A Case Study on Building a Hierarchical and Categorized Micro-Course Resource System for Mobile-Based Weather Science Popularization

Xue Han   HUIXIN LI

CONTENTS

Basic Information of the Project

Main Work Content

Project Application Prospects

1 Basic Information of the Project

Research Background and Significance

Grassroots meteorological work serves as the cornerstone of the entire meteorological cause. The quality of the grassroots talent team is crucial to promoting the scientific development of meteorology, and online meteorological education and training play an important role in building this team.

1 Basic Information of the Project

➤➤ **Distance Education Platform**: It addresses the prominent issue of work-study conflict at the grassroots level, resolves the problem of insufficient training funds for grassroots units, and mitigates the shortage of on-campus training resources. Since 1999, the Meteorological Cadre Training Institute has been exploring meteorological distance education and training, providing strong support for the cultivation of Party building and professional talents at the grassroots level.

➤➤ Mobile Learning: It conforms to the new development direction of modern educational technology. Mobile learning integrates the characteristics of the times, social development status, and the audience's information reception habits.

➤➤ Microcourse Resource Construction: It aligns with the current development trends and concepts of online education, and meets the learning needs arising from the reform of professional and technical systems.

1 Basic Information of the Project

Limited research objectives, focusing on professional and technical modules.

To meet the strategic needs of high-quality development of grassroots meteorological undertakings, adapt to the reform of the new meteorological professional and technical system, and address the demands for the transformation of the meteorological talent team and the update of technical systems, we will leverage modern educational technology to explore new models of mobile learning in meteorological online education, construct a curriculum resource system for mobile learning tailored to grassroots personnel, and provide strong support for the development of grassroots talent teams.

Main Research Tasks

1.First, sort out the post structure of grassroots meteorological stations through research, and clarify the **target groups of meteorological microcourse resources.**

2.Second, design and classify **training objectives** in accordance with Bloom's Taxonomy of Educational Objectives.

3.Third, conduct in-depth research on the **microcourse content system**, focusing on the correlation between training content and objectives, practical needs and value, as well as its adaptability to the requirements of high-quality development of meteorological undertakings.

4.Fourth, carry out research on the design of **microcourse teaching videos**.

5.Finally, analyze and summarize the **development rules, models, and technical indicators** of microcourse resources for meteorological education and training. Synthesize comprehensive factors including **discipline construction**, **curriculum setup**, and **training resources** to formulate a construction system plan for mobile learning microcourse resources oriented to grassroots personnel.

Research Methods

1.It mainly adopts a combined approach of **theoretical research**, **literature research**, **survey research**, and **expert consultation**.

2.It analyzes the basic information of grassroots meteorological personnel, such as their **educational background**, **job responsibilities**, and **professional status**.

3.Combined with business plans and development trends, it designs and researches the educational and training curriculum resource system for grassroots meteorological personnel.

4.It conducts research on the construction of different types of meteorological mobile learning resource systems around three levels: **introductory training (to make up for shortcomings)**, **on-the-job basic training**, and **capacity improvement training.**
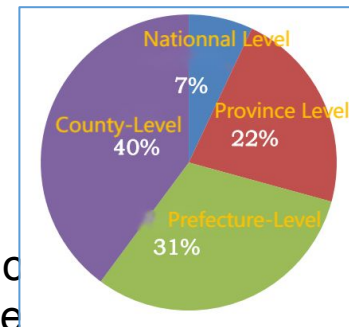
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Main Work Content

