

Employment Pattern and Educational Standards of Engineering Graduates in the Lao PDR

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ABSTRACT

The National Polytechnic Institute (NPI) is the only tertiary institution in the Lao PDR that produces engineering graduates at the Bachelor's level in the major engineering fields of Civil, Electrical and Mechanical Engineering. Since its establishment under a UNESCO-sponsored project in 1984, a total of 294 graduates were awarded the Bachelor of Engineering degree in these engineering fields. In November 1994, a country-wide survey was conducted by the NPI to examine the employment pattern of these graduates and to determine the relevance of their engineering educational background gained at NPI. The survey targeted the 235 students who had graduated by the end of academic year 1993 and their employers. 68% of the graduates responded. Results of the survey have revealed that most graduates were employed by Government agencies and parastatal bodies. The quality of the graduates' engineering education was perceived by the employers as being inadequate for engineering work - hence, the underemployment of the graduates as technologists rather than engineers.

In this paper, the main results of the survey are presented, and a discussion of the shortcomings of the old curricula and the appropriateness of a newly implemented curricula at the NPI is elaborated.

1. INTRODUCTION

The National Polytechnic Institute was established in 1984 by the Government of the Lao PDR. An UNESCO-supported program provided financial assistance and experts, the majority of which came from Eastern Block Countries. Under this program, which lasted for 5 years, four departments - namely those of Basic Science, Civil, Electrical and Mechanical Engineering - came into being. The curricula developed for NPI were mostly in line with those of the Eastern Block countries.

In 1989, the International Development Agency of the World Bank signed a project agreement with the Lao Government. This agreement had a grant component for the upgrading of the curricula at NPI in order to comply with the Lao Government's "New Economic Mechanism", as well as a credit component for building new infrastructure and purchase of equipment.

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In 1989, the first group of students graduated from NPI and by June 1994 the number of graduates reached a total of 294, 47 or 16% of which were female. Table 1 gives the details of students graduating each year from the NPI.

Table 1. Number of NPI graduates

Year	Civil	Electrical	Mechanical	TOTAL
1989	8	10	2	20
1990	22	6	11	39
1991	32	10	14	56
1992	17	15	14	46
1993	34	17	23	74
1994	23	18	18	59
TOTAL	136	76	82	294

One of the objectives of the World Bank development aid was to undertake a study of the effectiveness of the NPI curricula and evaluate the technical and professional quality of its graduates. In November 1994, a country-wide survey was conducted by the NPI to examine the employment pattern of these graduates and to determine the relevance of their engineering educational background gained at NPI. Both graduates and their employers were consulted. The survey excluded the 1994 graduates who were fresh out of college, but targeted 235 students who had graduated by the year 1993. Two types of questionnaires were drafted. The first was addressed to the graduates of NPI and the second to the supervisors/employers of the NPI graduates. A pilot run was carried out to test and refine the questionnaires. The actual survey was carried out in 9 Provinces namely: Bokeo, Champasak, Khammuane, Luang Prabang, Luang Namtha, Saravanh, Savanakhet, Udomsay and Vientiane.

2 GRADUATES AND THEIR PROFILES

The survey succeeded in obtaining responses from 161 out of the 235 NPI graduates i.e., 68% of the target group. Fig. 1 gives the breakdown of the number of respondents according to their fields of study, while Fig. 2 gives a breakdown of respondents by gender.

The survey revealed that the majority of the NPI students joined the Institute immediately after graduating from High School, and lived mostly on campus during the period of study. Tuition and living expenses were met by the Government. However, 30% of the students did not start studies immediately after finishing High school, of whom 26% were working before joining NPI.

