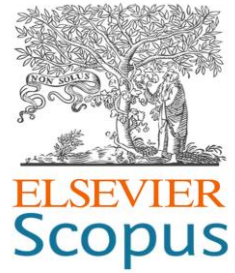




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## Impact of UPI's EE Education Program on Professional Outcomes

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**Abstract:** This study explores the shortage of productive teachers in vocational secondary education schools in the field of electrical engineering in Indonesia by examining the contribution of the professional careers of graduates in the department of electrical engineering education at the Indonesian University of Education at the national level. The purpose of this study is to reveal the influence of aspects of motivation, social influence and social dissuasion on the contribution of the vocational teacher profession in the field of electrical engineering. This study involved 100 respondents who graduated from electrical engineering education from various graduate generations and provinces in Indonesia. The analysis and research methods used are descriptive quantitative approaches and data analysis techniques, including Jamovi for Windows version 1.6, SPSS for Windows and Microsoft Excel. From the results of the research, it is obtained that there is a simultaneous relationship between the shortage of productive teachers in the electrical engineering vocational field and non-teacher professions (the world of industry and business); this is indicated by indicators of motivational variables from career opportunities and social welfare; variables of social influence and study experience in universities; and variable indicators of social media disaffection, career challenges in the non-educational field, balance of workload and salary, gender recognition of female electrical engineering teachers, and policies in the system of qualifications, protection and teacher rights. This study introduces a novel exploration into the factors influencing the career trajectories of graduates from electrical engineering education in Indonesia, with a focus on motivational, social, and institutional elements. By combining descriptive quantitative analysis with advanced statistical tools, the research provides unique insights into the interplay between teacher shortages in vocational education and the attraction of non-teaching professions in industry and business.



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**Keywords:** Professional career, electrical engineering education, teacher and non-teacher professions.

## UPI 的电子工程教育项目对专业成果的影响

**摘要：**本研究通过考察印尼教育大学电气工程教育系毕业生在国家层面的职业生涯贡献，探讨了印尼电气工程领域职业中学教育中生产性教师的短缺问题。本研究的目的是揭示动机、社会影响和社会劝阻等方面对电气工程领域职业教师职业贡献的影响。这项研究涉及 100 名来自印尼不同毕业生世代和各省的电气工程教育毕业生。所使用的分析和研究方法是描述性定量方法和数据分析技术，包括 Jamovi for Windows 1.6 版、SPSS for Windows 和 Microsoft Excel。从研究结果可以看出，电气工程职业领域的生产性教师短缺与非教师职业（工业和商业世界）之间存在着同步关系；这通过职业机会和社会福利的激励变量指标、社会影响变量和大学学习经历来表明；以及社交媒体不满、非教育领域的职业挑战、工作量和工资的平衡、女性电气工程教师的性别认可以及资格、保护和教师权利制度中的政策等变量指标。本研究对影响印度尼西亚电气工程教育毕业生职业轨迹的因素进行了新颖的探索，重点关注动机、社会和制度因素。通过将描述性定量分析与先进的统计工具相结合，该研究对职业教育教师短缺与工业和商业中非教学职业的吸引力之间的相互作用提供了独特的见解。

**关键词：**职业生涯、电气工程教育、教师和非教师职业

### 1. Introduction

Teachers are the central point and starting point of all educational development [1]. The teaching profession is a complex process involving multidimensional factors [2]. Many countries focus on recruiting, training, and retaining the number of qualified teachers to improve educational outcomes [3]. The shortage of teachers has become the biggest issue in the world of education. Teacher degradation is considered an “eternal problem” that occurs in many countries [4]. The OECD reports serious teacher shortages in many countries due to the failure to recruit and retain sufficient numbers of teachers [5]. Other studies report that this high teacher shortage is a challenge faced by both developed and developing countries [6]. It is stated that such countries as the USA [7, 8], Europe [9], Africa [10, 11], and Asia [12] are facing this phenomenon. This is reinforced by the Indonesian Minister of Education and Culture’s statement regarding the shortage of vocational school teachers in 2018 that ‘currently there is a shortage of around 72,000 productive teachers. Currently, in Indonesia, there is a significant shortage of vocational teachers [13].

