Exploration on Whole Procedure Precision Management of Teaching and Scientific Research

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Abstract. Teaching and scientific research management methods of some colleges and universities in our country have been difficult to adapt to the institutional innovation over years in the reform of colleges and universities. This work proposes an integrated product development (IPD) based management method of teaching and scientific research. The proposed method emphasizes the whole process of teaching and scientific research, and precision management to ensure teaching and scientific research quality. One can apply it to the colleges and universities from the aspects of ideological preparation, system construction, decision making and management team construction, and technical facilities construction.

Introduction

In recent years, with the deep-going reform of university education in our country, the major school has made great progress both in scale and quality. At present, the higher education institutions of our country has reformed and made a series of innovation curriculum system, training mode and management scheme[1]. The reformations and innovations has improved the system of talent training scheme in Colleges and universities of our country, developed a lot of talents in various levels with types of application, experts and compound, and spawned a series of innovative scientific research and academic achievements, which made outstanding contributions for the development of our national economy, social stability and national security [2]. However, the new educational environment inevitably brings new challenges to the teaching and scientific research management in some colleges and universities [3], for example:

1) The goals of teaching and scientific research management are not clear and discontinuous. Reforms often require a constant adjustment of goals and plans. This makes the goal of teaching and scientific research management changing constantly, lacking clear and forward-looking plan on teaching and scientific research. Many managers and teaching and research workers are easy to be confused.

2) Teaching and research management methods are not suited. There are few overall understanding on current progress and problems of teaching and scientific research, and various works are still managed by old schemes. There are few effective working processes and management rules on teaching and scientific research, especially, few evaluation mechanisms could be used to fully mobilize the enthusiasm.

3) Teaching and research resources platform is incomplete. The document is not complete, the resources are not shared, the resource platform construction is not matched, and various needs departments could be co-ordinated. The problems above result in that a lot of important information transfer unclear, and a large number of duplication of work are assigned to the frontline staff and students, which result in excessive administrative burden and the normal teaching and research work are seriously affected.

These problems have greatly restricted the development of teaching and research in some colleges and universities, and become the main obstacle to the further reform of college education. It is urgent
to innovate the management mechanism and improve the working methods, so that the reform will become the multiplier of the quality of teaching and scientific research.

**Whole Procedure Precision Management of Teaching and Scientific Research**

With the deep-going reform of university education, the teaching and scientific research management with simple and extensive, the event triggered mechanism has been unable to meet the requirements of teaching and scientific research work in colleges and universities. In the current situation, it is urgent to do whole and precision management for the teaching and scientific research, and the reform of university system has created a good condition for that.

IPD (Integrated Product Development) is a process oriented development management system for cross functional integration product[4]. In the modern enterprise management, IPD has been adopted by more and more enterprises, which significantly improves the efficiency and innovation ability of these enterprises [5]. The use of IPD ideas in the teaching and scientific research management and the implementation of the whole precision management in the quality of teaching and scientific research, will probably improve the efficiency of teaching and scientific research management, cultivate more excellent talents and produce higher level output of scientific research for the state development.

The whole procedure precision management of teaching and scientific research will divide the teaching and scientific research management into multiple projects. For example, take the training of each session of students as a project to manage. By the establishment of high-level decision-making committee and cross-functional management team, each functional management staff can be integrated as much as possible to promote the communication and integration between functional managers. Then, the relevant information could be shared in the management project of teaching and scientific research, and each stages of teaching and scientific research management could be organically integrated. Finally, the efficiency and quality of teaching and scientific research could be improved.

The whole procedure precision management of teaching and scientific research will each project into multiple stages. At the beginning and end of each phase, the teaching and research decision-making committee is responsible for decision-making and review. For example, take a semester as a stage of a talent training project. From the end of each semester to the beginning of the next semester, the completion of the indicators of talent training will be reviewed. Then, sum up the experience, decide and adjust the training planning of the next semester, and identify the key object to cultivate and the key project to save. The cross-functional supervisors are responsible for tracking the teaching and scientific research projects at all stages of the management. Then, take the collective office as a link, organize and coordinate each functional management staff to organically integrate all aspects of all stages of the teaching and scientific research management, and ensure that the teaching and scientific research could be persistent. If the cross functional managers find problems in the implementation of the teaching and scientific research projects, they should immediately ask the steering committee to review and decide on whether to adjust and how to adjust the plan. The functional managers are responsible for the management of the specific affairs of the teaching and research projects at various stages, such as the management of scientific and technological innovation managers responsible for the management of surveying, project approval, review and checking of the scientific technological innovation. In the preparation of the existing results of the system adjustment, the personnel skills and responsibilities of the functional departments and their staffs should be strengthened. In the following, the discipline construction, talents training and scientific research will be taken as examples to illustrate the specific tasks of the decision-making steering committee, the cross functional supervisors and the functional managers.

**Discipline Construction and Management**

Take the discipline construction as a project to manage. Relying on the existing teaching guidance committee, degree assessment subcommittee and scientific research academic committee, etc.,
develop discipline construction management system, discipline construction goals and developing planning, review the implementation details of the discipline construction and the completion of each stage, and make decision at all stages. Discipline construction cross functional supervisor, organize and coordinate all aspects of discipline construction, formulate discipline construction rules, and submit it to the steering committee for the quality of discipline construction. The staffs in all aspects of discipline construction are responsible for all aspects of the specific work, construct technical facilities of disciplines, including document specification and management system, and are responsible for the quality of all aspects of discipline construction.