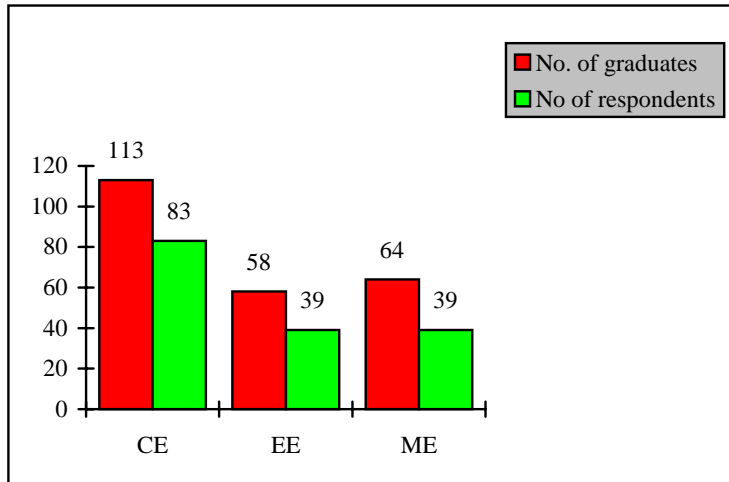


Figure 1. Field of studies.

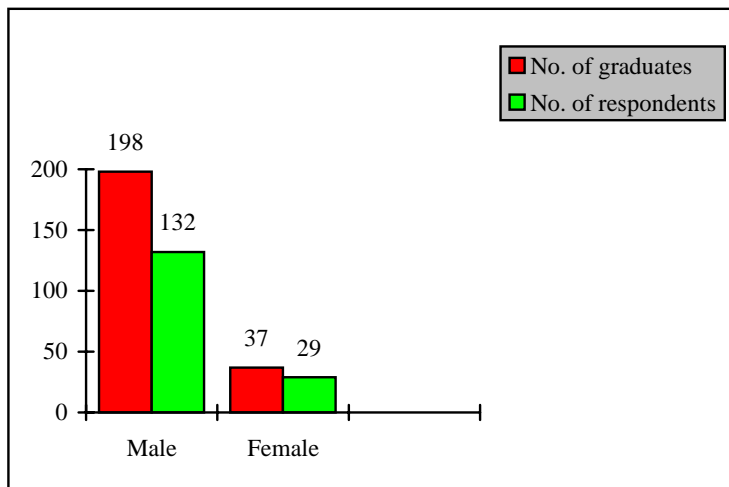


Figure 2. Graduates and respondents by gender.

2.1 Further development studies

Among the graduates interviewed, none followed further M.Sc. or Ph.D. studies. However, some 21% were able to attend short and medium duration courses. Most graduates went to Thailand for training while others went to China, France, Japan, Sweden, and Vietnam. The duration of these courses varied from 1 week up to 1 year. Many graduates stated that they would be interested in attending short, upgrading courses if they were organized by NPI.

3. EMPLOYMENT

3.1 Job acquisition and employment pattern

The majority of the respondents (68%) obtained their job by applying directly, while others did so through acquaintances and by being allocated by the authorities. A small percentage (11%), returned to their previous employers.

The employment pattern is shown in Fig. 3. By far the biggest employers of NPI graduates were the Government (Central and Local) and the parastatal organizations. The Civil

Engineers were mainly employed by the Government and their majority was dealing with construction, design, and administration/planning related to buildings, roads and bridges. For the Electrical Engineers, the major employers were the parastatal bodies, "Electricité du Laos" being the largest. The maintenance, planning/administration and production of electrical supply were their main fields of activity. The Mechanical Engineers were mostly employed by parastatal organizations and their main field of activity was maintenance and planning/administration.

3.2 Job mobility

Although the survey was carried out only 5 years after the first graduates left NPI, the pattern which emerged was that, once a job was found, the graduates did not move easily to other jobs; 76% were still with their first employer. From the total of 37 graduates who had another job before the present one, 27 had held one job, 9 had two jobs, and 1 had three jobs in the past.

3.3 Qualifications and adjustment

The respondents indicated that the Engineering courses were the ones most useful for their work; however, a few also mentioned that courses in Management and Basic Science were equally useful. The great majority (76%) stated that their qualifications did not suit their present type of job (Fig. 4). 81% stated that they had difficulties in adjusting to work after graduation (Fig. 5). They felt that the most common source of difficulties was the lack of practical skills, experience, and training as depicted in figure 6, which shows the actual number of responses instead of the percentages.