It was found from previous research that the shortage of teachers in 2018-2019 in the field of electronics engineering expertise was 1191 people and in the field of electrical power engineering was 1296 people taking into account annual retirement [1]. The Undergraduate Study Program in Electrical Engineering Education,

Faculty of Technology and Vocational Education, Indonesian Education University (UPI FPTK Electrical Engineering Education Undergraduate Study Program) aims to produce graduates who can teach professionally at Vocational Schools in the field of electrical engineering. Students studying in the electrical engineering education study program are educated to become professional teachers, apart from that they are also given skills in the technical field in addition to becoming a teacher. In this way, graduates have the opportunity to choose many careers after graduating, not only a career in education, but also a career in industry or entrepreneurship according to their technical skills or other fields. A career in the industry is a very lucrative career for someone to earn a high income [14]. Opportunities for a career in industry are also very wide open for various majors, not just one major, because the most important thing is that the competency skills that a person has are in accordance with the needs of that industry [15]. The research focuses on graduates from the Electrical Engineering Education program at the Indonesian University of Education (UPI), specifically targeting individuals from 2015–2020 who have pursued careers as vocational teachers or in the industry. This choice is significant because the program is designed to address the critical shortage of skilled vocational teachers in electrical engineering in Indonesia, as highlighted by national reports indicating a deficit of approximately 72,000 teachers in vocational education.

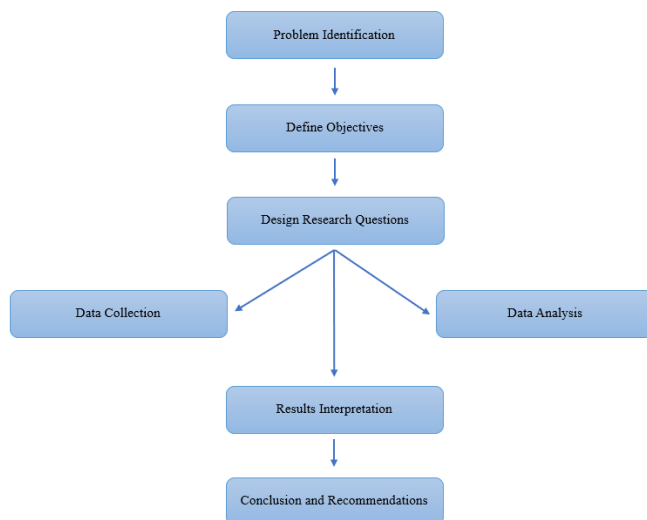
The inclusion of both teachers and non-teachers allows for a comprehensive exploration of the motivational, social, and institutional factors influencing career decisions, shedding light on the professional pathways available to graduates of this specialized program. The aim of this research is to reveal the influence of aspects of motivation, social influence and social dissuasion on the contribution of the vocational teacher profession in the field of electrical engineering.

## 2. Literature Review

Motivation is something that drives people to act [16]. Motivation is largely driven by cognition. Furthermore, motivation is a key construct because it has the potential to determine what people want or do not want to do, how long they want to stay, and the extent to which they want to engage in the activity [17]. Referring to the choice of adaptation of the research instrument, the motivation factors that will be reviewed are aspects of personal ability, career needs, social contribution, intrinsic career value, career security, and balanced distribution of time [18, 19].

## 3. Method

Research methodology flowchart is shown in Figure 1.



**Figure 1. Flowchart of the research methodology (developed by the authors)**

This research involved 100 respondents who had graduated from electrical engineering education from various graduate groups (2015-2020) and were located in various provinces in Indonesia. The analysis and research methods used were a quantitative descriptive approach and data analysis techniques Jamovi for Windows version 1.6, SPSS for Windows and Microsoft Excel. Choosing a career in any field after graduating from college is everyone's right; it is not limited to only being open to graduates with certain majors. However, all graduates from all majors can also pursue industrial

fields [20]. The interest of graduates in the industrial field is very dependent on what they study or what they like. Every graduate has the desire to achieve the goals they dream of [21]. To find out one's work interest, one of which can be seen from the factors that influence the interest itself. The existence of a shortage of teachers and the phenomenon of mismatch between interests, profession and educational background of graduates could be caused by different assessments of the teaching profession. Based on other research, the assessment of the teaching profession influences the choice of a career in teaching and must be shown with a positive attitude. If the assessment of the teaching profession is negative, then the choice of a career in teaching will also be negative [22].

