

## Research on Deep Learning through Micro-video

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**Abstract.** In recent years, with the continuous development of education informatization, How to scientifically and reasonably use new media technology to promote students' deep learning is extensively concerned by the educational technology researchers. This paper discusses the supporting effect of micro-video on deep learning, and constructs a deep learning model including network guidance, knowledge construction, practical application, evaluation and summary. It also elaborates on how to carry out deep learning through micro-video. The research can provide reference for the effective development of deep learning.

### Introduction

With the popularity of "Khan College" and "Flip Classroom" around the world, micro-video has injected new vitality into the traditional teaching video. The teaching activities supported by micro-video have many advantages, such as fine learning content, free learning style, flexible learning process, and strong sense of context, but these advantages can't be spontaneously extended to learning. In the teaching practice, the final impact of micro-video on learning effects often fails to achieve the expected results, especially online learning based on micro-video as the main learning content. The knowledge and skills acquired by learners are always not solid enough. We attempt to innovate the application of micro-video, in-depth integration of online and offline learning, the construction of micro-video based deep learning model, in order to improve the quality of classroom teaching, promote the achievement of students' deep learning.

### Micro-video and deep Learning

#### Micro-video

Since 2006, micro-video has been widely used in network news commentary, entertainment sharing, product advertising and other aspects, showing unlimited potential. For the definition of micro-video, the representative one is that micro-video is a collective name for video clips recorded or played by individuals through PC, mobile phone, camera, DV and other video terminals and the duration is between 30 seconds and 20 minutes. [1] It has the characteristics of short duration, small file, fast spread, refined content, simple production and strong participation.

#### Deep Learning

The concept of deep learning was proposed by American scholars Marton. F. and Saljo. R. In 1976, they conducted an experiment on students' reading. They found that learners had different levels of understanding and perception of learning tasks, and the learning process showed shallow and deep differences. [2] This opens up a shift in education from focusing on how much is learned to exploring what is learned. Later, Entwieser, Peggs, and Ramsden conducted in-depth research on deep learning theory. At present, most researchers believe that deep learning can critically examine new facts and viewpoints, integrate them into existing cognitive structures, establish innumerable links between viewpoints and facts, and ultimately make decisions and solve problems.

## Deep Learning Supported by Micro-video

At the moment when learning is moving towards mobility, miniaturization and fragmentation, the traditional large-unit and large-capacity presentation of curriculum content can no longer meet the needs of learners, so the reform of learning technology is imperative. As a recent emerging media technology, micro-video has shown infinite vitality in the field of education. As long as it is applied reasonably, it can effectively improve the quality of learning and promote the deep learning of learners.

(1) Micro-video support immersive autonomous learning is conducive to learners' connection and active construction of learning knowledge. Deep learning is problem-solving-oriented inquiry-based learning, which emphasizes the integration and reconstruction of knowledge. In traditional classroom teaching, each student has different foundations and different comprehension. In a limited time, some students only stay in shallow learning, and it is difficult to integrate new knowledge with old knowledge. Micro-video transforms the teacher's teaching and operation process into a "graphic image", creating a self-learning situation that can "fast forward" and "reverse", which is beneficial for learners to re-link and actively construct micro-video content. .

(2) Micro-video is easy to spread and share, facilitate communication, and promote learners' critical understanding of knowledge content. A large number of learners around micro-video content, through thinking across time and space collision, expand their respective perspective of thinking, enhance the grasp of knowledge content, and promote deep understanding, to achieve the internalization of knowledge. At the same time, it also trains the ability of critical thinking, and builds a foundation for the "integration and penetration" of knowledge in complex situations.

(3) Micro-video supports procedural reflections and provides favorable conditions for deep learning. All behavioral actions of learners when watching micro-video reflect the process of assimilation and adaptation of new knowledge in a certain sense. By reviewing the learning experiences shared by other learners, self-examination of the current learning situation helps learners adjust their individual learning strategies, and learning evolves to a higher level.

