A Study on the Impact of Anxiety on the Perception of Communication Engineering Teachers about Self-Efficacy

https://doi.org/10.3991/ijet.v15i24.18211

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Abstract—The anxiety felt by teachers stems from the stress caused by teaching, life and learning. It affects not only their teaching performance, but also their teaching efficiency. Therefore, an in-depth study on how the anxiety felt by teachers affects teaching efficacy helps researchers better understand the underlying mechanism of teaching efficacy and enables teachers to improve themselves over the course of teaching. By adopting both quantitative and qualitative research methods, this study takes the communication engineering teachers participating in the communication engineering professional meeting as the research object, to analyze the relationship between the anxiety felt by teachers and their teaching efficiency, and to explore the influencing factors in the self-effect of communication engineering teachers. According to the results of empirical analysis, teaching experience has a positive effect on the perception towards self-efficacy, while life and work experiences have a negative effect on the perception towards self-efficacy. Finally, some suggestions are made in light of the empirical conclusions.

Keywords—Anxiety, teaching self-efficacy perception, Teaching_experience
1 Introduction

With regard to higher education, the role played by communication engineering in advocating the core literacy of the subject and the value of scientific education is what students are required to develop through the study of communication engineering. The core literacy of communication engineering includes scientific thinking, theoretical concept, social responsibility and scientific inquiry, all of which could provide guidance on how to explore the laws of communication and physics. To resolve the practical problems, prioritizing the development of education will have a direct impact on the further development of a country [1]. Thus, a problem facing the country is to cultivate talents with comprehensive capabilities.

The anxiety felt by teachers stems from the stress caused by teaching, life and learning [2]. It affects not only their teaching performance, but also their teaching efficiency. Teaching efficacy plays a vitally important role in the improvement of education [3]. Whether teachers can be successful in imparting cultural knowledge is affected by many factors, including the subjects taught, the content of textbook, school conditions and classroom environment. The in-depth study on the impact of the anxiety felt by teachers on the sense of teaching efficacy helps researchers better understand the underlying mechanism of the sense of teaching efficacy and enables teachers to improve themselves over the course of teaching. Meanwhile, it will also enhance the training and management of teachers. In order for the career development of teachers, what matters most is to preserve the concept of education system, improve the morality of teachers, update their professional knowledge and improve the teaching ability of teachers [4].

2 Theory and Hypothesis

2.1 Self-efficiency theory

The premise of self-efficacy theory is that people usually believe in their ability of producing the effects as predicted, which is one of the most significant factors in the behavior of implementers. Self-efficacy theory plays an irreplaceable role in addressing various mental health problems. In addition, it is also indicated that the theory of self-efficacy does not necessarily mean that the sense of self-efficacy is the only crucial factor in promoting behavior [5]. That is to say, it is impossible for even a person with a strong sense of self-efficacy to develop the subsequent behavioral ability in the absence of the corresponding ability. Therefore, it can be considered that only when an individual feels motivated and realizes the need to develop the corresponding skills, can the sense of self-efficacy become an influencing factor in individual behavior and produce expected results [6]. From the theoretical implication of the self-efficacy theory and its background of development, it can be seen that the sense of self-efficacy in essence is a pattern of behavior and thinking that make individuals regard themselves as objects [7]. For themselves, it will be a vitally important factor. It reflects the assessment made by an individual of his or her own ability [8]. Accord-
ing to the viewpoint held on the completion of the task, it can be determined whether the task can be completed smoothly [9].

In 1984, Gibson and Dembo continued previous studies by turning their attention to the sense of self-efficiency, and created the structural connotation of teaching efficacy from a theoretical perspective. Based on the conclusion about the self-efficacy theory, they adopted literature analysis, teacher interview and other research methods, to launch a project known as Teaching Effectiveness Scale (TSE). From the perspective of psychological structure, the sense of self-efficacy that teachers have mainly involves two dimensions and four aspects [10]. First of all, the sense of self-efficacy among teachers involves two dimensions, which are general teaching efficacy and individual teaching efficacy. Herein, general teaching efficiency refers to the position of education in the development of students, while individual teaching efficacy refers to whether teachers exert a positive influence on students and deliver effective education, so as to cultivate self-cognition, subjective feelings and beliefs for students [11]. The research into self-efficacy of teachers plays a key role. It is considered that the sense of self-efficacy is determined by four elements, including personal achievement (direct experience), verbal persuasion, alternative experience (indirect experience), as well as emotional and physiological state. In some studies, however, it has been indicated that the direct experience, simple experience, emotion and physiological state of teachers are associated with the relevant variables to teaching experience [12]. As teaching experience increases, the sense of teaching efficacy that teachers have is enhanced as well.