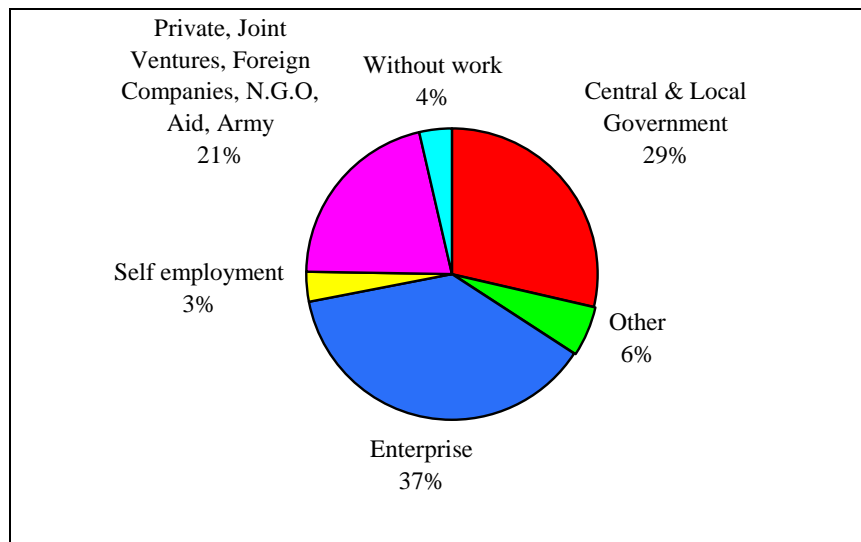


Figure 3. Sectors of employment; all respondents.

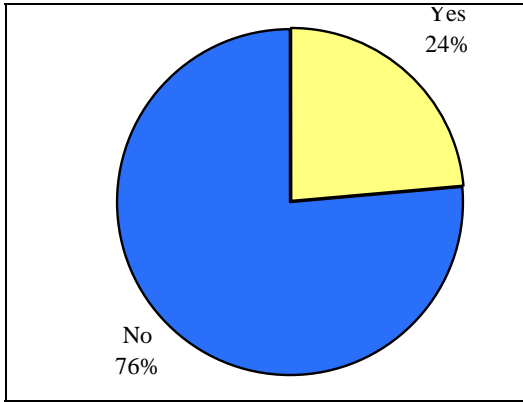


Figure 4. Do your qualifications from NPI suit your present job?

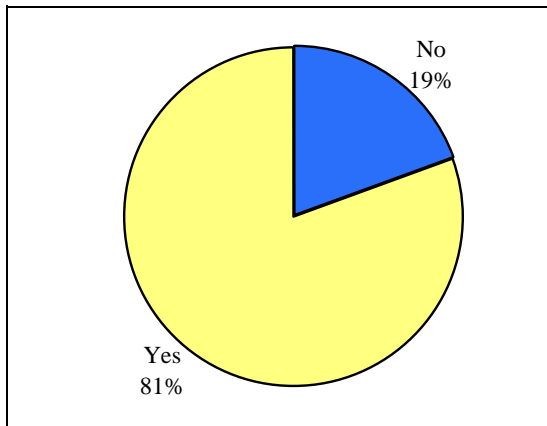


Figure 5. Did you have any difficulties in adjusting to work after graduation?

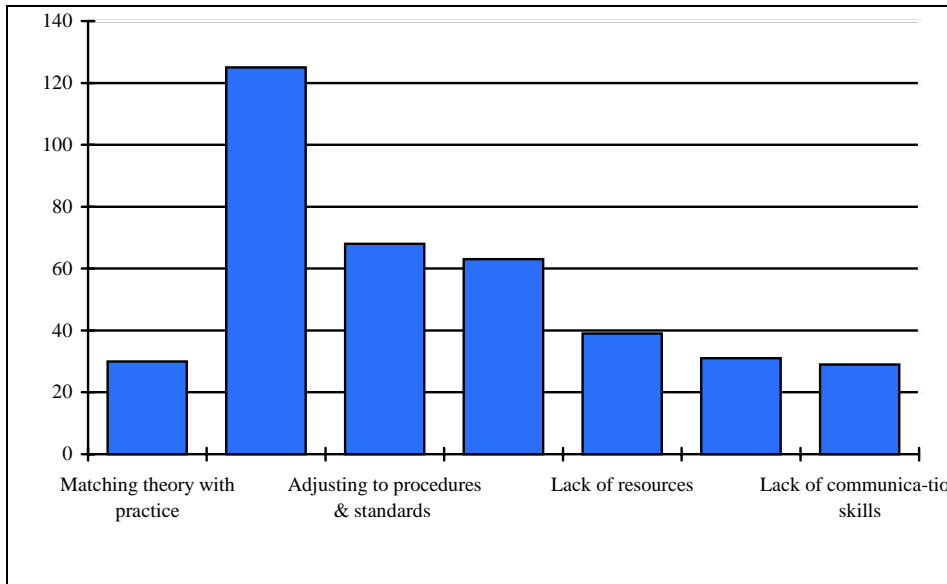


Figure 6. Sources of difficulties in adjusting to work.

