

The Influential Factors on Teaching Anxiety Using Decision Tree Analysis: A Case Study of EFL Teachers in Japanese Universities

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Article information	Abstract
<p>Article history: Received: 1 Feb 2024 Accepted: 16 Sep 2025 Available online: 23 Sep 2025</p>	<p><i>This study aimed to examine three aspects of university English teachers (EFL teachers) in Japan: (i) the factors influencing the levels of teaching anxiety as perceived by the teachers, (ii) the extent to which these factors affect the levels of teaching anxiety, and (iii) the characteristics of teachers who are more prone to perceiving teaching anxiety than those who are less likely to perceive it. The analysis employed decision tree analysis, a machine learning method that classifies and predicts data by dividing them into branches. This approach presents the data in a tree diagram, which allows for the identification of factors influencing the target variable and their relative importance. The results of the analysis indicated that the factors influencing teaching anxiety, in descending order of impact, were: "Feeling fulfilled by research activities," "Feeling anxiety about childbirth and childcare," "Age," and "Feeling that there are many administrative tasks apart from teaching and research activities." This indicates that the anxiety experienced by university English teachers regarding their teaching role is not an isolated phenomenon but is closely interconnected with other aspects of their lives, including their workplace environment and personal life circumstances. Furthermore, it suggests that these influencing factors may reflect the intrinsic attributes associated with specific job responsibilities and the overarching philosophies of their affiliated institutions. Therefore, a comprehensive support system must be established at the organizational level to mitigate teaching anxiety. This system must consider the aforementioned variables. The findings of this study have the potential to provide effective strategies for English teachers to manage anxiety in similar contexts. These findings are anticipated to contribute to the development of comprehensive support mechanisms for educators.</i></p>
<p>Keywords: Teaching anxiety Influential factors EFL teachers Decision tree analysis Teacher cognition</p>	

This paper was specially selected to be published from the FPT Conference of Language and Education (FCLE) that ran from 20 to 21 January 2024 at FPT University's Can Tho campus in Vietnam.

INTRODUCTION

Background

In recent years, the environment for Japanese university teachers has undergone significant changes owing to several factors, including declining student enrollment resulting from a decline in the birth rate (Central Council for Education, 2025), establishment of national universities as independent administrative institutions, competitive allocation of funds, promotion of industry-academia collaboration (Central Council for Education, 2025), and advancement of IT and generative AI technologies. In this context, university teachers are required to fulfill several responsibilities, including teaching, research, social activities, and administration. This suggests that contemporary university teachers are likely to be exposed to stressful environments (Fuchigami & Sugita, 2021; Kataoka, 2024a, b; Kataoka, 2025; Kawai & Higashihata, 2021; Kimura et al., 2007; Kuri, 2004). Moreover, it has been observed that the obligations demanded of university faculty frequently render it challenging to delineate a clear boundary between their professional and private lives (Fuchigami & Sugita, 2021). This indicates that stress experienced by university faculty may originate from a multifaceted combination of factors, including job responsibilities, workplace environment, and life events.

Among the expected roles of university faculty, particularly in the field of education, there is currently a dearth of mandatory, systematic training for university faculty members in Japan. This includes the lack of pedagogical teaching programs and teaching certificates (Nakamura et al., 2007). As indicated by Taguchi et al. (2006), novice teachers frequently experience considerable anxiety regarding teaching activities. These findings indicate that deficiencies in pre-service training and restricted opportunities to acquire teaching experience may precipitate anxiety and apprehension pertaining to teaching activities. Furthermore, it has been observed that in language classes (for example, foreign language subjects), faculty members who do not possess expertise in English language teaching or applied linguistics are frequently assigned to instruct these courses (The Committee of the 4th JACET Jittaichosa [a status-quo survey], 2018). Discrepancies between a teacher's areas of expertise and the subject matter they teach may give rise to particular anxieties in the field of foreign language education. The role of emotional responses such as anxiety and stress in influencing classroom practices has been underscored because of their impact on factors such as teacher confidence, teaching methods, and the frequency of target language use (Horwitz, 1996; Yonezaki et al., 2016).

However, studies on stress in Japanese teachers have primarily focused on elementary and middle school teachers, with limited attention being paid to university teachers (Kimura et al., 2007; Kuri, 2004; Nakamura et al., 2007). Notable discrepancies exist between the educational systems, curricula, and professional responsibilities of elementary and middle schools and universities. Furthermore, existing research has not addressed the potential differences in teaching anxiety between foreign language subjects and other academic disciplines. Moreover, there has been no discussion on the possibility of anxiety being unique to language education. In the existing literature on teacher stress, the factors that may influence anxiety have not been sufficiently examined, making it challenging to gain a comprehensive understanding of the stress situations experienced by teachers.

It is imperative to gain a comprehensive understanding of the stressors associated with educational activities as perceived by university English teachers to maintain their mental well-being and ensure the quality of learning. Therefore, it is essential to explore practical improvement measures that are tailored to work environments, job types, and professional conditions. As previously noted, the stress experienced by university faculty members may be associated with a range of complex factors. Consequently, to gain a comprehensive understanding of the stress experienced by university English teachers, it is essential to examine anxiety directly related to teaching itself, as well as to investigate in detail the factors influencing such anxiety.

