

# Research of Communication Engineering Teaching System on Data Analysis

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**Abstract**—In this paper, a new subject of teaching method for communication engineering is introduced. The study is on construction of teaching system of communication engineering, which is based on the new technology of data mining and data analysis. And the following part of the article presents the data analysis, data mining in different kinds of majors and function of these new technology. The research method of the article is to introduce the data analysis technology into teaching system construction of the communication engineering. Comparison of the effect of the teaching system construction that uses the new method to the traditional one is obvious. The result is that the data analysis is very efficient to improve the study of students whose major are communication engineering. From the information point of view, the paper describes the possibility and necessity using data analysis as a teaching method and technology of communication major. The clear conclusion is that the new technology of data analysis has great value for teaching system construction of communication engineering.

**Keywords**—teaching system; data analysis; communication major; ladder teaching method; big data

## I. INTRODUCTION

In the communication engineering teaching, it is important to explore and construct the professional backbone course, such as: the principle of communication, signal and system, wireless communication, computer network, and communication electronic circuit. However, the main points of knowledge and the relationship between them, have not been paid much attention to. Nowadays, the new technology of data analysis is popular and through machine learning method of large data, communication course can make examination of the papers, can summarize the teaching difficulties and knowledge node of communication backbone courses; and can also make the contact of other knowledge points of other lectures for the professional teaching. And professional teaching is different in theoretical depth and scope of application, the final theory teaching and application can be more suitable in the future teaching with data analysis according to "explain profound theories in simple language".

Secondly, the teaching with data analysis can explore and construct the ladder incentive teaching method. The different learning levels of students can be studied in their own learning basis, so the teachers can continue to make the knowledge learning and

progress, step by step. It can help construct the structure to understand the knowledge point of use and the whole knowledge system; at the same time it can improve the self-confidence and interest of students for autonomous learning.

## II. TECHNOLOGY SUMMARY OF INFORMATION AGGREGATION

### A. Importance of Communication Teaching

Communication engineering is one of the important emerging engineering specialty in our college, is also the theoretical basis of higher, hands-on practical ability of professional[1]. Traditionally, communications professional teaching in classroom teaching and experiment is the main means of teaching, in order to reach the students theory and practice of strong application of wide bore teaching purpose, but as one of the main participants in teaching, fuzzy and motivation of students in learning aim and points of interest is not strong, students polarization is more and more serious. Are mainly students in the subject more and more lacking in class active learning spirit, the subject status of traditional classroom teaching and the insufficiency, discusses the mode and methods of classroom teaching, starting from the overall goal of teaching communication professionals, with professional linkage as a breakthrough point, through to professional courses, professional the series, learn in order to practice the target[2].

### B. Goal of Communication Major

Communication Engineering is a professional development of information science and technology quickly and a very vibrant, especially digital mobile communication, optical fiber communication, internet network communication so that people in the transmission of information and access to information and the convenient degree reached a hitherto unknown. Communication engineering has broad prospects for development, but also one of the serious shortage of professional talent[3]. Communication technology, communication system and communication network knowledge learning students who majored in communication engineering, the graduates can be engaged in the research, design, manufacture, operation and engaged in the development and application of communication technology and equipment in all sectors of

national economy and national defense industry in the field of communications[4]. Graduates can be engaged in wireless communication, television, large scale integrated circuits, intelligent instrument and application of electronic technology research, research, design, technology introduction and development of design work and communication engineering[5].

### III. COMMUNICATION LECTURE

But in the existing communication engineering professional teaching conditions, students of Communication Engineering Specialty in our college should be based on making full use of the existing theory of classroom teaching and engineering test conditions, in classroom teaching, including the theory teaching and experiment teaching of teachers and learning of basic theoretical knowledge actively, break the knowledge learning mode of fragmentation, the construction of knowledge the system structure is complete, reach to master the complete communication engineering system, so as to achieve the effect of thick foundation[6]. And a solid theoretical foundation and practical ability, will inevitably bring about a profound understanding of the high and new technology and the rapid mastery, thus opening wider channels for students to their professional development[7].