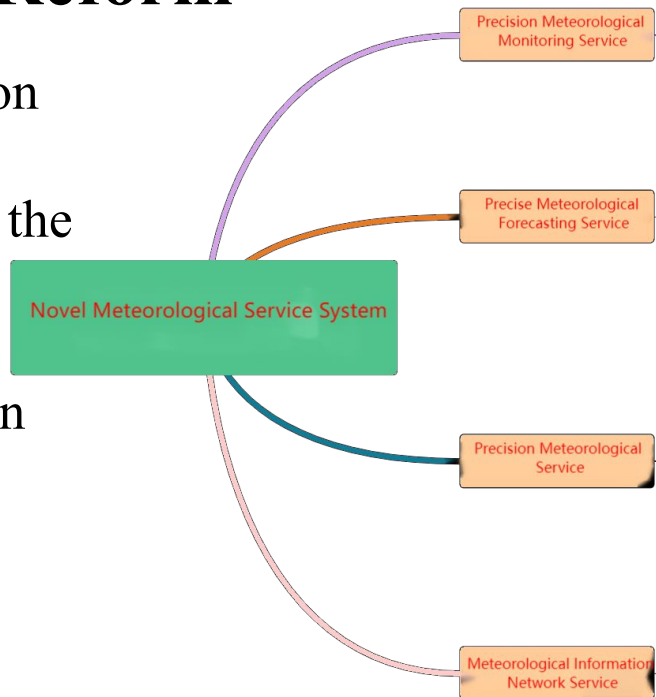# Current Status of the Talent Team Structure in County-Level Meteorological Departments

➤ Grassroots personnel account for a large proportion, with county-level personnel making up 40% of the total number of staff in national meteorological departments, approximately 28,000 people.

The total number of high-education and high-level talents is insufficient,
➤ especially the shortage of academic leaders.

The scientific and technological innovation capacity of the talent team is not strong, and there is significant room for growth in professional competence
➤ improvement.

The coverage of education and training is not wide enough; in particular,
frontline professional personnel have insufficient time for intensive training,
➤ resulting in slow knowledge updating and a relatively serious phenomenon of knowledge obsolescence.

Nationnal Level 7%
Province Level 22%
County-Level 40%
Prefecture-Level 31%

Business Orientation and Layout of County-Level Meteorological Departments After Reform

➤➤ Give full play to the basic outpost role of observation support and meteorological services.

➤➤ Strengthen the guarantee for the stable operation of the observation system and efficient data transmission.

➤➤ Intensify meteorological monitoring, early warning and forecast services focusing on disaster prevention and mitigation.

➤➤ Enhance meteorological services for agriculture, ecology and local characteristics.

Novel Meteorological Service System

- Precision Meteorological Monitoring Service
- Precise Meteorological Forecasting Service
- Precision Meteorological Service
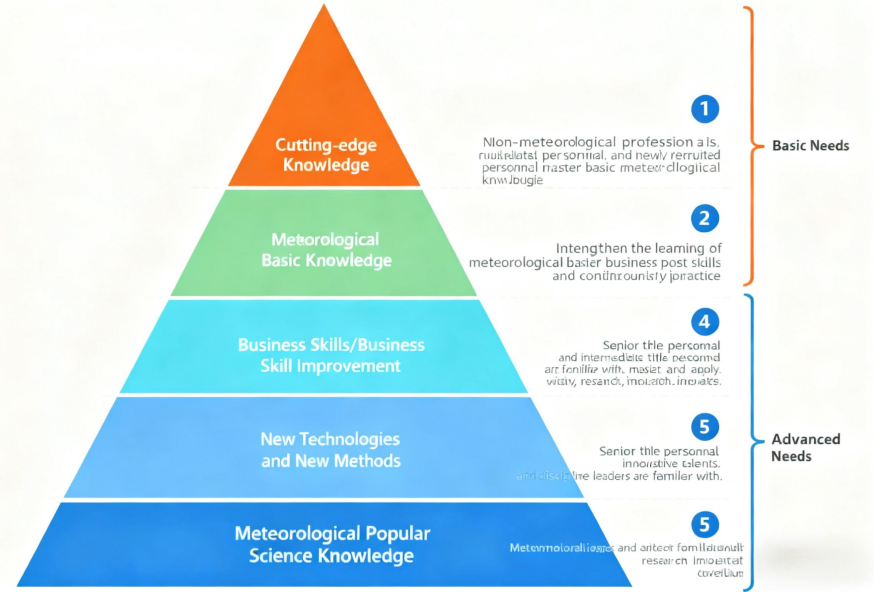- Meteorological Information Network Service

◻ **Learning Needs Survey**

Through expert consultation, surveys have been conducted multiple times to fully investigate the relevant situations of grassroots business development, post requirements, and individual learning needs. This further enables an in-depth understanding of the direction of resource construction and provides a reference basis for the planning and design of subsequent resource development.