Purpose and significance of the study

This study aimed to explore a comprehensive understanding of the actual situation of university English teachers' anxiety in teaching activities. Therefore, this study proposes effective support strategies for educators in their practice. Specifically, this study aimed to identify the factors that influence teaching anxiety of English language instructors at Japanese universities and junior colleges (Research Purpose 1), to ascertain the extent to which these factors influence teaching anxiety (Research Purpose 2), and to identify the characteristics of teachers who are more prone to experiencing teaching anxiety as well as those who are less likely to feel such anxiety, particularly to investigate the influence of varying degrees of awareness of influencing factors on the levels of teaching anxiety (Research Purpose 3). For these purposes, this study used decision tree analysis.

In the absence of sufficient opportunities to disseminate information pertaining to educational and learning activities, it becomes challenging for teachers to address their anxiety effectively. The findings of this study contribute to a comprehensive understanding of teaching anxiety experienced by university English teachers and provide valuable insights for exploring practical approaches to stress management and the reduction or alleviation of teaching anxiety.

LITERATURE REVIEW

Teacher stress

Nishizaka (2003) asserted that research on teacher stress originated in the United Kingdom in the late 1970s and has since flourished in Europe and the United States, encompassing a range of topics, from the causes of stress to the relationship between stress and health. Amata (2022) investigated the correlation between stress levels and coping strategies among Filipino public school teachers during the pandemic. Statistically significant differences were observed in stress levels based on the subjects taught and grade levels assigned, as well as in coping strategies based on educational attainment. Additionally, a statistically significant relationship was identified between stress levels and subjects taught.

Ferguson et al. (2017) explored the relationship between teacher stress and the utilization of social support among teachers in northern Ontario, Canada. Teachers rarely discussed stress

with their healthcare providers, instead relying on family, friends, fellow teachers, and occasionally their principals for support. The frequency of social support utilization exhibited variability based on specific stressors, including workload, student behaviour, professional relationships, societal attitudes, and employment conditions. Furthermore, male teachers were less likely than their female counterparts to engage with social support networks regarding stress.

Carroll et al. (2022) surveyed Australian teachers to examine their experiences of work-related stress and burnout. More than half of the participants reported experiencing high or extreme levels of stress and were contemplating leaving the profession. Early career teachers, primary school teachers, and those working in rural and remote areas exhibited the highest levels of stress and burnout. Emotion regulation, workload, and subjective well-being have been identified as significant contributors to the development of teacher stress and specific forms of burnout.

Research on teachers' stress in Japan began in the late 1980s. Although this research has sought to elucidate the underlying causes of stress, it has not reached the same level of sophistication as Western research (Nishizaka, 2003). The research on stress among teachers in Japan has historically been conducted within the context of "teachers' anxiety or concerns," as outlined by Nishizaka (2003). Accordingly, this study focuses on "anxiety and concerns" as psychological stress responses. Yamauchi and Kobayashi (2000) studied teacher stress and found a significant difference between the stress levels of male and female teachers. Female teachers in all three categories (elementary, junior high, and high school) reported higher levels of stress than their male counterparts.

Taguchi et al. (2006) examined the influence of various levels of experience on anxiety in university educators. The participants were divided into two groups based on their teaching experience: those with more than two years of experience and those with less than two years. A comparison of the mean scores for each anxiety item revealed that teachers with less than two years of experience exhibited higher anxiety scores on a greater number of items than those with more than two years of experience.

These studies indicate that teacher attributes are closely associated with the perception and degree of teaching anxiety. This underscores the importance of focusing on the differences in attributes when understanding teachers' mental health. This study examined the relationship between teacher attributes and teaching anxiety.

University faculty roles and stress

In recent years, substantial shifts in the context of universities and university faculty have necessitated their engagement in a diverse array of responsibilities, including teaching, research, social activities, and university administration. Kuri (2004) conducted a questionnaire survey with assistant professors from national, public, and private universities to identify the stress factors as perceived by university faculty members. The survey encompassed a range of domains including research activities, non-research responsibilities, interpersonal relationships

with students, interactions with academic supervisors, collegial relationships, relationships with subordinates, and mental health status. The findings indicated that the perceived burden of miscellaneous tasks and the quality of relationships with supervisors were associated with adverse effects on mental health.

Fuchigami and Sugita (2021) elucidated the realities of work-life balance among university faculty and the necessity of workplace environment improvements. They surveyed faculty members (including those in specially appointed positions and hospital lecturers) from three universities of various sizes and types. These findings suggest that personal research interruptions or inadequate research time owing to life events, non-research duty burdens, and a lack of support for those around the research target may contribute to research inhibition, which is a distinctive occupational stress experienced by researchers. Furthermore, the results indicated that maternity leave, parental leave, and childcare were areas with the highest demand for support.

The aforementioned studies indicate that the expansion of job scope and diversification of tasks necessitate adaptation across multiple fields for modern university faculty, suggesting that such individuals are situated in stressful environments. This study is specifically concerned with the educational aspects inherent in the multifaceted roles of university faculty. To gain insights into the nature of teaching anxiety, it is crucial to consider the distinctive work environment and professional roles of university faculty as well as their individual attributes and life circumstances. It is essential to examine the relationship between these factors and teaching anxiety.