4. STUDIES AT NPI

This part of the questionnaire requested information about the graduates' perception of their studies at NPI. Questions relating to the content of the courses and to the qualities of the faculty were asked. The majority of the responses, shown graphically in Figs. 7-14 painted the following picture:

- i) The courses provided considerable knowledge but they were too theoretical and were not relevant to the Lao environment.
- ii) The tutorials, laboratory sessions, practicals and home assignments were useful and helpful in understanding the subjects.
- iii) The practical training and the final year project formed a useful background for the job.
- iv) The lecturers were well prepared and encouraged students to think for themselves. Furthermore their lectures were interesting and the lecturers made themselves available for consultation after class.

Although the above opinions were shared by the majority of the graduates, a substantial number disagreed, particularly on issues related to their lecturers. These are illustrated in figures 7 to 10.

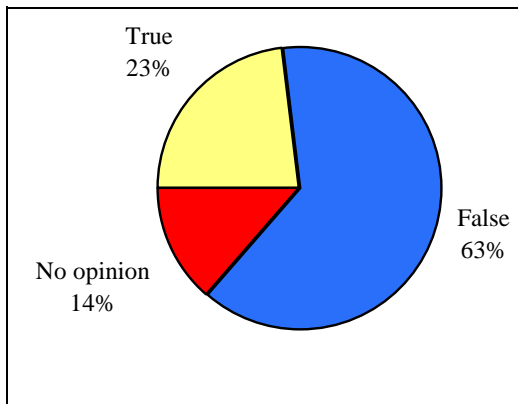


Figure 7. Lecturers encouraged us to memorize without questioning instead of encouraging us to think for ourselves.

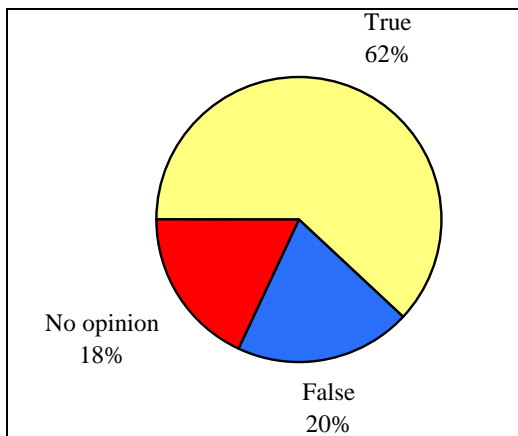


Figure 8. The lecturers were usually well prepared.

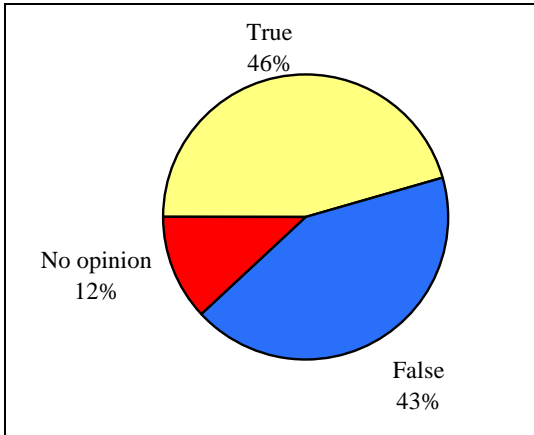


Figure 9. Lecturers made themselves available for questions after class.