Talents Training and Management

Take each session of undergraduate students, graduate students and pre-job training students as a teaching project management. Relying on the existing teaching guidance committee, degree assessment subcommittee and scientific research academic committee, etc., develop talent training system, goals and developing planning, review the implementation details of talent training and the completion of each stage, and make decision at all stages. Each of the teaching project cross-functional supervisors, organize and coordinate the functional staffs of all stages and aspects of the students of this session. Then, develop talent training implementation details, submit it to the steering committee for review, and be responsible for the quality of talents training in the charged teaching projects. The staffs in all aspects of talents training are responsible for all aspects of the specific work, construct technical facilities of talents training, including document specification and management system, and are responsible for the quality of all aspects of talents training.

In the aspect of talents training, we could consider the instructor or supervisor to be responsible for the cultivation of each session students. As the supervisor is required to have a mastery of all aspects of the work, how to improve the professional skills and management capacity of the supervisors is essential to the quality of talents training. Moreover, because the cycle of talents training is usually longer, therefore, the decision-making nodes should have the corresponding indicators.

Scientific Research Management

Take each category of scientific research as a project to manage. Relying on the existing scientific research academic committee, develop various types of scientific research management system, goals and developing planning based on the provisions of scientific research management, review the implementation details of assessment research reporting, checking, concluding and achievement identification and the completion of all the stages, then, make decision at all stages. The cross functional managers of each kind of research projects organize and coordinate leader of each scientific research project in the whole procedure to develop the implementation details of assessment research reporting, checking, concluding and achievement identification, construct technical facilities of scientific research management and submit to the scientific research academic committee for review. The cross functional managers are responsible for the quality of scientific research of the supervised category. The leader of each scientific research project are responsible for the specific implementation of scientific research, develop the scientific research work plan and are responsible for the quality of each research project.

In addition, the affairs of logistics and political in daily management could be considered as the corresponding project to manage, and specific person and functional staffs should be assigned.

Implementation of Whole Procedure Precision Management of Teaching and Scientific Research

At present, the whole procedure precision management of teaching and scientific research require all the staff to do the ideological preparation, establish and improve the system, build the required various decision-making and management team, construct and ensure various technical facilities.
Ideological Preparation

The ideological preparation is the source power of the whole procedure precision management of teaching and scientific research. The key to the reform of teaching and scientific research management lies in people. The primary task on implementation of the quality of the whole procedure precision management of teaching lies in the transformation of the related personnel ideas. Once the ideological understanding is inaccurate, there is a conflict, then, the requirements for document formation, management system integration and use of various stages are likely to cope with the trouble. The process above will make the reform of a mere formality, not only the efficiency and quality of teaching and scientific research cannot be improved, and it may have the opposite effect, increase the burden of staff at all levels, and reduce the quality of teaching and scientific research. Therefore, in the initial stage, the staff should be fully ideological educated, so that everyone is deeply aware of the quality of teaching and research throughout the precise management to take the initiative in accordance with the implementation of the management system and go forward to the correct direction of reform.

System Construction

The system construction is the guarantee of the whole procedure precision management of teaching and scientific research. The whole procedure precision management of teaching and scientific research includes the system of investigation and research, cooperation and decision-making system, evaluation system and implementation rules. The main content of each system includes the purpose and significance, guiding ideology, basic principles, organization and implementation. Among them, the organization and implementation of the research work should include survey approval, survey scope, survey time node, survey content, survey summary, survey exchanges and survey review of all kinds of teaching and scientific research work. The organization and implementation of the collaborative and decision-making system should include a summary of manning, time node, content and conclusion of the collaboration and decision making. The evaluation system should include the evaluation object, evaluation time node, evaluation content, evaluation method, evaluation indicators, reward and punishment method. The detailed rules of implementation are closely related to the detail content of teaching and scientific research.

Building of Decision-making and Management Team

The building of decision-making and management team is the key issue of the whole procedure precision management of teaching and scientific research. The building of decision-making and management team include the construction of various steering committee, cross functional team and functional team. In the decision node, A variety of steering committee review the research results of demand analysis, teaching and research status, and make decisions for the curriculum construction, talents training programs, scientific research progress and direction. The steering committee is mainly composed of experts and professors in various fields, including some frontier experts and technical leaders. For each teaching and research project, a corresponding cross-functional supervisor team or person should be established. The cross-functional team will coordinate the functional teams, manage the implementation of the teaching and research projects, and be responsible for the quality of the project implementation. The functional teams are mainly responsible for the specific management of the specific tasks and stages of implementation under the coordination of the cross-functional supervisors or personnel.

Implementation of Technical Facilities

The implementation of technical facilities is the material base of the whole procedure precision management of teaching and scientific research. The technical facilities should be a complete management system that links the elements of the teaching and research projects to each other and links them to the objectives of the project. The technical facilities should also links the quality and processes of the various stages of teaching and research. Managers relying on technical facilities
could obtain enough information of teaching and scientific research projects to share and integrate information, so as to enhance the decision-making ability of the team at all levels. Technical facilities include planning, tracking and implementation of documents and information systems for teaching and research projects.

Summary
With the deep-going reform of the university system, some problems existing in the current management mechanism are becoming more and more obvious. In view of the problems existing in the management of scientific research of institutes and universities in our country, the main causes of these problems are analyzed. On the basis of IPD that be used in the product development in the modern enterprise, this paper explores the whole procedure precision management of teaching and scientific research, and interprets the ideological preparation, system construction and decision-making, management team construction and the construction of technical facilities required in the current whole procedure precision management of teaching and scientific research.

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References