the class. This is to confirm the understanding, or for exchanging viewpoints. However, after discussion, students do not have to change their understanding if the reason can be more clearly explained than others' comments.

## **5. Successful conditions of online teaching and learning ecology (OTLE) for higher education**

The management of instruction in the new era is under the constraint of area and place. Digital technology is an important factor that brings efficiency in learning management. The preparation and improvement of the technological system may be beyond the responsibility of university lecturers. Thus, university administrators or the department involving with system development and technological infrastructures must revise and plan the digital technology strategies in order to cope with the use by both lecturers and students. These are the successful conditions of virtual university. Followings are the issues to be implemented:

1. Evaluate the status and readiness of the system and digital technology, modernize it, make it highly potential and respond to teaching and learning management and urgent use.
2. Adjust the tool and technological platforms that are categorized as low-code tools to reduce the time to develop new tools and systems, since they are already familiar to people in the organization.
3. Support in terms of necessary materials and equipment for online learning, both for the teachers and students.
4. Develop several forms and frameworks for efficient learning management that enable teachers to choose according to the context of each course.
5. Train both staff and teachers, and teaching supporters who have to work with the digital technology and distance working, of which most may not be familiar with.
6. Closely monitor and evaluate the teaching in order to use the results in adjusting the policy and implementation in time. This does not have to be a long-term or a 1-year policy, but can be done each semester.
7. Prepare the students for online learning by building an understanding of the roles, duties, and practices, including training how to use digital tools for learning.

## **6. Conclusion**

Under the pandemic of COVID-19, universities in Thailand are attempting to adjust themselves to pass the crisis. The action done is to change the channels in teaching to be online so that bodies of knowledge can be transferred and communications made possible with students. Although the implementation may not be very good, learning and adjustments of learning methods are being attempted to pass through the crises. If considering sustainability, the learning methods may be

changed, while the target of competency development remains. Instructional management method that aims toward sustainability should rely on technology for the development of virtual classroom or virtual university. This is similar to the online world that permits teachers and students to perform learning activities, meet, and discuss, with facilities supporting the activities and the work [37]. Such technology is only a facilitating tool, but the heart of learning is the design of learning activities in virtual classroom that corresponds to the goal of the curriculum, learners' learning style, and context. The design of learning activities must also be in accordance with the functions of modern tools and technology. Besides, those directly involved in teaching and learning, that is, teachers and students, must accept the virtual classroom condition in terms of impossible items. There are many things that are the opportunity in virtual instruction, for example, freedom to plan the learning, searching and rapidly accessing the multiple sources of information, and quick and convenient communication. Thus, besides the skill in the use of digital tools for teaching and learning, both the teachers and students must adjust their mindset in perceiving online learning.

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