## Construction of Deep Learning Mode Based on Micro-video

### Micro-video Design under Deep Learning

Table 1, Micro-video design under deep learning

Micro-video Classification	Learning Environment	Micro-video Resources Support In-Depth Teaching Activities
Guided Micro-video	Pre class study (online)	1. Scaffolding resources, teachers arrange pre-class online learning tasks, and release guided micro-video resources. 2. Students use the network to watch micro-video, conduct independent learning, and complete the learning tasks arranged by teachers.
Explained Micro-video	Teaching assistants (offline)	1. Scaffolding resources, the teacher released the explained micro-video with the main content of "Interpreting the difficult knowledge points of the course" 2. Students watch micro-video for self-learning and assisted learning.
Application Micro-video	Students in class (offline)	1. Case-based resources, teachers use micro-video to interpret the specific application process and methods of knowledge, and set a specific problem situation as a task for students. 2. Students use micro-video to grasp the application cases of knowledge in practice, and use the knowledge they have learned to complete the task of assisting learning.
Summary Micro-video	Post class review (online)	1. Micro-video content can include self-evaluation, his evaluation, mutual evaluation and other reflective content. 2. Students, teachers summarize, summarize, evaluate and reflect on pre-class tasks, knowledge learning, classroom activities, etc.

Micro-video should play different roles in each stage of deep learning. Micro-video content needs to emphasize the depth of knowledge. The role of micro-video resources in deep learning activities is shown in Table 1.

### Deep Learning Mode Supported by Micro-video

American scholars Eric Jensen and LeAnn Nickelsen proposed a model of deep learning process called the "deep learning route" [3], as shown in Fig.1. From the point of view of teacher's teaching, this model explains how teachers guide students step by step to carry out the whole process of deep learning.

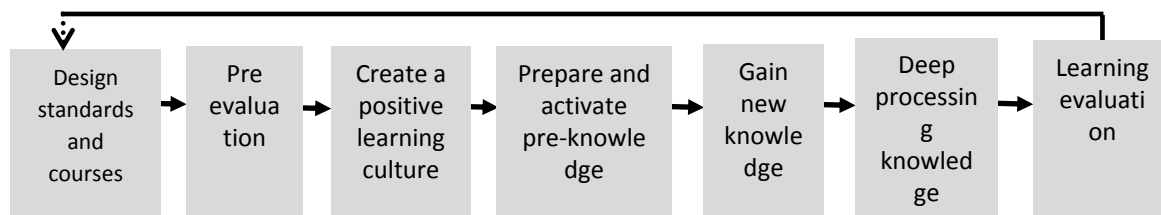


Fig.1, Deep learning route

Combining with the "deep learning route", the "micro-video-based deep learning model" is constructed, as shown in Fig.2. The model is mainly divided into four stages, namely, network guidance stage, knowledge construction stage, Deepening Application stage, evaluation and reflection stage. These four stages are progressive, the teaching content is interlinked, the learning level is from shallow to deep, and the different levels of micro-video are fused into mixed learning, reconstructing network learning and classroom practice, so that online and offline learning can achieve successful teaching.