Therefore, the following hypotheses are proposed:

H1: The teaching experience of teachers has a positive impact on their sense of self-efficacy.

H2: The title of teachers has a positive impact on their sense of self-efficacy.

H3: The experience of teachers as class adviser has a positive impact on their sense of self-efficacy.

2.2 Anxiety theory

The anxiety-related study has attracted much attention since the detailed explanation made by Freud as to the principles of the anxiety [13]. According to the definition given by Horwitz (1986), an involuntary response of the nervous system is the subjective feeling of tension, anxiety, anxiety, etc. In 1983, Charles D. Spielberger proposed the Trait-StateAnxin theory that anxiety may be a long-term development of personality, or a temporary subjective state, to break the long-standing anxietyholism. Anxiety is also divided into general and specific anxiety [14]. Based on this, teaching anxiety has drawn attention from the academic circle since the 1980s [15]. In 1986, Horwitz and others designed the Classroom Teaching Anxiety Scale (ClassroomAnxin).

H4: The anxiety felt by teachers has a negative impact on their perception about teaching efficacy.

H5: The anxiety felt by teachers adjusts the impact of teaching experience on teaching efficacy negatively.
H6: The effect of anxiety felt by teachers adjusts the impact of title on teaching efficacy negatively.
H7: The effect of anxiety felt by teachers adjusts the impact of work experience as class adviser on teaching efficacy negatively.

![Research Model](http://www.i-jet.org)

Fig. 1. Research Model

3 Research Methods, Data and Analyse

3.1 Research ideas

The purpose of this study is to explore the sense of self-efficacy felt by teachers majoring in communication engineering. In order to facilitate the research, the ideas and methods involve the following aspects:

Firstly, based on the understanding of self-efficacy among teachers, literature review is conducted to better understand the relevant research carried out both at home and abroad will be conducted [16].

Secondly, from the practicalities of communication engineering teachers, and based on the existing scale, a number of problems are discussed to highlight the characteristics of communication engineering subjects [17].

Thirdly, the current state of teaching anxiety and the sense of self-efficacy among communication engineering teachers are investigated and analysed, while the impact of different factors on the sense of self-efficacy among communication engineering teachers is analysed [18]. Through the analysis of the survey results, the effective strategies to improve the sense of self-efficacy among communication engineering teachers are proposed [19].

3.2 Research tool

In the process of compiling the teacher anxiety scale [20], the author draws lessons from the teaching anxiety scale proposed by Dong Yanping et al. (2013) and the anxiety scale of teaching cognitive processing suggested by Deng Yuan et al. (2018). The
former not only describes the teaching anxiety from three dimensions, including the difficulty of teaching, the service nature of teaching and the general confidence of teaching with regard to the teaching process as an overall task from a macro point of view, but also explores how teachers feel about the teaching task. Based on the cognitive load model suggested by Jill (2009) and the teaching working memory theory proposed by Baddeley (2003), the latter divides the teaching cognitive processing process into three parts, including information input, processing and output, corresponding to learning anxiety, using anxiety and imparting anxiety, respectively [21]. The three-factor model proves scientific through two tests. Therefore, when the teaching anxiety scale is compiled, the author also draws lessons from the scale framework presented by Deng Yuan and others, and divides the teaching process anxiety into three stages, which are learning, memory and imparting. Each part includes 5 questions, and the scale involves 15 questions [22]. The questions related to Learning anxiety are numbered 1 to 5, the questions related to memory anxiety are numbered 6 to 10, and the questions related to imparting anxiety are numbered 11 to 15 [23].

The teacher effectiveness questionnaire, abbreviated as TE, is generally premised on the teacher self-efficiency feeling scale revised by Yu Guoliang from Beijing normal University, which mainly refers to the methods developed by Gibson and Dembo. Besides, the scale is also compiled according to the practicalities of domestic education. This scale involves two dimensions, which are personal self-efficiency and general self-efficiency. There are 27 multiple choice questions contained in the questionnaire. Among them, the questions related to the general level of the sense of teaching efficacy among teachers are numbered 1 to 10, and those related to the level of the personal sense of teaching efficacy are numbered 11 to 27, involving a 5-level scale. The total score of each question is accumulated. The higher the score, the stronger the sense of teaching efficacy felt by teachers. The questionnaire also includes the characteristics of the subjects, for example, gender, education, age, teaching experience, professional titles and current position. The scale shows excellent reliability and validity, while all the indicators basically meet the psychometric criteria [24].