☐ **Hierarchical Design of Training Objectives**

From a macro perspective, employees' career development is divided into 5 different cognitive levels from low to high, and multi-dimensional and multi-level teaching objectives are formulated to achieve a progressive and cumulative spiral ascending structure from easy to difficult.
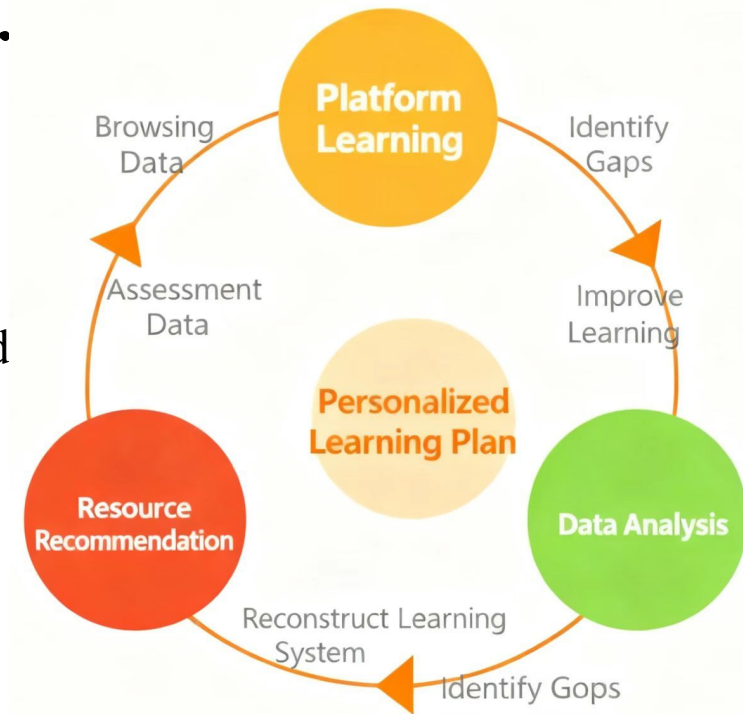
❑ **Hierarchical Design of Learning Tasks**

From a micro perspective, when setting the teaching objectives of a microcourse, the knowledge content is refined in accordance with Bloom's six cognitive levels to form **a detailed list of learning objectives**. Through mastering basic theoretical knowledge, applying it, and progressing to the upper levels of the pyramid—"evaluation" and "creation"—learners complete the cognitive progression **from lower to higher levels** as defined in Bloom's Taxonomy of Educational Objectives.

◻ **Intelligent Hierarchical and Categorized Push to Achieve Personalized Lear**

For learners who have performed well in achieving category-specific objectives, further push more challenging training based on their interests, raise the threshold for knowledge point evaluation objectives, and reconstruct the learning system.

For those who have not fully achieved the category-specific objectives, monitor their learning progress through online and offline methods, conduct knowledge interaction and emotional communication, with the aim of helping them reach the highest category-specific objectives for personal learning.
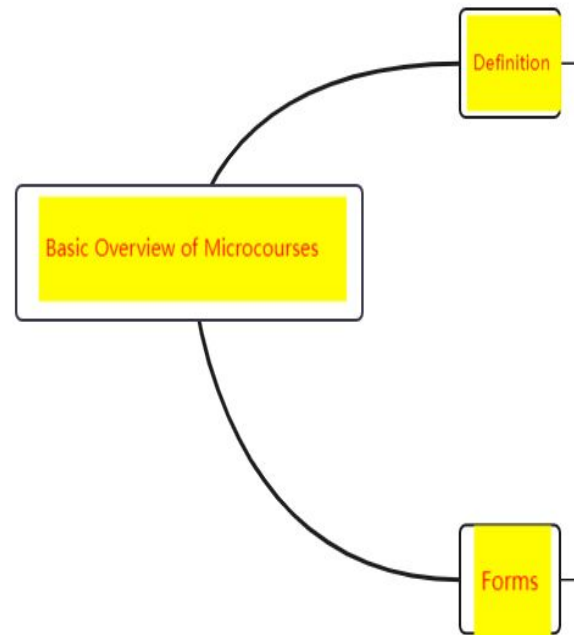
☐ **Basic Overview of Microcourses**

Microcourses (Micro Course or Micro Online Open Course)

A microcourse, also known as a Micro Online Open Course (MOOC for short in some contexts, but distinguished by its "micro" nature), refers to a miniaturized online open course. It is a streaming teaching video produced with a relatively independent knowledge point as the core content.