Other studies also reveal that low assessment of the teaching profession has a positive effect on choosing a career as a teacher [23]. The low assessment of teacher status and respect for teachers has made prospective teachers not choose a career as a teacher, adding that this description can be the root of the problem of teacher attrition [24] This assessment of low status also has an impact on the number of graduates who want to have a professional career in the world of business and industry.

Many are interested in teaching but never pursue the teaching profession as a career path after seeing the extent of the dignity and career policy process of being a teacher in the eyes of the graduate alumni. Having to attend further education, the cost and time of additional education is a consideration and a career as a teacher is considered non-competitive compensation and a lack of autonomy and creativity is allowed in the profession [25]. According to Teacher Employment & Deployment, a problem faced in the world of education in Indonesia is the striking inequality in teacher placement. It was recorded that 66% of the remote schools experienced a shortage of teachers, while 68% of the urban areas and 52% of the rural areas had excess teachers. Apart from that, it was recorded that there were 52,639 non-civil servant teachers in state vocational schools and 126,510 non-civil servant teachers in private vocational schools. The high number of non-civil servant teachers is an indication that there are still many schools that lack teachers.

In this research, professions in the field of education (teachers) and non-education professions (working in industry or as entrepreneurs) for each student graduating from the UPI Electrical Engineering Education major will be studied and discussed from the level of motivational factors, social influence and social dissuasion.

## 4. Results and Discussion

Based on the purpose of this research, it is necessary to explain the differences between respondents who graduated from UPI Electrical Engineering Education who are teachers and non-teachers (professional careers

in the business world and industry). Therefore, the research data description will be divided into 2. Respondents with a teaching professional background were 39 people, and 61 respondents had a professional career background in the world of business and industry.

The results of the research on 100 respondents who

graduated from UPI Electrical Engineering Education were obtained through a questionnaire with 45 questions, then processed with the help of Jamovi for windows version 1.6, Microsoft Excel 2016 and SPSS for windows version 18. From the steps taken, the results of the descriptive statistical tests were as follows:

**Table 1. Description professional graduates, motivation, social influence, social disuse, professional career in the business world and data industry (compiled by the authors)**

Descriptives	Professional Graduates	Motivation	Social Influence	Social Disuse	Professional Career in Business and Industry
N	Non-Education	39	39	39	39
	Education	61	61	61	61
Missing	Non-Education	0	0	0	0
	Education	0	0	0	0
Mean	Non-Education	71.8	17.5	12.2	69.5
	Education	59.3	15.8	14.0	68.5
Median	Non-Education	72	18	12	71
	Education	59	16	14	71
Standard Deviation	Non-Education	9.61	4.25	2.64	8.72
	Education	11.9	3.40	3.36	8.79
Minimum	Non-Education	50	8	8	34
	Education	31	5	6	41
Maximum	Non-Education	88	25	17	82
	Education	85	25	20	90

Based on Table 1 it is known as follows:

Of the 18 questions related to motivation factors, the highest score was 88, the lowest score was 50, and the average was 71.8. of the 5 questions related to social influence, the highest score is 25, the lowest score is 8, and the average is 17.5. The data above also shows that of the 4 questions related to social dissolution, the highest score is 17, the lowest score is 8, and the average is 12.2. In the perception of the teaching profession, there were 18 questions with the highest score being 82, the lowest score being 34, and the average being 69.5. Thus, it is generally known; The majority of respondents who work in the education sector (teachers) are

influenced by the variables of motivation and social conditions, which are in a fairly high category, namely 41%. Meanwhile, the influence of social dissuasion variables is also quite high. namely 30.8%.

The majority of respondents who work in non-educational professions (working in industry or entrepreneurship) are influenced by motivation variables by 37.7%. Meanwhile, most non-teachers chose the variable social influence in the quite large category, with 27 respondents or 44.3%. The majority of respondents who worked as non-teachers chose the social dissuasion variable in the high category with 19 respondents or 31.1%.

