# Construction of Remote Training System for Rural Revitalization Talents Under the Background of Internet + Open Education

Yanxia Zhang(✉)

Chongqing College of Architecture and Technology, Chongqing 401331, China
284857571@qq.com

**Abstract.** With the deepening of rural revitalization strategy, it is realistic to explore the training and education system of rural revitalization talents and improve the efficiency of talent training, which is also the bottleneck of rural development in the new period. In this regard, based on the problems existing in the current training and education practice, such as imperfect mechanism, imperfect content and inflexible form, this paper puts forward a set of remote training system based on streaming media, and applies the "internet plus Open Education" model to the training and education of rural revitalization talents, thus forming a new carrier for cultivating and bringing up high-quality rural talents. The core function of the system is composed of streaming media technology framework, that is, using FFmpeg technology, RTMP transmission protocol and Nginx-RTMP streaming media server to realize network distance training, and combining various forms of digital resources to realize modular training and teaching, so as to enhance the effectiveness of rural revitalization personnel training. After the simulation test, the functions of system live course training, teaching resources and remote service run smoothly, which effectively improves the training quality and provides intellectual and talent support for the implementation of rural revitalization strategy.

**Keywords:** Internet + open education · Rural revitalization · Remote training · Streaming media · Computer software application

## 1 Introduction

Since the 19th National Congress of the Communist Party of China, the rural revitalization strategy, as the key and guiding ideology to solve the "three rural issues" in China in the new period, has pointed out the phased goals and fundamental tasks of agricultural and rural development for us [1]. After five years of promotion and implementation, the rural revitalization strategy has achieved remarkable results. At the same time, it also reflects the importance of revitalizing talents and science and technology. On the one hand, professional rural revitalization talents come from outside, on the other hand, they rely on a lot of education and training to improve the overall quality and ability of grassroots talent teams. However, training rural revitalization talents is a complex,


D. Kumar et al. (Eds.): IEIT 2023, AHSSEH 10, pp. 464–469, 2023.
https://doi.org/10.2991/978-94-6463-230-9_55

systematic and long-term project. The traditional offline training mode is affected by problems such as single form, fixed content, insufficient teachers and lack of follow-up services, which seriously restricts the effectiveness of talent training [2]. In view of this, this paper holds that the training and education of rural revitalization talents at the grass-roots level should closely follow the goal orientation, adhere to the innovation drive, and actively combine the actual advantages of the information education model. In this paper, a feasible streaming media distance training system is constructed, and the "internet plus Open Education" mode is applied to the training and education of rural revitalization talents, so as to realize the transformation and upgrading of the training mode of rural revitalization talents [3]. The system will take streaming media technology as the core, realize live online distance training, and incorporate situational, case-based and interactive teaching methods, effectively targeting the training content, effectively improving the training efficiency of rural revitalization talents, and also providing feasible measures and suggestions for the full implementation of rural revitalization.

## 2 Development Process

First of all, the realization of online live broadcast function mainly involves three parts: push flow client, streaming server and pull flow client [4]. Before the broadcast, train teachers to open FFmpeg software on the streaming client to complete the detection and configuration of microphones, cameras and other equipment. After the broadcast, FFmpeg software will convert the digital audio signals collected by the microphone and the digital video signals collected by the camera into streams according to AAC audio compression coding algorithm and H.264 video compression coding algorithm respectively, and package them in MPEG2-TS and FLV formats respectively [5]. Then, according to the server key under RTMP communication protocol, the encapsulated audio and video files are sent to the streaming media server to complete the push flow operation. Secondly, the streaming media server is implemented by Nginx-Rtmp-Module, an extended live broadcast function module of Nginx. The pull flow client embeds the Flash player into the front-end interactive interface with the help of JWplayer framework, and unseals, decodes and plays the received audio and video files synchronously [6]. Finally, for the development of system structure framework, one part is the design and development of front-end interactive interface based on VUE framework, and the other part is the construction of Web Server based on Yii framework. The overall development environment is PHP, and the version is 7.0.30. The Web server is Apache 2.4.33 and the database is 5.7. The development tool is PHPStorm 2020.1. After importing VUE framework and Yii framework, MVC creation and single entry file configuration are completed in turn, and the corresponding functional modules are finally selected to realize specific functions [7]. Through the introduction of the above key technical theories, the overall environment of system development, the configuration of related software and tools are determined, and the technical feasibility of the overall project of the remote training system for rural revitalization talents is also clarified.

# 3 Functional Implementation

## 3.1 Pull Flow Client

### 3.1.1 Live Training

Under this function module, the platform will update the training notice regularly, which is convenient for users to choose their own learning according to their own time schedule and actual needs. Content setting is different from traditional offline training, which ensures innovation and pertinence. The system can support users to log in with mobile phones, computers, tablets and other devices, and users can choose different training courses from the live broadcast list to study. In addition, the platform also supports the playback function of live courses, which is convenient for users to use the fragmentation time to study and consolidate [8].

### 3.1.2 Live Interaction

In the live course, the user interacts with the teacher through the "barrage" function under the interface. Through the barrage, users can ask questions to teachers at any time, and also express their views and opinions. The barrage will appear on the teacher's side simultaneously. When the teacher sees the barrage, he can answer the questions raised by the student users in a targeted manner, and also adjust the training content in time according to the users' opinions to make the training form more flexible.