Teaching anxiety among Japanese EFL university teachers

Kataoka (2024a) administered a survey to 102 EFL teachers at universities and junior colleges in Japan to ascertain whether participants experienced teaching anxiety, the extent of their anxiety, and the strategies they employed to cope with it. A preliminary study by Kataoka (2024a) was based on prior research (Shinto & Ozaki, 2004) and a scale developed by Kataoka (2024b) to measure teaching anxiety among Japanese EFL university teachers. The scale comprises 14 items pertaining to teaching anxiety, as shown in Table 1.

Table 1
Items of teaching anxiety among Japanese EFL university teachers

Items
(1) Anxiety about whether my explanations are easy for students to understand
(2) Anxiety about the quality of teaching in my class compared to other related classes
(3) Anxiety about whether I can properly answer the students' questions
(4) Anxiety about how to improve and reflect upon my teaching methods
(5) Anxiety about my knowledge about teaching methods (planning, teaching content, evaluation, etc.)
(6) Anxiety about whether students understand the content of teaching in my class
(7) Anxiety about students' motivation towards my class
(8) Anxiety about students' English proficiency
(9) Anxiety about the lack of consultation and information exchange regarding the class
(10) Anxiety about tailoring classes to match the students' English proficiency and interests

Items
(11) Anxiety about the amount of time spent on class preparation
(12) Anxiety about conducting classes in English
(13) Anxiety about my English proficiency
(14) Anxiety about my knowledge about the class content (class theme, English-speaking culture, etc.)

Participants were asked to rate their level of teaching anxiety using a four-point Likert scale with options ranging from “do not feel at all” (1), “do not feel much” (2), “somewhat feel” (3) to “strongly feel” (4). Responses indicating higher levels of anxiety received higher scores, with the aim of quantitatively assessing the degree to which each respondent perceives their teaching anxiety. The mean anxiety score for each participant and the overall average score were calculated. Participants were then categorized into groups based on whether their average scores were above or below the overall mean. In this study, this score was used as teaching anxiety (the target variable).

METHODOLOGY

Preliminary survey

A preliminary survey was conducted prior to the main survey to select items for a scale designed to measure the factors influencing teaching anxiety as perceived by Japanese EFL university teachers. Participants were defined as teachers (including part-time lecturers) responsible for teaching at least one English (foreign language) course at a university or junior college. The selection of participants who met these criteria was completed in Kataoka (2024a). Both the preliminary and subsequent main surveys, described in detail below, were conducted using web-based questionnaires. The Ethics Committee of the Kataoka’s affiliated institution approved this study (approval number: 2024-009). Participation was anonymous and voluntary, and respondents were informed of the protection of their privacy, rigorous data management, and the voluntary nature of their participation. All the respondents provided consent to participate in the study.

Table 2 provides an overview of the preliminary survey.

Table 2
An overview of the preliminary survey

Survey method	WEB-based questionnaire survey
Survey period	October 3-4, 2023
Number of participants distributed	60
Number of valid responses	60

The preliminary survey was conducted from October 3 to 4, 2023, and targeted 60 participants, all of whom provided valid responses, yielding a 100% response rate. The survey was designed to identify the presence and content of the factors that either alleviated or amplified teaching anxiety.

The survey items and instructions used in the preliminary survey are presented in Table 3.

Table 3
Survey items and instructions for the preliminary survey

Items	Instructions
(1) Presence of alleviating factors	"Are there any factors that alleviate your anxiety or concerns in your current English classes?"
(2) Content of alleviating factors	"What kind of factors alleviate your anxiety or concerns?"
(3) Presence of amplifying factors	"Are there any factors that amplify your anxiety or concerns in your current English classes?"
(4) Content of amplifying factors	"What kind of factors amplify your anxiety or concerns?"

Regarding Items (1) and (3), which inquired about the presence of factors that alleviate or amplify teaching anxiety, a single-choice format was utilized, with the options "Yes" and "No." Regarding Items (2) and (4), which pertained to the specific content of the factors, the respondents were invited to provide open-ended responses. Respondents could only advance to Items (2) or (4) if they responded affirmatively to Items (1) or (3), respectively. A supplementary explanation was provided for Items (2) and (4) to facilitate the formulation of the responses. "You may include any factors related to research, administrative task, personal life, or any other aspects, provided that they are pertinent to the subject matter." Please base your responses on your own experiences and provide as specific and detailed answers as possible within the limits of what is appropriate and relevant.

The results are presented in the following manner. With regard to Item (1), 24 of 60 respondents (40%) answered affirmatively, and all 24 respondents (100%) proceeded to answer Item (2). Regarding Item (3), 26 of 60 respondents (43%) answered affirmatively, and all 26 respondents (100%) proceeded to answer Item (4).

Main survey

As the present survey was conducted at a different time from the preliminary survey, there is a risk that respondents may have assumed different teaching classes when answering the questions. Accordingly, at the outset of the questionnaire, we included a note stating, "In this survey, we are inquiring about the English classes you were responsible for and your own circumstances at the time of the previous survey (October 2023)."

Table 4 provides an overview of the survey.