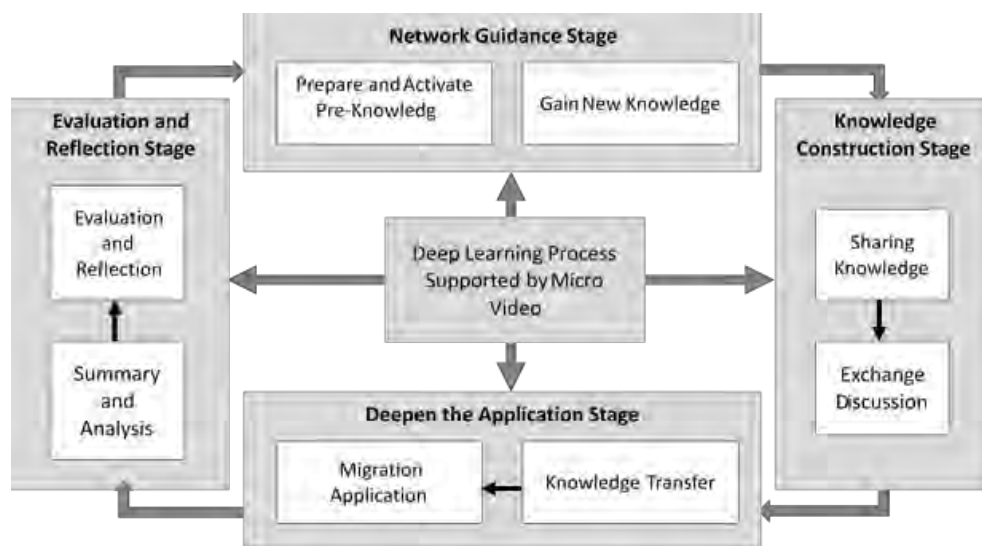


Fig. 2, Deep learning model based on micro-video

#### (1) Network Guidance Stage.

Network guidance is the beginning stage. At this stage, the teacher first pre-evaluates the students, designs the course objectives on the basis of this, and publishes the guided micro-video and pre-class preparation tasks through the online platform. Among them, the design of guided micro-video is to improve students' intrinsic interest in learning new knowledge as the main purpose, with the help of analysis and life contact cases, starting from the old knowledge, put forward the problem of guided learning, create a learning environment with context to help students establish the relationship between new and old knowledge.

#### (2) Knowledge Construction Stage.

The knowledge construction phase is an important stage for students to acquire new knowledge. First of all, the teacher should understand the situation of students watching the guided micro-video before class, and classify and sort out the difficult problems in the pre-class preparation tasks. Then, in the classroom, point or elaborate on the course knowledge points, sort out the difficult content of the teaching content, help the learners to clarify the learning ideas, let the students understand and establish the overall structure of the course content, and achieve the deep understanding of the new knowledge. Finally, the group study project is arranged. These projects mainly select tasks that are difficult or not performed well in the pre-study tasks, so that students can complete the work through collaborative learning.

### (3) Deepening Application Stage.

Deepening application stage is the key stage for students to learn how to transfer and apply new knowledge. Deep learning requires learners to transfer and apply new knowledge after learning new knowledge. Any knowledge is not independent and single. They are interrelated. Applied micro-video is the case analysis or application explanation of teachers applying new knowledge to a certain situation. Through watching and learning application-oriented micro-video, students are guided to practice independently and cooperatively, experience, comprehend and construct knowledge in repeated training, and transform knowledge into ability. Students learn how to apply theoretical knowledge transfer to real projects and practical problems by learning application cases in specific situations, so as to achieve deep understanding and internalization of knowledge. In practice, students will encounter more confusion and puzzlement. Students pay attention to the core knowledge and key elements needed to solve problems, understand complex concepts, deep knowledge and other unstructured knowledge, understand how to solve complex and practical problems in similar situations, and then realize the reorganization, transfer, application and innovation of knowledge.

### (4) Evaluation and Reflection Stage.

The main purpose of the evaluation and reflection phase is to promote teachers and students to reflect on the process and results of blended learning, to emphasize the cultivation of students' critical thinking and to enhance students' ability to think deeply. At the end of classroom teaching, teachers guide students to self-reflection, to reflect on what they have learned and what they have accomplished in groups by establishing an evaluation and assessment mechanism. At the same time, we encourage students to analyze and evaluate their research results. Team evaluation, project evaluation and other ways can be used to require students to use mobile phones, tablets and other mobile devices after class, record the corresponding summary micro-video, upload to the cyberspace, and share learning reflection and harvest with the public, truly practice the concept of "reflection in practice, learning in reflection".

## Summary

We attempts to apply micro-video integration into the teaching process, support students' active knowledge construction, and carry out effective curriculum teaching and learning interaction to meet the needs of individualized learning, from mechanical passive shallow learning to knowledge transfer and knowledge creation. We believe that era progress and technology renewal will give students a richer meaning and more forms, which will lead to higher learning efficiency and better learning outcomes, and lead to profound changes in the effect of classroom teaching in schools.

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