### 3.1.3 Follow-Up Services

Compared with previous offline training, the system can provide users with long-term and extensive training services [9]. First, the system will provide a large number of supporting digital resources according to the live training courses to form a multi-dimensional and three-dimensional training content system. Secondly, the system also provides remote guidance service, that is, users can ask for help online at any time, which shortens the problem handling time.

## 3.2 Push Flow Client

The streaming client is designed for training teachers, and the function module involves three main functions: training course management, online live broadcast and data statistics. Among them, the course management mainly completes the modification of teachers' personal information, the release of training course information and the modification of live broadcast titles. When the live broadcast course is over, the training teachers and users can view the live broadcast and accumulated live broadcast data under the statistics, as shown in Table 1.

According to the functions of the system and the actual application effect, this paper will also build corresponding simulation tests. In the test, 40 users and 10 training teachers were selected as the evaluation subjects, and corresponding evaluation standards were formulated according to the feedback of different users, as shown in Table 2. After the simulation score is finished, the coefficient of variation algorithm will be used to

**Table 1.** Statistical table of live course data

| Live time | Live title | Viewer number (peak) | Per capita viewing time | Barrage number |
|---|---|---|---|---|
| 22.11.01 | Digital economy empowers rural revitalization | 1633 | 68.3min | 5647 |
| 22.11.27 | Agricultural cultural tourism industry integration and tourism planning | 913 | 44.7min | 4113 |
| 22.12.10 | Rural community construction | 854 | 57.6min | 3619 |
| 22.12.16 | Farmers' entrepreneurial path and market development | 1125 | 73.7min | 4497 |

**Table 2.** Evaluation standard for the system application effect

| Evaluation benchmark | Evaluation indicator | Grading standards |
|---|---|---|
| Instructional | A1: Training form | Excellent: 5 points<br>Good: 3 points<br>General: 2 points<br>Poor: 1 point |
| | A2: Training content | |
| Interactivity | A3: Barrage interaction | |
| | A4: Voice interaction | |
| Practicability | A5: Resource application | |
| | A6: Remote guidance | |

**Table 3.** Evaluation results of the system application effect

| | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|
| User S1 | 5 | 5 | 3 | 2 | 3 | 5 |
| … | … | … | … | … | … | … |
| User S40 | 5 | 3 | 3 | 3 | 2 | 3 |
| Teacher T1 | 3 | 5 | 3 | 2 | 2 | 5 |
| … | | | | | | |
| Teacher T10 | 3 | 3 | 5 | 2 | 2 | 5 |

determine the weight of each evaluation index, and the comprehensive evaluation will be finally completed. The score results are shown in Table 3. The calculation formula of coefficient of variation is shown in Formula 1, where $A_j$ is the standardized mean, $S_j$ is the standardized mean square deviation, and $V_j$ is the coefficient of variation. The weight calculation formula is shown in Formula 2, and λ is the weight value [10]. The test results show that all the functions of the system meet the design requirements, users have a high evaluation of the resource application function, and the training teachers are satisfied with the remote guidance, which can help the subsequent upgrade and maintenance of the system.

$$V_j = \frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(r - A_j\right)^2}}{\frac{1}{n}\sum_{i=1}^{n} r} \tag{1}$$

$$\lambda = \frac{V_j}{\sum_{j=1}^{n} V_j} \tag{2}$$

## 4 Conclusions

In order to improve the training and education efficiency of rural revitalization talents at the grass-roots level, this paper constructs a Web-based distance training system with the application advantages of streaming media technology, network information technology and computer application technology. It applies the "internet plus Open Education" model to the training and education of rural revitalization talents, and realizes the transformation and upgrading of the training model of rural revitalization talents. In the follow-up study, the interactive mode of live training courses will be further improved, the allocation of training resources will be optimized, and the necessary technical support will be provided for the implementation of rural revitalization strategy.

## References

1. Yan Huali. Study on Rural Revitalization Strategy from the Perspective of New Development Pattern[J]. Vitality.2022.12.
2. Duan Yuqin, Hao Li. Research and Practice on Education and Training Mode of Rural Revitalization Grassroots Talents[J]. Continue Education Research.2020.12.
3. Wang Jingguo. Exploration on the Training Mode of Innovative and Entrepreneurial Talents from the Perspective of Rural Revitalization[J]. China Higher Education.2022.10.
4. Zhao Cheng. Research on Teaching Live Broadcasting System Based on Streaming Media[D]. Huazhong University of Science and Technology.2019.01.
5. Zhang Yin. Design and Implementation of Streaming Media System Based on RTMP Protocol[D]. University of Electronic Science and Technology of China.2015.09.
6. Lin Min. Research on Authentication Application of Nginx-rtmp-module Streaming Media Server[J]. Modern Information Technology.2020.08.

7. Mu Chun. Application and Research of MVC Design Pattern in Yii Framework[J]. Electronic Technology & Software Engineering.2015.06.
8. Ji Xionghua, Wang Wei. Research on "5+X" Training Curriculum System for Farmers under the Rural Revitalization[J]. Adult Education.2022.12.
9. Yang Yang. Measures to Develop Farmers' Training from the Perspective of Rural Revitalization[J]. Agricultural Engineering Technology.2022.12.
10. Ma Xiangnan, Liu Qing. Research on Evaluation Index System of Innovative Talents Training Effect [J]. Continue Education Research.2021.04.