

The Role of Owners in Engineering Construction Project Management

Yanchun Niu

Henan University of Technology, Zhengzhou 450001, China

Abstract: *Owner project management plays an important role in managing construction projects. As an important part of construction project management, it is necessary to promptly contact relevant owners and make corresponding adjustments during construction. This is beneficial for the organization and task arrangement of the project, in order to assist in the scientific and effective management of the construction project. It not only ensures the quality of the project, but also reduces the cost of the facility construction process, and meets the requirements proposed by the owner. However, in the practical application process, the project management of the owner plays an important role in engineering project management, therefore, a relatively scientific management method must be adopted. Only in this way can the management of construction projects in engineering construction be further improved. This is mainly a comprehensive analysis and research on the engineering construction project management of the owner, hoping to provide helpful information for professionals in the same industry.*

Keywords: owner; Engineering construction; project management.

Construction project management is a systematic and scientific management activity that utilizes scientific theories and perspectives during the construction cycle of a construction project to effectively plan, make decisions, organize, coordinate, and manage the project in accordance with the original construction period, total investment, resource constraints, and environmental conditions, and comprehensively achieve the goals of the construction project. This article mainly discusses the safety management, quality management, schedule management, cost management, and contract management of civil engineering projects. Wray (2002) points out that the effective use of collocations will better guarantee the interactive accuracy and fluency. In other words, acquiring and using lexical collocations in English is of vital importance for English speakers and learners. In China, countless researchers have done research on acquisition of single words both implicitly and explicitly. Though recent years researchers have drawn their attention to collocation acquisition, seldom paid attention to ways and effects of collocation acquisition. In 1974, Baddeley and Hitch proposed the concept of working memory. Baddeley et al. referred to working memory as a memory system of limited capacity to keep information, master such complex human cognitive skills as problem solving, reasoning, reading comprehension, etc.

Participants of this study are 76 English majors in Henan University of Technology. They are freshmen with the average age of 19.5 learning English as a foreign language (EFL) and all of them have learned English for about 8 years and shared the same English learning background. In order to ensure that participants have similar level of English language proficiency and that students' vocabulary knowledge has little influence on the research results, the scores of students' intensive reading course and the results of the vocabulary test in the SPSS 16.0 are carefully analyzed. Finally, the researcher chooses 64 participants whose test scores are very close.

1. ANALYSIS OF MANAGEMENT OBJECTIVES AND FUNCTIONS IN THE PROCESS OF OWNER'S ENGINEERING PROJECT MANAGEMENT

Working memory is a memory system of limited capacity to keep information, master such complex human cognitive skills as problem solving, reasoning, reading comprehension, etc. Involvement Load Hypothesis assumes that tasks with different degrees of involvement load affect learners' vocabulary acquisition. This study applies working memory theory and design tasks on the basis of the involvement load hypothesis to verify whether working memory capacity and task-induced involvement affect students' collocation acquisition. 1) What is the effect of working memory capacity on collocation acquisition under different conditions of involvement load? What are the differences of the effect of working memory capacity on immediate and delayed collocations acquisition of two task groups? 2) What is the effect of task-induced involvement on incidental collocation acquisition? In this study, 64 participants are selected from Henan University of Technology in China. The experimental subjects in this thesis are divided into two groups (32 students of each group) to read the same

passage and finish two different kinds of reading tasks. After participants finish reading the material, an immediate collocation test is given to them. Participants are required to translate the target collocations from English to Chinese. A week later, a delayed collocation test will be given to these 64 participants to test the retention of these collocations. The quantitative analysis is applied to analyze the data collected. Major research findings are presented below: 1) working memory capacity exerts a great influence on immediate collocation acquisition both in the multiple-choice task group and in paraphrasing task group; 2) participants taking tasks with higher involvement load can better acquire collocations and memorize the target collocation for a longer period than those taking tasks with low involvement load. The results of this study will bring certain enlightenment to teaching which is helpful for teachers in designing reading tasks and for students in more effectively acquiring English collocations.

1.1 Analysis of management objectives of the owner in the process of engineering project management

For construction project owners, their management objectives mainly include the following aspects: project quality control objectives, project development objectives, and project investment objectives. The quality objectives of the project mainly involve the owner adopting effective management methods to ensure that the project meets technical specifications and standards, and maintains the quality of building materials. For the goal of engineering development, project management mainly focuses on continuously improving the management of construction progress in each section, and completing the construction project within the time limit specified in the contract. For the management of engineering project investment, basically adhere to the quality of engineering design, more reliably realize the benefits of economic engineering, and strive to control engineering cost. In terms of project quality management, project development management, and project investment management, there is an opposing and unified relationship between the three. By obtaining scientific and effective management, it can be ensured that these three factors are coordinated.