**Table 2. Pearson correlation test results (graduates working in the field of education (vocational teachers)) on motivation teacher professional perception in working careers (compiled by the authors)**

Correlations	Motivation	Social Influence	Social Disuse	Teacher's Professional Career Perception
Motivation	Pearson Correlation	1	0.626**	0.328*
	Sig. (2-tailed)		0.000	0.041
	N	39	39	39
Social Influence	Pearson Correlation	0.626**	1	0.711**
	Sig. (2-tailed)	0.000		0.000
	N	39	39	39
Social Disuse	Pearson Correlation	0.328*	0.711**	1
	Sig. (2-tailed)	0.041	0.000	
	N	39	39	39
Teacher Professional Perception	Pearson Correlation	0.541**	0.587**	0.584**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	39	39	39

\*\* The correlation was significant at the 0.01 level (2-tailed).

Based on Table 2 regarding the graduates who work as teachers, it is known that the results of the correlation

test of motivation variables on perceptions of a professional career in the field of education (teaching), namely the correlation coefficient  $r = 0.541$ ;  $p = 0.000$  ( $p < 0.050$ ); results of the correlation test of the social influence variable with perceptions of professional careers in the field of education, namely the correlation coefficient  $r = 0.587$ ;  $p = 0.000$  ( $p < 0.050$ ); the results of the correlation test of the social dissuasion variable on perceptions of professional careers in the field of education, namely the correlation coefficient  $r = 0.584$ ;  $p = 0.000$  ( $p < 0.050$ ). The results of the correlation test of the social dissuasion variable on perceptions of professional careers in the field of education, namely the correlation coefficient  $r = 0.584$ ;  $p = 0.000$  ( $p < 0.050$ ).

This shows a “quite strong” relationship between motivation and perceptions of a teacher’s professional career, so it can be concluded that there is a positive and significant relationship between social influence and perceptions of a professional career in the field of education, meaning that the higher an individual’s social

influence, the higher the value of a professional career in the field of education for these individuals.

Conversely, the lower the social influence an individual has, the lower the perceived value of a professional career in education. The correlation between social influence and perceptions of the career of the teaching profession is “quite strong.” It can be concluded that there is a positive and significant relationship between social dissuasion and the perception of the value of a career profession in the field of Education, meaning that the higher the individual’s social dissuasion, the higher the value of the career profession in the field of Education. that individual. Conversely, the lower the social dissuasion an individual has, the lower the perception of the value of a professional career in the field of education. This shows a “quite strong” relationship between social dissuasion and the perception of the value of a professional career in education.

**Table 3. Pearson correlation test results (graduates with non-education profession) on motivation, social influence, and social disuse of teacher professional perception in professional careers in business and industry (compiled by the authors)**

Correlations		Motivation	Social Influence	Social Disuse	Perception of Professional Career in Business and Industry
Motivation	Pearson Correlation	1	0.575**	0.103	0.440**
	Sig. (2-tailed)		0.000	0.429	0.000
	N	61	61	61	61
Social Influence	Pearson Correlation	0.575**	1	0.135	0.449**
	Sig. (2-tailed)	0.000		0.298	0.000
	N	61	61	61	61
Social Disuse	Pearson Correlation	0.103	0.135	1	0.164
	Sig. (2-tailed)	0.429	0.298		0.206
	N	61	61	61	61
Perception of Professional Career in Business and Industry	Pearson Correlation	0.440**	0.449**	0.164	1
	Sig. (2-tailed)	0.000	0.000	0.206	
	N	61	61	61	61

\*\* The correlation was significant at the 0.01 level (2-tailed).

Based on Table 3, the results of the correlation test of the motivational variable on the perception of a professional career in the non-educational sector (business and industry) are obtained, namely the correlation coefficient  $r = 0.440$ ;  $p = 0.000$  ( $p < 0.050$ ); the results of the correlation test of social influence variables on perceptions of professional careers in the business and industrial world, namely the correlation coefficient  $r = 0.449$ ;  $p = 0.000$  ( $p < 0.050$ ); the results of the correlation test of the social dissolution variable on professional perceptions in the world of business and industry, namely the correlation coefficient  $r = 0.164$ ;  $p = 0.000$  ( $p < 0.050$ );