Table 4
An overview of the main survey

Survey method	WEB-based questionnaire survey
Survey period	October 17-30, 2023
Number of participants distributed	102
Number of valid responses	91

In this study, a web-based questionnaire survey was employed to maximize the number of responses and minimize biases in participant attributes such as age and place of residence. A web-based questionnaire survey is a method of collecting responses via the Internet. In this study, the author designed the questionnaire, which was then distributed to registered survey participants through a research company. The primary survey was conducted between October 17 and 30, 2023, targeting the 102 participants from Kataoka (2024a). A total of 91 valid responses were obtained, yielding a response rate of 89.2%. The questionnaire included a multitude of questions pertaining to research activities, life events, and their attributes.

Based on the findings of the preliminary survey and previous research (Kuri, 2004), the factors influencing teaching anxiety identified by Kataoka (2024a) were selected, as shown in Table 5.

Table 5
Influential factors on teaching anxiety

Items
(1) Feeling fulfilled when teaching English classes
(2) Feeling that the number of assigned English classes is high
(3) Having the ability to use the Internet and AI tools to alleviate teaching anxieties
(4) Feeling satisfied with the affiliated institution's evaluation of my English classes
(5) Establishing good relationships with students in my English classes
(6) Feeling satisfied with the students' evaluation of my English classes
(7) Feeling that the students in my English classes have low motivation towards the class
(8) Feeling fulfilled by research activities
(9) Feeling that my abilities are being fully utilized in research activities
(10) Feeling satisfied with the affiliated institution's evaluation of my research activities
(11) Feeling pressure to produce research achievements
(12) Feeling pressure to secure research fundings
(13) Feeling that there are many administrative tasks apart from teaching and research activities
(14) Feeling satisfied with the affiliated institution's evaluation of administrative tasks apart from teaching and research activities
(15) Feeling a shortage of personnel in the affiliated institution
(16) Feeling uncertainty regarding the employment status
(17) Recognizing changes in educational policies regarding English education
(18) Feeling anxiety about my health condition
(19) Feeling anxiety about childbirth and childcare
(20) Feeling anxiety about caregiving for family members
(21) Engaging in hobbies for relaxation and mood enhancement
(22) Having colleagues (or native speakers) to consult about teaching anxieties
(23) Having family (or friends) to consult about teaching anxieties
(24) Having opportunities to participate in training, seminars, and study groups related to English classes
(25) Gender
(26) Age
(27) Years of teaching experienced

The first 21 items employ a 4-point Likert scale, with the anchors “strongly agree,” “slightly agree,” “slightly disagree,” and “strongly disagree” to assess the extent to which respondents are aware of the influential factors. The subsequent 22 to 24 items utilize a 2-point scale, with the options “agree” and “disagree” to determine whether respondents possess these influential factors. Item (27) was classified into four categories based on the distribution of responses, which indicated distinct trends across the four levels: “5 years or less,” “6–15 years,”

“16–25 years,” and “26 years or more.” As previously mentioned, this study adopted a web-based questionnaire survey. Items (25) and (26) were provided in advance by the survey company as fundamental demographic information of the participants. Furthermore, items that had been reversed were subjected to reverse coding.

Decision tree analysis

The analysis was performed using decision tree analysis (Python 3.10.12). Decision tree analysis is a machine learning-based analytical method that represents critical information about the attributes of the target variable through a combination of rules displayed in a tree diagram. It is a data mining technique commonly employed for prediction and classification (Oku et al., 2004). In other words, decision tree analysis employs an iterative process whereby an appropriate explanatory variable is selected from a set of explanatory variables to divide the dataset into subsets that exhibit greater homogeneity. The principal objectives of this process are to (a) identify explanatory variables that are strongly associated with the target variable, (b) elucidate the structure of the explanatory variables, and (c) discover subgroups of interest (Nishida et al., 2024; Oku et al., 2004). In this study, decision tree analysis was considered an appropriate analytical method. This was because Research Purpose 1 (What factors influence teaching anxiety as perceived by university English teachers?) can be addressed by (a) Research Purpose 2 (To what extent do these factors impact teaching anxiety?), by (b), and Research Purpose 3 (What characteristics make teachers more or less likely to experience teaching anxiety?) by (c). This structure clarifies the research purposes.

In this study, the target variable was defined as teaching anxiety levels (high/low), while the explanatory variables were identified as influential factors. In alignment with Simsek’s (2022) methodology, this study assessed the precision of model projections in decision tree analysis across four key dimensions: (1) Accuracy rate represents the frequency with which a model produces accurate predictions. This calculation was performed by dividing the number of correctly classified samples by the total number of samples. (2) Precision is defined as the proportion of correctly identified positive samples out of all samples predicted to be positive. (3) Recall is defined as the proportion of actual positive samples correctly predicted as positive by the model. (4) F-measure, also known as the F1 score, is a statistical measure that represents the harmonic means of precision and recall.

The four criteria can be interpreted in accordance with the objectives of this study as follows. The accuracy rate represents the proportion of high- and low-scoring groups of teaching anxiety that were correctly identified in all samples. Precision was used to describe the proportion of high-scoring groups of teaching anxiety that were correctly predicted. The recall rate represents the proportion of actual high-scoring groups for teaching anxiety that were correctly identified. The F-measure, which ranges from zero to one, represents the harmonic mean of the precision and recall scores. A value approaching one indicates a superior performance level.