1.2 Functional analysis of the owner in project management

1.2.1 Functional analysis of decision-making

For a construction project, the construction process is a relatively systematic process, and the initiation of each construction is highly dependent on decision-making. The early decision-making of construction projects directly affects the design and construction of the project. Therefore, the owner needs to collect relevant data about the project in order to make more informed decisions and take appropriate actions. In the process of designing and organizing project proposals, each project is given a set of parameters, preliminary design is carried out, and careful evaluation is conducted to manage project development progress accordingly. It includes various technical and economic experts, reviewing design and construction drawings to ensure the rationality of the drawings, while also being cost-effective and advanced in technology.

1.2.2 Functional analysis of the organization

In terms of property owners, the organization and management team are mainly responsible for coordinating the relationships between various parts of the building throughout the entire management process. At the same time, the tenderer is responsible for the design and research of the project, and supervises the project team.

1.2.3 Functional analysis of guarantee

In addition to the preliminary preparation of the project, the owner must also prepare the annual investment and overall investment plan for the project. Owners can exercise their authority in accordance with the general contract content of the project, promptly solve engineering problems, and ensure the smooth progress of the project.

2. PROBLEMS IN THE MANAGEMENT OF THE OWNER'S ENGINEERING CONSTRUCTION PROJECT

2.1 Lack of democratic awareness and scientific attitude in the decision-making stage of engineering projects

The construction projects completed at the current stage in China have already brought huge social and economic benefits, but there are still some projects and some projects that have not been fully resolved in the decision-making process. After the construction of the project, not only did it not bring expected profits, but it also brought financial burden to the enterprise. On the other hand, due to the weak democratic awareness of property owners, the quality of employees varies, Insufficient understanding of the implementation of laws and regulations or related regulations, as well as a general lack of democratic conscience or scientific attitude, results in insufficient cooperation between some relevant departments, unclear responsibilities and authorities, and potential conflicts. In addition, there are still issues with the decision-making of administrative supervisors, who often prefer to blindly issue orders rather than following procedures.

2.2 The owner's quality awareness is weak and the quality assurance system is incomplete

As investors, owners, and users of construction projects, owners play an important role in supervising technical quality management in the quality control of the entire project. Contractors, suppliers, supervisors, etc. are an important part of quality management activities in engineering projects, and their management content only covers some of the participating parties in the project, resulting in their inability to comprehensively manage the entire lifecycle and subsequent engineering projects. (1) For the owner, selecting a supervision agency in accordance with the law and regulations, but without providing comprehensive exercise rights for the supervision agency, is more about intentionally reducing management fees, making management more difficult. (2) Projects that do not guarantee quality are not feasible due to poor quality awareness, severely shortened construction periods, arbitrary behavior, violations of building codes, and reduced technical standards among owners. (3) For some owners, incomplete quality assurance systems, poor quality, incorrect information transmission, delayed quality control time, and even quality safety may lead to accidents.

2.3 The owner has problems with outdated contract management methods and weak contract awareness

Contract management is an important component of the owner's construction project management. Generally speaking, the entire implementation and management of an engineering construction project can be included in the scope of contract management. Contract management covers all aspects of the entire project process, responsible for monitoring and ensuring the implementation of the entire project. In modern technology, without understanding the contract, the overall goal of the project is unclear. Without contract management, it is difficult to establish a project system and achieve efficient construction, making it difficult to achieve project goals. At present, there are mainly the following problems in contract management: (1) With the intensification of competition in the construction market, the market's tolerance towards owners is becoming increasingly high, and owners often provide relatively strict contract terms. The contractor had to propose to modify the contract due to livelihood issues, and the owner was forced to accept it for the smooth completion of the project. (2) The national construction contract legal system is incomplete, and some laws are still incomplete. (3) Some owners have insufficient understanding of contract management. Most project management organizations do not have a contract management department, an effective and competent contract management system, and a specific operational system. They are unable to monitor projects in a timely manner in the form of contracts, and achieving dynamic management goals is impossible. (4) Lack of contract management personnel. The owner has a large number of skilled personnel, but lacks personnel who understand contracts and specialize in contract management. At the end of the contract, it is difficult to analyze from a legal perspective, as problems arise during the contract execution process, which hinders its effective use of legal weapons to safeguard its interests. (5) Delay in contract management resources and failure to use contract management information tools.

3. MANAGEMENT MEASURES FOR ENGINEERING CONSTRUCTION PROJECTS BY THE OWNER

Aiming at the problems of low accuracy of joint trajectory and trajectory optimization, this paper uses cubic non-uniform rational B-spline to plan the trajectory of dexterous hand based on the principle of shortest path optimization, and compares it with cubic polynomial and cubic B-spline trajectory planning curves to verify the validity of cubic non-uniform rational B-spline. And reliability.