From these results, it can be concluded that the higher the motivation of an individual, the higher the perception of a professional career in the world of

business and industry for that individual. Vice versa, the lower the individual’s motivation, the lower the perception of a professional career in the world of business and industry. In addition, there is a positive and significant relationship between social influence and perceptions of a professional career in the world of business and industry, meaning that the higher the social influence of an individual, the higher the perception of the values of the professional profession in the field of business and industry for that individual. And vice versa, the lower the social influence that is owned by an individual, the lower the perception of assessing a professional career in the field of business and industry. From the results of the correlation analysis, it can be concluded that there is a positive and significant relationship between social dissolution and the

perceived value of a professional career in the business and industrial world, meaning that the higher an individual's social dissolution, the higher the perception in assessing a professional career in the business world and industry in the individual. Vice versa, the lower the individual's social dissolution value, the lower the perception of the value of a professional career in the business and industrial world.

## 5. Conclusion

This research identifies a simultaneous relationship between the shortage of productive vocational electrical engineering teachers and non-teaching professions in industry and business. Key influencing factors include career opportunities, social welfare, social influence, study experience, dissatisfaction with social media, career challenges outside education, workload-salary balance, gender recognition of female teachers, and policies related to teacher qualifications, protection, and rights.

The research concludes that there is a significant relationship between motivational factors, social influence, and social dissuasion on perceptions of the teaching profession in vocational education, as shown by the ANOVA test. For teacher respondents, these factors explain 47.9% of the changes in perception, whereas for non-teachers, they account for 26.1%. Motivational factors, such as career opportunities and work-life balance, have the greatest impact on teachers' perceptions of the profession. Social influence from previous learning experiences also plays a significant role, while social dissuasion from the media impacts both teachers and non-teachers. Positive perceptions of the teaching profession include the importance of teacher competencies and social status, while negative perceptions focus on high administrative workloads, low income, and challenges related to gender and policy issues.

The approaches used in this study, including descriptive quantitative analysis and advanced statistical tools such as Jamovi and SPSS, effectively reveal the interplay between motivational, social, and institutional factors influencing career decisions among graduates. These methods ensure a comprehensive understanding of the dual challenges posed by the shortage of vocational teachers and the attraction of non-educational professions, providing reliable, data-driven insights for targeted interventions.

The implications of this study are significant for policymakers, educational institutions, and industries. Policymakers can address the vocational teacher shortage by designing supportive policies that improve teacher welfare and career attractiveness. Educational institutions may refine their curricula to balance teacher training with industry-aligned skills, ensuring that graduates are prepared for diverse career pathways. For industries, the findings highlight the value of technically

skilled graduates, emphasizing the need for stronger collaboration with educational sectors. This multi-faceted prospective aids in bridging the gap between education and professional demands.

This research focuses on graduates of the Electrical Engineering Education program at the Indonesian University of Education (UPI) from 2015 to 2020, limiting its scope to this specific timeframe and institution. The sample size of 100 respondents, while representative, may not fully capture the diverse experiences of graduates nationwide. Additionally, the study relies on self-reported data, which may be influenced by individual biases and perceptions. The analysis does not extensively account for external factors, such as regional policy differences or specific industrial demands, which may also impact career choices.

## Declarations

### *Author Contributions*

Conceptualization, B.T.; methodology, B.T. and Y.; software, B.T.; validation, B.T., Y., S., and A.; formal analysis, B.T. and S.; investigation, B.T. and A.; resources, B.T.; data curation, B.T.; writing—original draft preparation, all authors contributed equally.; writing—review and editing, B.T.; visualization, Y.; supervision, B.T.; project administration, B.T. All authors have read and agreed to the published version of the manuscript.

### *Data Availability Statement*

The data presented in this study are available on request from the corresponding author.

### *Institutional Review Board Statement*

Rigorous ethical guidelines were adhered to throughout the study to ensure participant privacy and data confidentiality, in compliance with institutional and national research standards.

### *Informed Consent Statement*

Participation in the study was voluntary and informed consent was obtained from all participants prior to their involvement.

### *Funding*

Funding information is not available.

### *Conflicts of Interest*

The authors declare no conflicts of interest regarding the publication of this manuscript. In addition, ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies, have been completely observed by the authors.

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