FINDINGS/DISCUSSION

The initial stage of the analysis involved an examination of responses pertaining to teacher attributes, as represented by items (25), (26), and (27) in Table 5. With regard to gender, the study sample comprised 52 men and 39 women. In terms of age, the participants were distributed as follows: nine in their 20s, 22 in their 30s, 27 in their 40s, 26 in their 50s, five in their 60s, and two in their 70s. With respect to years of experience, 26 participants had less than five years of experience, 31 had six to 15 years, 18 had 16 to 25 years, and 16 had 26 years or more. The results indicated that most of the 91 university English teachers who participated in this study were male. The age distribution was centered around those in their 30s to 50s, with the largest proportion of teaching experience falling within the 6–15 years range.

Subsequently, the results of the decision tree analysis identified the most significant factors predicting the degree of teaching anxiety, as shown in Table 6. These factors were ranked in order of their levels of influence. These were identified as follows: “(19) Feeling fulfilled by research activities” (34.1087), “(8) Feeling anxiety about childbirth and childcare” (29.3794), “(13) Feeling that there are many administrative tasks apart from teaching and research activities” (18.9092), and “(26) Age” (17.6028) (level of importance in parentheses).

Table 6
Feature importance

Items	Relative importance
(19) Feeling fulfilled by research activities	34.1087
(8) Feeling anxiety about childbirth and childcare	29.3794
(13) Feeling that there are many administrative tasks apart from teaching and research activities	18.9092
(26) Age	17.6028

Furthermore, a tree diagram was constructed to ascertain the degree to which the potentially influential factors listed in Table 5 affected teaching anxiety. A summary of the evaluation metrics for the decision-tree model employed in this study is presented in Table 7.

Table 7
Evaluation metrics for the decision tree model

Items	Low scoring group	High scoring group	Average
Accuracy	–	–	0.47
Precision	0.43	0.60	–
Recall	0.75	0.27	–
F-measure	0.55	0.37	–

As illustrated in Table 7, the probability of correctly predicting teaching anxiety based on potentially influential factors was 47%. The results of this analysis indicate that the predictive accuracy of the model was not particularly high.

As illustrated in Figure 1, the classification of English teachers into high and low groups, based on their level of teaching anxiety, exhibited the following pattern:

Low anxiety group:

(a) IF “(8) Feeling fulfilled by research activities” = slightly disagree or strongly disagree AND “(26) Age” = 20s, 30s, or 40s AND “(19) Feeling anxiety about childbirth and childcare” = strongly agree THEN Scoring group = Low;

(c) IF “(8) Feeling fulfilled by research activities” = slightly disagree or strongly disagree AND “(26) Age” = 50s, 60s, or 70s THEN Scoring group = Low;

(d) IF “(8) Feeling fulfilled by research activities” = slightly agree or strongly agree AND “(19) Feeling anxiety about childbirth and childcare” = strongly agree AND “(13) Feeling that there are many administrative tasks apart from teaching and research activities” = slightly agree or strongly agree THEN Scoring group = Low;

(f) IF “(8) Feeling fulfilled by research activities” = slightly agree or strongly agree AND “(19) Feeling anxiety about childbirth and childcare” = slightly agree, slightly disagree, or strongly disagree THEN Scoring group = Low;