TABLE I. CORE LECTURES SITUATION OF COMMUNICATION ENGINEERING

Lectures	Semester	Class hours	Type of examination
communication theory	5	64	Closed book exam
signal&System	4	80	Closed book exam
wireless communication	6	64	Closed book exam
digital signal processing	6	64	Closed book exam
communication circuit	3,4	128	Closed book exam
computer network	6	64	Closed book exam
electromagnetic field and electromagnetic wave	5	64	Closed book exam
RF circuit design	7	48	Closed book exam

Through discussion with the classroom teacher and the inquiry to the students, the team found that the existing communications professional students in the learning process, there is no clear understanding of the knowledge points, no communication engineering construction of knowledge system, not in-depth understanding of the physical meaning of knowledge and mathematical derivation, thus not only master knowledge, application of knowledge to practice.

### IV. PROBLEM AND SOLUTION USING BIG DATA ANALYSIS

#### A. Importance of Communication Teaching

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Classroom teaching mode has not been separated from the traditional mode of teaching: emphasis on knowledge, skill to the teacher explain the main light. Most teachers according to books, read very few course ware, arrangement of practice interactive link. Usually, monotonous teaching content, progress faster[8]. This method leads to Professor passive communications professional students' interest in learning and initiative repressed. Knowledge content students just mechanically passive memory teachers ask students to understand, lack of capacity flexibility of application. But, this kind of memory is often in order to cope with the short-term memory of curriculum examination in utility, little can play in the future work.

It is because of the existence of deficiencies of the above, this research has profound significance for the deepening of communications professional teaching. This topic uses this favorable research platform, a professor of communication at the professional course, the professional knowledge of the students were further reviewed, through the connection between curriculum, constructing reasonable professional knowledge structure, to achieve professional series; the use of science and technology data and audio and video content external rich, expand knowledge of students, understanding the technological frontier, arouse the learning enthusiasm and creativity, to lay the foundation for later study; the use of rich form of classroom teaching, the cultivation of professional application ability, students can learn in order to practice, to improve the professional competence of a basic work.

#### B. Big Data in Teaching

In the classroom teaching, this thesis intends to adopt the teaching mode of ladder type of encouragement, meaning is in the teaching to encourage students to learn, improve students' learning initiative, is ultimately a love of learning, become the subject of study[9].

However, this is not close to the teacher's encouragement of language and strict management of the classroom teaching, and get but through stepped progressive encourage students to learn. Learn the features of University of science and technology is the large amount of knowledge, curriculum variety, once students a class does not follow to go up, often behind; the subject from the basic knowledge points of textbooks, teaching content is not limited to linear systems, but repeated review knowledge point, both for the students build knowledge service system.

At the same time also in emphasis and difficulties in the course of time, while the non key content, it is through the establishment of a knowledge system, make its natural attached to the key points of knowledge, to allow students to have more deeply understand and master the.

At the same time, teachers every time on the knowledge system in order, but also easy to digest, stepped to improve students' understanding of the depth of knowledge. In this way, step by step system of knowledge teaching instead of mechanical scripted, will greatly improve the efficiency of student learning, so as to enhance their self-confidence and subjective initiative and creativity[10].

## V. PROBLEM AND SOLUTION USING BIG DATA ANALYSIS

### A. Professional Backbone Course

In the teaching to explore and construct the professional backbone course of communication (such as: the principle of communication, signal and system, wireless communication, computer network, communication electronic circuit) the main point of knowledge and the relationship between them, and further constructs the system structure of knowledge.

Research group of communication. Through the preliminary analysis of teaching outline, outline the basic communication professional backbone courses and teaching system.

By reading the text carefully, and main teacher conferences and teaching of main courses, analyze each course knowledge point. Read the paper and paper analysis before, get the main points of each main course point.

Combining the basic courses such as mathematics, University Physics, circuit analysis basis, combing between each course knowledge point of contact, constructing knowledge framework system.

Invite students representatives, put forward to the knowledge system of the opinions and suggestions, and modified, complete the construction of the first round of the knowledge system.

TABLE II. BACKBONE COURSES OF COMMUNICATION ENGINEERING

Courses	Grade/Semester	Credit	Type of examination
communication theory	3/5	4	Closed book exam
signal&System	2/4	5	Closed book exam
wireless communication	3/6	4	Closed book exam
digital signal processing	3/6	4	Closed book exam
communication circuit	2/3,4	8	Closed book exam
computer network	3/6	4	Closed book exam
electromagnetic field and electromagnetic wave	3/5	4	Closed book exam
RF circuit design	2/7	3	Closed book exam

Through the teachers use the curriculum Professor knowledge framework system has been constructed, the key link between the open knowledge point, is that students can really from the theoretical basis to understand

the knowledge points in that position in the whole communication specialty, gradually build their own knowledge system.