Integrating various media such as video, animation, slides, audio, images, and text for teaching purposes, it focuses on a single knowledge point in the teaching content with a duration controlled at approximately 10 minutes.
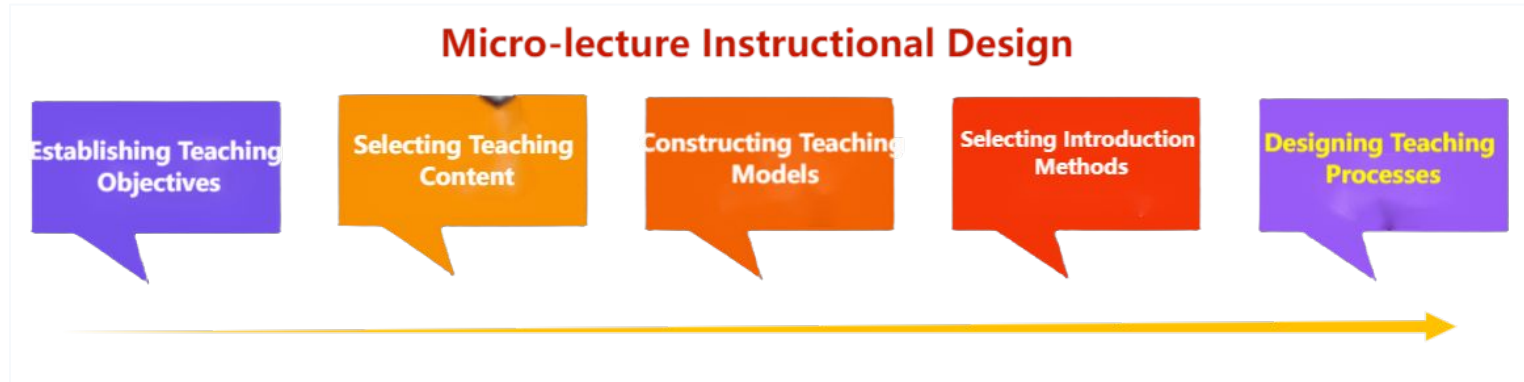
Compared with traditional courses that require systematicity and structure, microcourses emphasize pertinence and conciseness—focusing accurately on one knowledge point, one skill, or one problem, and delivering thorough explanations.

The three core characteristics of microcourses are: supporting independent learning, enabling mobile learning, and being concise and effective.

The three core links of microcourses are: teaching design, teaching process, and packaging & presentation.

Definition

Basic Overview of Microcourses

Forms

 Micro-lecture Design, Production, and Scripting

Micro-lecture Instructional Design

Establishing Teaching Objectives · Selecting Teaching Content · Constructing Teaching Models · Selecting Introduction Methods · Designing Teaching Processes

Micro-lecture Teaching is a visualized teaching approach based on audio-visual language. It involves analyzing and processing teaching content, dissemination methods, teaching methods, and teaching activities respectively to design the most effective video teaching scheme. Through instructional design, once the teaching content and scheme are finalized, they are further developed into courseware scripts and storyboards for filming.

3 Project Application Prospects

3 **Project Application Prospects**

1. Research Achievements

This project has completed the microcourse resource construction module system for three core businesses of county-level (station) meteorological work: precision meteorological observation, meteorological forecasting, and meteorological services. It also put forward planning suggestions for the county-level (station) meteorological popular science knowledge resource construction module. Priorities can be determined based on factors such as the importance and urgency of resources—resources with higher comprehensive priority will be developed first. This will gradually improve the construction of meteorological mobile learning microcourse resources, optimize the meteorological online education and training resource system, and provide a reference plan for the multi-level training layout of the Meteorological Cadre Academy.

This project has summarized the design, production, and technical indicators of microcourses, and proposed multiple technical solutions for microcourse teaching design, personal production, and professional production.

2. Limitations

The integration between theoretical research on microcourse design, production, and technical indicators and practical application is not close enough;

The planning system for microcourse resource construction needs further in-depth research to achieve gradual refinement and optimization, and its feasibility remains to be explored and verified.