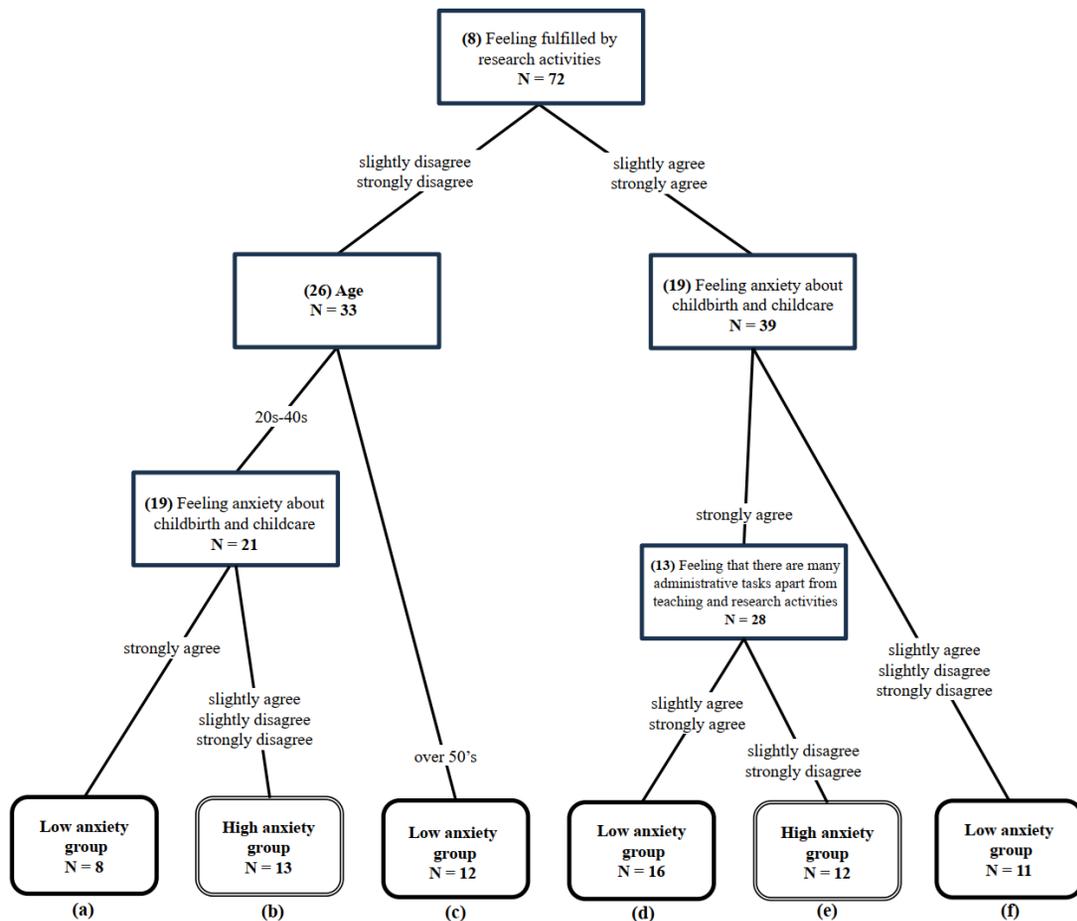


Figure 1 Tree diagram of English teachers' teaching anxiety

High anxiety group:

(b) IF “(8) Feeling fulfilled by research activities” = slightly disagree or strongly disagree AND “(26) Age” = 20s, 30s, or 40s AND “(19) Feeling anxiety about childbirth and childcare” = slightly agree, slightly disagree, or strongly disagree THEN Scoring group = High;

(e) IF “(8) Feeling fulfilled by research activities” = slightly agree or strongly agree AND “(19) Feeling anxiety about childbirth and childcare” = strongly agree AND “(13) Feeling that there are many administrative tasks apart from teaching and research activities” = slightly disagree or strongly disagree THEN Scoring group = High;

These findings indicate that four factors—namely, “(8) Feeling fulfilled by research activities,” “(19) Feeling anxiety about childbirth and childcare,” “(26) Age,” and “(13) Feeling that there are many administrative tasks apart from teaching and research activities”—are the most significant contributors to the teaching anxiety experienced by Japanese EFL teachers. Furthermore, it is evident that teaching anxiety is not an isolated phenomenon but is rather intricately linked to other aspects of teachers’ lives, including their work environment and personal life circumstances. The results of this study are in line with those of previous studies.

First, regarding “(8) Feeling fulfilled by research activities,” Nakamura et al. (2007) identified that the most significant source of anxiety for novice university teachers is the anxiety associated with the challenge of balancing teaching and research activities. Similarly, Fuchigami and Sugita (2021) identified the “hindrance of research activities” as a distinctive occupational stressor for university faculty. It is widely accepted that satisfaction and fulfilment derived by teachers from research activities directly contribute to the enhancement of educational quality. For example, a sense of fulfilment and satisfaction in research may enhance teachers’ overall self-efficacy and job satisfaction, thereby reducing teaching anxiety. Conversely, elevated expectations and motivations for research activities may elevate the standards and objectives of such activities. The discrepancy between these standards and the actual outcomes may induce anxiety in research activities, which may in turn exert an indirect influence on anxiety regarding teaching activities. Educators must be provided with a comprehensive support system that facilitates their research endeavours, strikes an equilibrium between research and teaching obligations, and provides them with adequate resources and time.

Second, with respect to “(26) Age,” Nakamura et al. (2007) examined the relationship between the age of novice teachers at the time of appointment and their educational anxiety and found a negative correlation with “anxiety about teaching methods”. Specifically, younger teachers tended to experience more anxiety about teaching methods as their age at hire decreased. One possible reason why older teachers may be less prone to perceive educational anxiety is that the richness of life experiences gained with age may contribute to a greater psychological buffer in educational activities. However, given that “(27) Years of teaching experience” does not have a strong influence on classroom anxiety, the term “experience” here may refer more to social experiences and relationship-building skills that extend beyond educational settings than to teaching experience alone. In addition, life stage characteristics such as stability in family life and accumulated parenting experience may enhance the understanding of students

in educational settings. As discussed later in item (19), “Feeling anxiety about childbirth and childcare,” teachers over the age of fifty do not report experiencing this anxiety.

Third, regarding “(19) Feeling anxiety about childbirth and childcare,” this study found two different results: Group (f), where teachers who were relatively unaware of this type of anxiety perceived less educational anxiety, and Group (a), where teachers who were highly aware of this type of anxiety also perceived less educational anxiety. For Group (f), it can be assumed that lower anxiety about life events, such as childbirth and child-rearing, allows them to devote more time to teaching activities, which is one of the reasons for their lower educational anxiety. Conversely, for Group (a), it is possible that high anxiety related to life events such as childbirth and parenting may make them less aware of anxiety related to teaching. Fuchigami and Sugita (2021) observed a significant need for support in “maternity, paternity, and childcare leave” among university faculty members. Many respondents highlighted the importance of ensuring fairness in the provision of support for maternity, paternity, and childcare leave. This indicates the existence of a challenging environment that discourages paternity leave for male educators and underscores the significant responsibilities associated with childcare. Considering these findings, it is of paramount importance to establish a family-friendly work environment that encompasses a parental leave policy that includes both women and men, as well as a flexible work system to facilitate the transition back to the workplace.