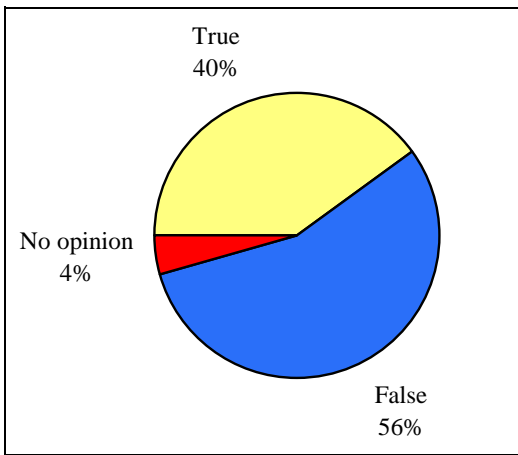


Figure 10. The laboratory/practicals had little connection with the course work.

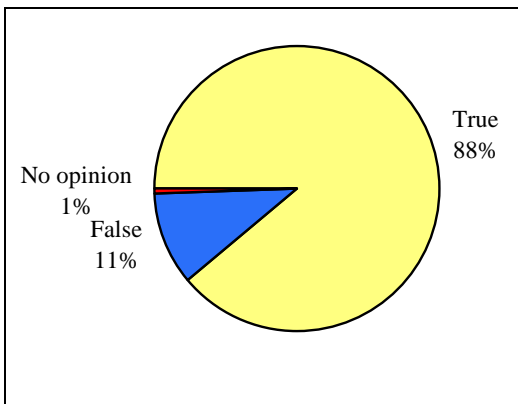


Figure 11. Much of what was taught was too theoretical.

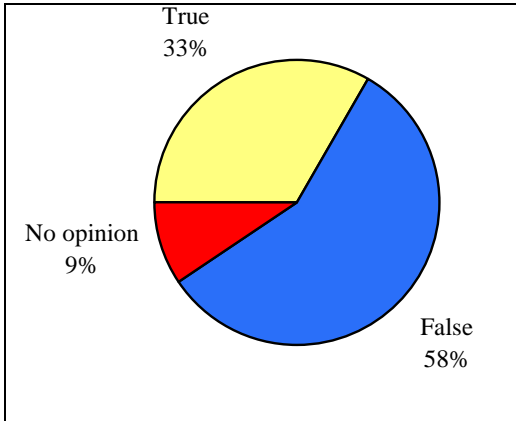


Figure 12. The courses used many practical examples from current Lao experience.

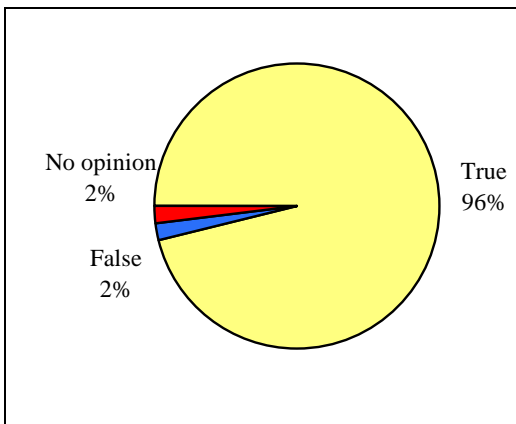


Figure 13. The practical training was a useful background for your job.

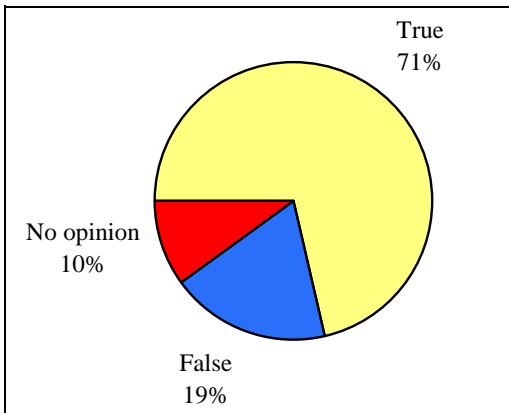


Figure 14. The final-year project was useful for your job.

5. EMPLOYERS

A total of 71 employers or immediate supervisors of NPI graduates responded to the survey. The purpose was to obtain their opinion regarding the engineering ability of the graduates and seek ways of improving and strengthening the cooperation between the Institute and the Industry. The employers were asked to indicate the qualifications and qualities of engineers they seek to employ and to rank them according to importance. At the same time, they were

asked to indicate their opinion regarding the NPI graduates as far as these qualifications were concerned.