There are many solutions to the inverse kinematics of dexterous hands. In the case of avoiding collision, the choice

is usually based on the "shortest stroke", i.e. a set of solutions with the smallest motion of three joints. In the course of calculation, we can weigh the three joints and follow the principle of "less movement of large joints, more movement of small joints". Large joints move up and down near the knuckles, while small joints refer to the rotation of the middle and distal knuckles.

The inverse kinematics is solved by MATLAB, and the trajectory of dexterous hand is optimized based on the principle of the shortest stroke. The cubic polynomial, cubic B-spline and cubic non-uniform rational B-spline motion curves of each joint of dexterous hand are obtained respectively. All the three planning curves are functions of time t . The total planning time is set at 3s. The curves are independent of each other and have no influence on each other. By deriving the cubic polynomial, cubic B-spline and cubic non-uniform rational B-spline curves, the angular velocity and angular acceleration of each joint trajectory can be obtained. This paper only discusses the joint motion curve of far knuckle based on three trajectory planning.

3.1 Safety Management

The safety management project of the owner is the foundation and necessary prerequisite for ensuring project quality, progress, cost, and other controls. Firstly, the owner must comply with the laws and regulations of the construction project standards, and comply with various procedures related to safety protection. Secondly, inspect the control and design departments, control departments, and production departments to ensure that each department completes their work diligently. Thirdly, special means need to be introduced to protect the project and complete security management work. The owner must perform the following safety measures.

Full management task: Subcontracting the project to reliable contractors. Once the project is completely fragmentation, it cannot be managed. Ensure that the architectural design department cannot lower construction standards, and also ensure that there are no instances of bribery during construction. Contractors cannot use inferior building materials and components to ensure engineering and technical quality, and to avoid accidents. The owner is responsible for providing all project documents (including safety production), implementing safety work and design requirements, and confirming safe construction with relevant construction departments. The contracting unit must construct in accordance with safety production regulations, and the construction department shall not shorten the relevant construction period. Owners can also use project insurance to solve the risks encountered during construction.

3.2 Strengthening Engineering Quality Management by the Owner

(1) Construction quality control: Firstly, appropriate technical information must be provided before setting up the drawings. Secondly, during the construction process, the customer representative must regularly check whether the contractor strictly follows the drawings for construction. If problems are found, timely coordination must be carried out with the design, monitoring, and construction units, and any damage caused shall be the responsibility of the contractor. (2) Confirmation of main material selection: According to the engineering construction materials specified in the contract or proposal, contractors can freely choose in the market and report to regulatory authorities and owners. After the product arrives at the site, three parties (manufacturer, manager, owner) sign and confirm the inspection to ensure the quality of the raw materials. In addition, the owner needs to check if there are non-standard products. If the construction company reduces and uses unqualified building materials, components, and equipment, fines must be imposed. If the situation is serious, work will have to be stopped to solve it. If the project quality does not meet the established quality standards, the contractor shall be responsible for reselling, repairing, and compensating for any losses caused. If there is a violation, criminal responsibility shall be pursued in accordance with the law. (3) The personnel of Party A dispatched by the owner should understand whether various types of work and contractors strictly comply with technical requirements, standardize construction, ensure mutual cooperation, and ultimately ensure that the overall quality of the project meets the standards. (4) Enhance inspection of concealed works and middleware: If the middleware is covered under the contract, the contractor must notify the local general contractor within 48 hours to independently establish a representative. Once approved, the owner's representative can sign the acquisition agreement and continue construction. If not approved, the contractor must make changes and re approve within the specified period. The owner's representative has the right to inspect the concealed works. If the concealed works are not approved after inspection, the contractor must identify and cooperate with the inspection.

3.3 Progress Management

The owner's progress review includes tracking the progress of the project preparation phase, design and development work, design process, and the entire project implementation phase, as well as the development of material extraction. Progress control must be a dynamic management process of preparing and adjusting plans. Progress control requires scientific and reasonable analysis and argumentation, constantly adjusting unreachable goals, and using pre project preparation steps. Therefore, this requires the management of progress, including the dynamic development and coordination of progress monitoring plans. Through scientific analysis, track, identify, and correct problems and deviations encountered during the construction process. The generation and coordination method of construction project schedule is mainly presented by histogram schedule and network schedule. In small projects, simple and convenient bar chart are often used. Some large and complex projects use computers to create complex network tables. Use a network diagram to represent the time of the planned task and the relationship between different tasks or processes, conduct network analysis, calculate network parameters through the network diagram, determine the main tasks, and determine the construction measures to complete the main tasks. Continuously improve, and finally, obtain an optimized plan and the best construction period to complete the construction. During the implementation process of the plan, supervise and manage through favorable suggestions, fully understand management measures, economic measures, technical development and management measures, ensure the implementation and progress of the planned plan, and clarify the use of materials. We have summarized some of the most important developments in the field of engineering practice management, which means that in ensuring project quality, establish and follow the basic principles of technical management to monitor project progress.