Finally, regarding “(13) the presence of numerous administrative tasks apart from teaching and research activities,” Kuri (2004) identified the perceived burden of miscellaneous tasks as a factor negatively affecting mental health. Teachers must manage both lesson preparation and administrative duties within a limited time. Undertaking many administrative tasks inevitably reduces the time available for lesson preparation. It is reasonable to posit that insufficient time for lesson preparation may precipitate heightened anxiety about the teaching quality. The implementation of ICT, assignment of specialized personnel, and streamlining or reduction of administrative tasks are regarded as effective measures for alleviating the perceived burden of miscellaneous duties among educators.

Therefore, these factors may indicate the characteristics inherent to teachers’ employment status, specific job duties, and the overarching philosophies of the institutions with which they are affiliated. To mitigate the prevalence of teaching anxiety, it is imperative to establish a comprehensive support system at the organizational level.

CONCLUSIONS

This study aimed to determine the factors influencing teaching anxiety among English (foreign language) teachers at Japanese universities or junior colleges (Research Purpose 1), to what extent these factors influence teaching anxiety (Research Purpose 2), and to identify the characteristics of teachers who are more prone to experiencing teaching anxiety as well as those who are less likely to feel such anxiety (Research Purpose 3). A survey was conducted among university faculty members who teach English classes in Japan. The data were analyzed using decision tree analysis, where the level of teaching anxiety (high/low) was set as the target variable and the potentially influencing factors were set as the explanatory variables.

Subsequently, regarding the extent to which the influential factors affected teaching anxiety, the study yielded the following insights into the characteristics of university English teachers. Teachers with low teaching anxiety showed the following four patterns: (a) those who did not feel fulfilled by research activities, were in their 20s, 30s, or 40s, and strongly agreed with anxiety about childbirth and childcare; (c) those who did not feel fulfilled by research activities and were in their 50s, 60s, or 70s; (d) those who felt fulfilled by research activities, strongly agreed with anxiety about childbirth and childcare, and acknowledged the burden of administrative tasks; and (f) those who felt fulfilled by research activities but reported little or no anxiety about childbirth and childcare. In contrast, teachers with high teaching anxiety exhibited two patterns: (b) those who did not feel fulfilled by research activities, were in their 20s, 30s, or 40s, and reported little or no anxiety about childbirth and childcare; and (e) those who felt fulfilled by research activities, strongly agreed with anxiety about childbirth and childcare, but did not perceive a high administrative workload. “Feeling that there are many administrative tasks apart from teaching and research activities” were likely to have high levels of teaching anxiety.

The results indicate that these influencing factors reflect the intrinsic attributes associated with teachers’ professional standing, work responsibilities, and the fundamental principles of the organizations to which they belong. Furthermore, to alleviate the teaching anxiety experienced by university English instructors, it is crucial to consider their work environment and personal life situations. Establishing a holistic support system at the organizational level is vital for effectively addressing these multifaceted needs. More specifically, this entails (1) allocating resources and time to facilitate a balance between research and teaching activities; (2) enhancing the parental leave system and flexible working conditions post-return, with attention paid to both women and men; and (3) minimizing non-essential tasks, optimizing efficiency, and bolstering support from administrative staff to allow teachers to focus on their teaching activities. Overall, this research contributes to a deeper understanding of both the mechanisms of English teachers’ teaching anxiety in higher education and effective support for these teachers.

Furthermore, employing decision tree analysis yielded the following benefits. Firstly, decision tree analysis facilitates the visualization of not only individual factors but also the intricate interactions among multiple factors that influence teaching anxiety. For instance, this study identified a specific pattern in which teachers with low fulfilment in research activities, aged 20–40, and experiencing high anxiety about childbirth and childcare were more likely to have higher teaching anxiety. The identification of these patterns facilitates the implementation of targeted support strategies for teachers who are at risk. Secondly, the employment of decision tree analysis facilitates the development of customized support strategies, which can be tailored to align with the unique circumstances of individual teachers. This study indicates that for early-career teachers, the introduction of support systems that facilitate the balancing of research and teaching activities, in conjunction with the enhancement of childcare and parental leave support, may prove to be effective. Teachers experiencing a high administrative workload may benefit from measures to reduce their workload or training in time management. Consequently, decision tree analysis facilitates the implementation of precise, individualized support measures based on teacher characteristics. The findings of this study offer significant



implications for educational institutions seeking to establish effective support systems for faculty. By using decision tree analysis, educational institutions can methodically evaluate the factors that are deemed most salient and the circumstances under which teaching anxiety escalates. This approach enables data-driven policy and organizational decision-making, enhancing the efficacy of support systems for faculty members.

LIMITATIONS

The probability that the influential factors correctly predicted the level of teaching anxiety among university English teachers was 47%. However, this was not a good result. A possible reason for this is that the large number of explanatory variables (potentially influencing factors) increases the risk of the model overlearning data. Therefore, future studies should focus on refining the selection of explanatory variables based on their association strength with the target variable. Exploring different machine learning algorithms may also enhance the model's predictive performance.