In general, the employers believed that the NPI graduates did not possess the kind of skills that they would like to see in their professional engineering workforce. This is depicted in figure 15, where the values on the y-axis represent the percentage (%) of employers' responses.

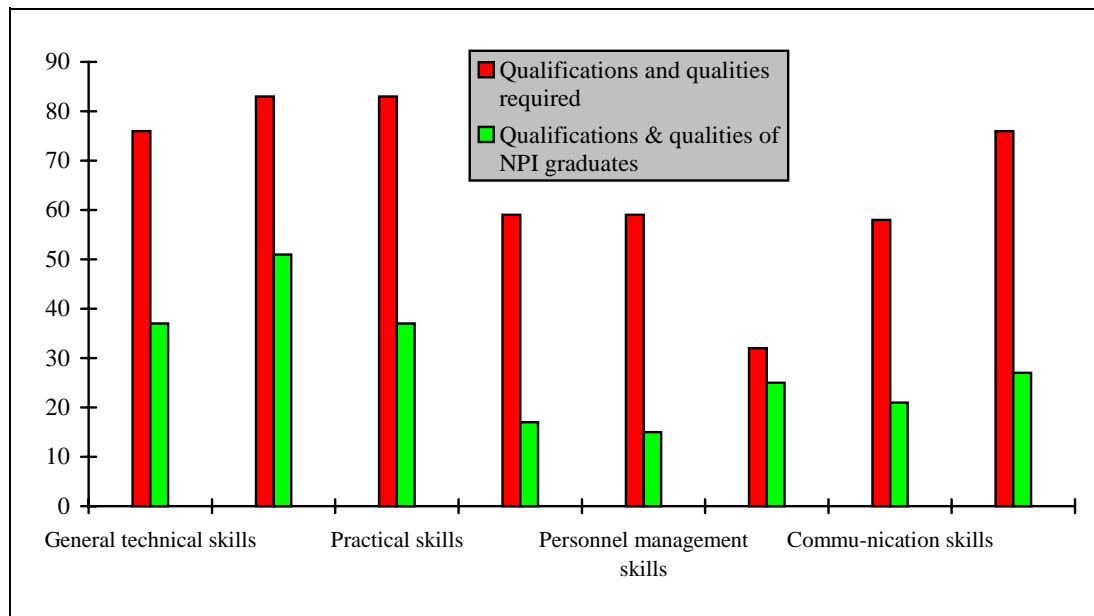


Figure 15. The short-fall in skills possessed by the NPI graduates as perceived by the employers.

6. DISCUSSION AND CONCLUSIONS

The findings of the survey highlight serious deficiencies in the old curricula. New 'market-oriented' curricula had been designed¹ in the meantime. Their implementation, at the First Year level, started at the beginning of the academic year 1994-95. Previously, a series of industrial visits were undertaken, and the views of the leaders of industry were elicited and incorporated in the design of the new curricula. The findings of the survey have reinforced these views and have fully justified the rationale on which the new curricula were based.

In order to provide more 'hands-on' practice to the NPI students, a compulsory Workshop Training program in CE, EE and ME during the two semesters of the First Year Common Core Program has been introduced. In subsequent years of study, a 10 week compulsory Practical Training Program in industry with on-site supervision, will be formalized and regulated. The laboratory practicals have been considerably strengthened and new laboratory facilities have been set up. New courses in Communication Skills and Management have been introduced. To consolidate communication skills and to encourage the spirit of independent inquiry, a substantial Student Project with a contact period of 6 hours per week throughout the two semesters has been introduced in the final year of study.

To cope with these new challenges, a restructuring of the NPI² and of the engineering departments³ was undertaken. Pedagogical and practical training programs were prescribed for the faculty to enhance their professional background⁴. Further, to assist the faculty in the selection of material for, and the timing of, their lectures, lecture manuscripts for all subjects to be taught in the new curricula have been developed. Faculty are also encouraged to interact with industry through consultancy agreements and by offering short courses to engineering graduates in industry. It is felt that these steps would go a long way toward redressing the deficiencies in the academic programs of the NPI. The success of these endeavors can only be judged through another survey, which should be conducted when graduates of the new curricula are in the workforce i.e., after 1999.

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