Study on the Influence of Building Permanent Responsibility Nameplate on Professional Identity of Engineering Management Majors

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Abstract. The paper investigates the occupational identity of two groups of students, who are the freshmen majoring in engineering management of the second tier colleges in four provinces. They are divided into two groups, one of which introduces the construction permanent liability nameplate cognitive practice and issues questionnaires. The design investigates the four dimensions of students, including professional cognition, professional emotion, professional behaviour and professional values. Through the analysis of the investigation data, it is found that the cognitive practice can preferably enhance the students' professional identity.

1. Research Situation of Professional Identity
Professional Identity is the self-concept of the individual in the professional regions, which is gradually confirmed from the growth experience. It is the positioning of the individual in the professional regions¹, and also the manifestation of the improvement of individual responsibility. Presently, the research on professional identity at home and abroad is still relatively macroscopic. It generally studies the cognition, emotions and values of the majors, and the identity of professional behavioral input². But there is a lack of research on the specific professional identity of the civil engineering industry, especially lacking the professional identity training in engineering management. The paper attempts to make students understand the types of employment involved in the engineering management profession through the cognitive practice of the permanent liability nameplate of the building, and to establish the career orientation, career development, and responsibility orientation of the work after graduating, so as to enhance students' professional identity and strengthen the driving force of the students' professional learning.

2. The content of the building permanent liability nameplate guides the professional identity
The building permanent liability nameplate should include: the name of the project, the actual construction period of the project (starting date, completion date), the construction unit and the project principle, the survey unit and the project principal, the design unit and the project principal, supervisory unit and chief management engineer, supervisory unit and supervisor. The content involves all the core stakeholders and specific responsible people. The contents are shown on the Figure 1.
3. The Content of Building Permanent Liability Nameplate Cognitive Practice
The steps of building permanent liability nameplate cognitive practice are followed on figure 2:

![Figure 2. Cognitive practice process](image_url)

The content of building permanent liability nameplate cognitive practice: firstly, students are asked to understand the concept and connotation of starting date, completion date, construction unit, survey unit, design unit, etc. before the cognitive practice by data searching and web searching. Secondly, they are required to find out the permanent responsibility nameplate of a single building on campus, read the content of the nameplate, and take photos with the nameplate to enhance professional sense of honor. Thirdly, they are asked to transcribe the content and fill in their names as a responsible person, with the aim of strengthening the student's professional responsibility.

4. The Survey Design of Engineering Management Professional Identity
The process of the survey design of engineering management professional identity is followed on figure 3:

<Figure 3. The survey design of engineering management professional identity>
Figure 3. Investigative process

In the study, four second tier colleges classified by A, B, C, and D in provinces with engineering management majors are selected. Each college only recruits one class per session, taking freshmen as a sample and selecting the survey time as the end of "Introduction to Engineering Management" course in the first semester. Moreover, the four colleges adopt the same teaching materials of "Introduction to Engineering Management" and have the same time for teaching. Therefore, the sample is comparable. In the first group, College A and College C do not have the teaching link of the building nameplate cognitive practice, only fill in the questionnaire; In the second group, College B and College D have the building nameplate for the cognitive practice, during which completes the teaching. After that, students are asked to fill in the questionnaires. The freshmen of engineering management majors of the four colleges, the sample distribution is shown in the table 1:

| College A | College B | College C | College D | Sum (person) |
|-----------|-----------|-----------|-----------|--------------|
| 46        | 49        | 47        | 47        | 189          |

The contents of the questionnaire are designed in four aspects: professional cognition, professional emotion, professional behavior and professional values. Professional cognition is to understand students' professional learning content, professional skills requirements, professional training objectives, and a clear understanding of the work content and development direction of specific occupations in the future; professional emotions are the feelings about Whether the profession is fond of or interested in, and you are happy or bored from professional learning; Professional behavior refers to students' proactive professional performance can promote professional learning, can complete professional classwork timely and seriously, can often read books and periodicals related to the profession and be willing to spend time studying professional courses, and can usually discuss the professional problems with the students; Professional values refer to whether students have practical value for the current profession, whether it is conducive to achieving self-life value, and whether it can improve the self-ability and so on. Four questions are set for each aspect, with a total of 16 questions, aiming to investigate the students. This questionnaire is scored with adopting the Likert five-point scale, which can measure complex concepts or attitudes consisting of multiple dimensions, each with a scale that indicates how strong the measured respondent is, such as “fully compliant” with 5 points, "Comparative" with 4 points, "Uncertain" with 3 points, "Comparatively inconsistent" with 2 points, "Completely inconsistent" with 1 point, the higher score for each question represents for the higher sense of professional recognition.

5. Investigation Process and Data Analysis

For the engineering management majors in four colleges, 189 students conducted a questionnaire survey with a total of one grade, four classes. A total of 189 questionnaires were distributed in this survey, 186 were returned, and 185 were valid. The effective recovery rate was 97.9%. Reliability analysis is an effective analysis method that adopts the same method used to measure the same metric.
comprehensive evaluation system, and checks whether the results are certainly stable and reliable\textsuperscript{[5]}. With the use of SPSS25.0, the "Engineering Management Professional Identity Survey Questionnaire" was obtained. The reliability coefficients of the overall reliability value, professional cognition, professional emotion, professional behavior and professional values were 0.965, 0.873, 0.815, 0.877, 0.832, the overall reliability value and the reliability value of each dimension are more than 0.8, and the overall reliability of the questionnaire is great.

The professional identification of the survey samples and the average, standard deviation and the number of items in each dimension were counted. The specific results are shown in Table 2 and Table 3.

| Table 2. The overall situation of the professional identity (without practice N=91) |
|-------------------------------------------------|
| Professional overall identity | Professional cognition | Professional emotion | Professional behavior | Professional values |
| Average | 3.326 | 3.357 | 3.213 | 3.451 | 3.422 |
| Standard deviation | 0.658 | 0.735 | 0.877 | 0.641 | 0.782 |
| Number of items | 16 | 4 | 4 | 4 | 4 |

Table 3. The overall situation of the professional identity (with practice N=94)

| Professional overall identity | Professional cognition | Professional emotion | Professional behavior | Professional values |
|--------------------------------|------------------------|----------------------|----------------------|---------------------|
| Average | 4.133 | 4.226 | 3.892 | 4.021 | 4.102 |
| Standard deviation | 0.328 | 0.413 | 0.562 | 0.463 | 0.382 |
| Number of items | 16 | 4 | 4 | 4 | 4 |

Using SPSS25.0 to analyze, it is found that professional identity and the eminence of the Levene statistic of the four dimensions are more than 0.05, according with the assumption of homogeneity of variance.

6. Conclusions
Freshmen are only learning "Introduction to Engineering Management", having not carried out the construction of permanent liability nameplate cognitive practice, so the overall professional recognition is not high, and the overall average value is $M=3.326$, which is only slightly higher than the medium threshold ($M=3$). After adding the permanent liability nameplate cognitive practice of the building, the overall professional recognition degree has been greatly improved, and the overall average value is $M=4.133$. The four dimensions of professional cognition, professional emotion, professional behavior and professional values have been improved, especially for the professional cognition and values. Thus, the cognitive practice on the building's permanent liability nameplate is beneficial to enhance the professional identity of engineering management. How to use the convenience conditions around us guides students to form a good sense of professional identity, which will surely become a crucial direction for the studies of teaching content, methods of engineering management.

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