3.4 Cost Management

3.4.1 control engineering material price and strictly control equipment price

Typically, the material cost of a construction site is approximately 60% of the total construction and installation costs. The key to cost management during the construction phase is material cost. The main management of material prices is to conduct research on the building materials market, timely understand the dynamic changes in building materials prices, adhere to the buying principle, closely monitor the trend of building materials prices, and achieve the goal of reducing project costs. This study conducts the immediate collocation test and the delayed collocation test one week later to investigate participants' retention of target collocations. The immediate collocation test consists of 10 randomly arranged target collocations, and participants are required to translate these collocations from English to Chinese. The delayed test contains the same target collocations but their order is different from that of the immediate test.

3.4.2 Change of control engineering

Technical changes lead to a substantial increase in design costs, and design changes have the greatest impact on design costs, so it is necessary to strictly control engineering changes. Design changes are not allowed. In a project, builders are often able to increase the scale of the building and improve project standards by changing the design, thereby achieving the goal of increasing project costs. The key to tracking project changes lies with the project owner, who must ensure quality and avoid unnecessary losses. A sound on-site visa system should be established, with cost professionals strictly reviewing visa matters and specifying specific measures to increase costs or extend construction periods to avoid disputes during the decoration process.

3.4.3 Investment Management

Investment management is directly related to the economic benefits of construction projects. Therefore, the main objective of the owner's management of project investment is to ensure that the construction period and quality of the project meet the requirements, as well as to coordinate and control the expenditure and investment management of each stage of the project. Thus achieving the established goals of construction project investment management can ultimately comprehensively reduce the investment costs of the project construction process. After the working memory capacity test, the experimental subjects are divided into two groups (32 students of each group) in this thesis. According to the Involvement Load Hypothesis put forward by Laufer and Hulstijn, it

assumes that different reading tasks will affect the cognitive processing of learners. There are three degrees of cognitive and motivational processing, namely need, search and evaluation. Need can be divided into internal need and external need. Search means that learners need to take efforts to find out the meaning of the target words. Evaluation can also be classified into weak evaluation and strong evaluation. If a learner evaluates the meaning of a word in the context, this process is weak evaluation. If he assesses the collocation of the word or combines the word with another word, this is strong evaluation. Group one has to do a multiple-choice task to fill in the blank with target collocations. The involvement load index of this task is 2. Group two is required to paraphrase several sentences with the target collocations. The involvement load index of this task is 3.

3.5 Strengthen contract management and reduce construction claims

Contract management is an important way to achieve project quality management, development management, investment management, and safety management objectives. In order to better manage contracts, owners can make improvements in the following aspects: (1) establish a specialized contract management organization and equip professional contract management personnel. The contract management of the owner's engineering project is an important component of the overall engineering project management. Therefore, the owner shall establish a contract management organization or hire full-time contract personnel for the project, establish procurement, statistics, inspection, and reporting systems, and serve as contract management coordination. Project contracts can make construction implementation, modification, and execution more convenient. (2) Establish a management guarantee system for comprehensive contract management. To ensure the implementation of contract management measures, it is first necessary to establish a regular monitoring system for engineering contracts. For signed and completed project contracts, the contract management department continuously monitors and monitors the progress of construction, identifies and evaluates current problems, and takes appropriate measures to solve them. Then, the owner needs to set up a regular reporting system for large-scale project contracts. For large-scale engineering projects, contracts must be approved, executed, and regularly reported to the owner's legal representative and project management department on the procurement process to avoid deviations from the report content. (3) Due to the dominant position of the owner in the management of technical construction projects, advanced information technology means are utilized to establish a contract management information system to achieve the overall goals of the construction technology project.

4. CONCLUSION

If the owner achieves the safety, quality, development, and cost goals of the project, it is important to carefully manage and adjust the project system to maximize the effectiveness of the entire project. The owner is the integrator of construction project management, and the owner's project management is the core of management. Therefore, the management and level of the owner determine the success or failure of the entire project. Therefore, it is necessary to continuously innovate and explore the means of engineering project management, and continuously strengthen engineering project management to meet the needs of developing social productivity and national economy.

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