3.3 Data

In this study, totally 90 questionnaires were distributed to the teachers majoring in communication engineering during the training on communication technology. A total of 85 valid questionnaires were recovered after screening, and the effective recovery rate was 94%. Of the participants, 58.8% were male and 41.2% were female. The data is shown in the table below.
Table 1. Variable descriptive statistics

| variable         | NUM | MIN | MAX | AVG  | SD   |
|------------------|-----|-----|-----|------|------|
| Age              | 85  | 26  | 47  | 34.93| 4.911|
| Local person     | 85  | 0   | 1   | 0.52 | 0.503|
| Sex              | 85  | 0   | 1   | 0.59 | 0.495|
| Teaching experience | 85  | 1   | 22  | 9.51 | 5.191|
| Class adviser    | 85  | 0   | 1   | 0.4  | 0.493|
| Professional titles | 85  | 1   | 3   | 2.27 | 0.662|
| Anxiety sense    | 85  | 2.3 | 5   | 3.706| 0.668|
| Self-efficiency  | 85  | 2.4 | 5   | 3.76 | 0.6  |

4 Empirical Analysis

4.1 Non-model analysis

Before the formal statistical model is analysed, the variables of interest are displayed in a statistical pattern, and the direct relationship between the variables is observed [25]. The figure showing the distribution of teaching experience and the sense of self-efficacy is shown as follows.

![Fig. 2. Scatter Graph of Teaching experience and self-efficiency](http://www.i-jet.org)

As shown in the above figure, as the Tagging period is extended, self-efficiency is enhanced, which means the Tagging period is directly associated with the self-efficacy [26]. It is assumed that H1 is supported. The distribution of work titles and self-efficacy is shown as follows.
As can be seen from the figure above, with the promotion of professional titles, the self-efficacy of teachers increases, which means, work titles are associated with self-efficacy. Therefore, H2 is supported.

The figure showing the relationship between class adviser and the sense of self-efficacy is presented as follows.

As can be seen from the figure above, the self-efficacy of class adviser is lower, which means, the experience of class adviser is negatively correlated with self-efficacy. Thus, H3 is rejected.

The figure showing the relationship between the sense of anxiety and self-efficacy is presented as follows.
Fig. 5. Scatter Graph of the Sense of Anxiety and Self-efficacy

As can be seen from the figure above, the sense of anxiety is negatively correlated with self-efficacy. It is supposed that H4 is supported.

4.2 Modelling

Although a general conclusion is drawn from the above statistical graph, there are no control variables involved in the analysis [27]. In consideration of the existing research practices, the impact of their respective variables on classroom self-efficacy perception is calculated through the econometric model.

\[ y_i = x_i' \beta + u_i \]

Where \( y_i \) represents the sense of self-efficacy of the teacher \( i \), \( x_i \) indicates a covariate matrix that affects the sense of self-efficacy of the user, which in the present study mainly includes professional titles, teaching experience, class adviser, the sense of anxiety and control variable such as age, place of origin and gender. \( u_i \) denotes an error term, and it conforms to a normal distribution expected to be 0. We are interested in the estimation factor \( \beta \), where \( \beta \) represents the magnitude and direction of the respective variables and the adjustment variables on the dependent variables. The expectation of our \( u_i \) is not equal to zero, as certain factors of the user’s individual, such as living habits and personality will affect the sense of self-efficacy of the individual. For example, the fixed effect of individuals is changed with \( i \). Therefore, the random error term \( u_i \) can be split into two parts, namely, the fixed effect \( c_i \) of the
individual and the random error term $\varepsilon_i$, which is subject to a normal distribution expected to be 0, that is,

$$u_i = c_j + \varepsilon_i$$

(2)

Therefore, the model is set to

$$y_i = \beta x + c_j + \varepsilon_i$$

(3)

### 4.3 Analysis of data

Based on the questionnaire data, the sense of self-efficacy among teachers is analysed. The software used in the analysis is SPSS19, while the method of hierarchical regression is applied in the regression model. This method is characterized by the addition of independent variables to the regression equation in steps, as a result of which the change of the influence exerted by some independent variables on dependent variables under different conditions can be judged. For example, one of the more commonly used methods is to incorporate the control variables into the regression, and then the main independent variables into the regression, so as to determine whether the impact of the independent variables on the dependent variables is consistent. In this study, this method is mainly used.