### B. Ladder Incentive Teaching

The use of active ladder incentive teaching method to encourage students to self learn, to develop their learning confidence, slowly accumulating knowledge point, so as to gradually understand the theoretical system of the whole communication professionals, and lists a large number of application examples, enhance their interest in learning. In the teaching practice, summarizes the characteristics of active ladder type incentive teaching method and shortcomings, improve its application.

In the process of teaching at the same time constant for student learning practical, framework adjustment and complement of knowledge points, degree of difficulty to adjust teaching. In the teaching of which and the exam, students and teachers forum convened representatives, completed the second round of knowledge system in the interaction of adjustment.

Through classroom teaching is introduced in the research on the network resources, such as open class, "Mu class", the latest products of conference papers and communications technology, contact communication course, students do to tamp the foundation, through professional courses.

The use of English literature of science and technology English audio and video data, mobilize the classroom student participation, the practical application of imitating the professional meetings, improve students' learning initiative and interest, and at the same time compaction in the application of theoretical knowledge point. Through the homework and group discussion, to improve the students grasp the knowledge.

Through the wireless communications bilingual teaching, feedback on students professional English ability, and to improve.

Outside research, learn from the successful experience and teaching methods of school.

Through large data in machine learning methods, the analysis of mining in recent years communication course examination papers, summarizes the teaching difficulties and knowledge node communication backbone courses (and other knowledge point of contact for the high degree of knowledge points, and analyzes its fit) of the professional and related professional different teaching theoretical depth and scope of application for example, the final theory teaching and application is more suitable in the future teaching, do have large data analysis according to the "layman".

In the teaching to explore and construct the ladder active incentive type teaching method. The different learning levels of students can be in their own learning basis, continue to make the knowledge learning and progress, step by step, structure to understand the knowledge point of use and the whole knowledge system; at the same time the self-confidence and interest in autonomous learning, the final is not only the completion of their studies, also has good study habits and self-study ability.

## VI. USING RESOURCES OF BIG DATA

Make full use of the existing campus databases and Internet resources, the students can receive the latest science and technology literature into communication professional teaching classroom. Combined with the basic theoretical knowledge, teaching of literature of science and technology of the latest[11]. Professor process in the literature of science and technology, knowledge path between the basic knowledge of communication can not only through professional students and the new theory and technology, but also can reach the advanced professional knowledge, broaden their knowledge, and to stimulate their interest and confidence in learning the professional training, active creative thinking.

The annual IEEE and ARM conference proceedings, especially the summary article, is often the starting point is good, can comprehensive review and understand the direction of professional knowledge.

The project area research results not only Communication Engineering College of information science and technology in our implementation, it has reference significance but also the Institute of information construction for "excellent engineers", and communications engineering information science similar to other professional also has a very good reference value.

The implementation of the value of popularization and application of this project can not only cultivate the theory of high quality, practical ability, has the strong ability of communication engineering of self promotion of talents, but also enhance the visibility and influence of Qingdao University of Science & Technology communication engineering at home and abroad, to create a professional brand characteristic of Qingdao University of Science & Technology; and can realize the strategic policy of "excellent response of Qingdao University of Science & Technology".

"Technology engineer" program curriculum cultivation, driving mode of teaching, teaching methods, innovative project evaluation methods and incentive mechanism of innovation and upgrading, which not only helping to cultivate communication engineering specialty, also has an important role in the demonstration.

Efforts to build the development strategy of famous brand school teaching research, comprehensively promote the communication engineering in the process of internationalization of professional teaching and personnel training of the professional construction to become in line with international standards, has a high level of domestic professional characteristics.

## VII. FORECAST

In a word, the purpose of this research is to the students as the main body of the class, teaching serves learning, teaching and learning to use for the purpose of. Students from the school of natural transition to learn in order to practice with, eventually, through the use of and consolidate learning content.

The classroom is the smell of the road, but also exercise self, self discovery of advantages and disadvantages, learn from each other, exchange platform. In this regard the students as the main body, the application as the purpose, flexible teaching mode greatly exert their subjective initiative, to mobilize the enthusiasm

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