| IV                  | Hypothesis | Model1      | Model2       | Model3       |
|---------------------|------------|-------------|--------------|--------------|
| Age                 | 0.412(2.11) *** | 0.32(1.56) ** | 0.29(1.23) *** |
| Local person        | -0.47(-2.54) *   | -0.22(-2.35) * | -0.21(-2.71) |
| Sex                 | 0.586(3.23) **    | 0.252(2.58) *   | 0.255(2.56)   |
| Teaching_experience | H1          | 0.159(1.89) *   | 0.195(1.96) *  |
| Professional_titles | H2          | 0.293(3.01) **    | 0.312(2.13) ** |
| Class_adviser       | H3          | -0.246(-2.86) **   | -1.87(1.22) ** |
| Anxiety_sense       | H4          | -0.256(-2.86) **   | -0.254(-2.1) ** |
| Teaching_experience | H5          | -0.11(-1.32) *     |              |
| Professional_titles | H6          | -0.09(-1.21) **    |              |
| Class_adviser       | H7          | 0.12(1.32) *       |              |
| Adjusted R2         | 0.34        | 0.46          | 0.51         |

*p<0.05, **p<0.01, ***p<0.001

It can be concluded from the above table that hypothesis H1/H2/H4/H5/H6/H7 are supported. Besides, H3 is invalid. Now, the causes for the result are analysed. As class adviser usually faces a lot of trivial things, it distracts teachers from teaching. When teachers are unable to dedicate themselves to teaching, their perception of self-
efficiency will decline. Therefore, the sense of self-efficacy among teachers is affected negatively by the experience of working as a class adviser.

5 Conclusion

1. The sense of anxiety that communication engineering teachers have is inversely proportional to teaching experience and professional titles. That is to say, with the increase of teaching experience and the promotion of professional titles, the sense of anxiety will decrease.
2. The perception that communication engineering teachers have is proportional to teaching experience and professional titles. That is to say, with the increase of teaching experience and the promotion of professional titles, the sense of self-efficacy among teachers will increase.
3. The experience of class adviser reduces the sense of self-effectiveness teachers have. Since the work undertaken by class adviser requires attention to be paid not only to the students, but also to their life, there are a lot of trivial things that prevent the teacher from concentrating on teaching.
4. Anxiety has a negative effect on the sense of self-efficacy among teachers. Besides, it will make a difference to the impact of teaching experience, work titles and the experience of working as class adviser on the sense of self-efficacy. Reducing the sense of anxiety is significant to improving the sense of self-efficacy.

6 Management Suggestion

The self-efficacy of teachers is reflective of their teaching efficiency. Based on our research, teachers shall be encouraged to focus on teaching, strive to improve their own professional competence and accumulate teaching experience. The tasks performed by class adviser can be assigned to dedicated teachers, such as counsellors. The management in school should take a series of measures to reduce the sense of anxiety felt by teachers, for the improvement of self-efficacy perceived by teachers.

7 Acknowledgement

This work is supported the following fund:

National natural science foundation: Research on panoramic and prescriptive marketing management and decision driven by big data in consumer market (NO:91746206); Omni Synchronous Marketing Paradigm in the Mobile Era: Tripartite Synchronous Interaction and Product-driven Integral Affect (NO, 71672132).

2017 Guangxi education science ‘ten-three-five’ planning project: Based on zte’s ICT education platform of fusion, work-integrated learning education training mode research (No, 2017B107).

Research Initiation Project of Ph.D., for GUET: Research on the Incentive Mechanism of Knowledge Sharing in Online Medical Community (No, US20001Y).
2018 Guangxi Young and Middle-aged Teachers’ Achievement Project: design and implementation of picking Robot based on Internet of things (No, 2018KY0556).

2018 Guangxi higher Education Teaching Reform Project: Exploration of cultivating Mechanism of Teaching characteristics of Communication Engineering Specialty based on ICT Education platform of ZTE(No,2018JGB322).

2018 Guangxi Vocational Education Teaching Reform Project: Reflections on the course setup of English majors in Private Vocational Colleges in Guangxi under Market demands Taking Guangxi Talent International College as an example (NO,GXGZJG2018A035).

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Article submitted 2020-09-02. Resubmitted 2020-09-20. Final acceptance 2020-09-22. Final version published as submitted by the authors.