Moreover, although decision tree analysis can examine the influence of explanatory variables on the objective variable and the strength of their influence, it cannot examine the causal relationships between these variables. To gain a comprehensive understanding of university English teachers' teaching anxiety, it is also necessary to clarify the causal relationships between variables, such as between teaching anxiety and influencing factors, and between influencing factors.

ACKNOWLEDGEMENTS

I would like to extend my heartfelt gratitude to the English teachers who kindly took the time to participate in this study despite their busy schedules. Additionally, I am deeply thankful for the invaluable comments and suggestions provided by the anonymous reviewers during the preparation of this manuscript.

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REFERENCES

Amata, C. (2022). Level of stress and coping strategies of public-school teachers during COVID-19 pandemic: The case of offshore and Philippine teachers. *AIDE Interdisciplinary Research Journal*, 3, 294–312. <https://doi.org/10.56648/aide-irj.v3i1.70>

- Carroll, A., Forrest, K., Sanders-O'Connor, E., Flynn, L., Bower, J., Fynes-Clinton, S., York, A., & Ziaei, M. (2022). Teacher stress and burnout in Australia: Examining the role of intrapersonal and environmental factors. *Social Psychology of Education, 25*, 441–469. <https://doi.org/10.1007/s11218-022-09686-7>
- Central Council for Education. (2025). 我が国の「知の総和」向上の未来像: 高等教育システムの再構築 (答申 [Future vision for improving Japan's "collective knowledge and wisdom" -reconstructing the higher education system (Report)]). https://www.mext.go.jp/b_menu/shingi/chukyo/chukyo0/toushin/1420275_00014.htm
- Ferguson, K., Mang, C., & Frost, L. (2017). Teacher stress and social support usage. *Brock Education Journal, 26*(2), 62–86. <https://doi.org/10.26522/brocked.v26i2.606>
- Fuchigami, N., & Sugita, N. (2021). 大学教員のワーク・ライフ・バランス実態と求められる職場環境改善支援 [Actual conditions of work-life balance and required supports of improvement of work environment on faculty members]. *Japan Journal of Educational Technology, 44*(4), 409–418. <https://doi.org/10.15077/jjet.44090>
- Horwitz, E. K. (1996). Even teachers get the blues: Recognizing and alleviating language teachers' feelings of foreign language anxiety. *Foreign Language Annals, 29*(3), 365–372. <http://dx.doi.org/10.1111/j.1944-9720.1996.tb01248.x>
- Kataoka, R. (2024a). 大学英語教員の授業活動に関するストレス測定尺度の作成: 因子分析による信頼性と妥当性の検証 [The evaluation of teaching stress among university English teachers: Scale development and validation]. *The Journal of International Media, Communication, and Tourism Studies, 38*, 19–41. <http://hdl.handle.net/2115/91794>
- Kataoka, R. (2024b). 英語授業を担当する大学教員のストレスとコーピングに関する探索的研究: 自由記述式データから見た新型コロナウイルス感染症による影響 [An exploratory study of university and junior college English teachers' stressors and coping strategies related to teaching activities: The impact of the COVID-19 pandemic]. *Japan Journal of Educational Technology, 48*(1), 99–108. <https://doi.org/10.15077/jjet.47059>
- Kataoka, R. (2025). 初任者英語教員の授業不安への対処過程: 複線径路・等至性モデル(TEM)による分析 [Coping processes of teaching stress in a novice English teacher: An analysis using the Trajectory Equifinality Model (TEM)]. *Journal of Higher Education and Lifelong Learning, 32*, 11–23. <https://doi.org/10.14943/J.HighEdu.32.11>
- Kawai, H., & Higashihata, H. (2021). 大学教員のストレスに関する文献研究 [A literature review on the stress facing university faculty members]. *Environment-welfare Science Studies, 6*(1), 39–48.
- Kimura, N., Hashikawa, K., & Kiuchi, Y. (2007). 大学教員の職業性ストレス構造に関する研究 [Covariance analysis of the work stress model of faculty members at a junior college, university, college, or graduate school]. *Bulletin of Center for Collaboration in Community, Naruto University of Education, 22*, 51–58.
- Kuri, T. (2004). 大学教員のストレス測定尺度の作成: 大学固有の職場環境・対人関係の視点から [An attempt to construct the stress evaluation scale for professors]. *Bulletin of the Graduate School of Education and Human Development, Nagoya University (Psychology and Human Development Sciences), 51*, 173–185. <https://doi.org/10.18999/nupsych.51.173>
- Nakamura, A., Shinto, T., Taguchi, M., Nishimori, T., & Nakahara, J. (2007). 大学教員初任者の不安の構造とその不安が職務満足感に与える影響 [Structure of junior faculty members' concerns and their job satisfaction]. *Japanese Journal of Educational Psychology, 55*, 491–500. https://doi.org/10.5926/jjep1953.55.4_491
- Nishida, J., Hashimoto, K., Kiuchi, A., Nakasuga, T., Fujiwara, H., Yamamoto, K., & Fijitsuka, C. (2024). 大学体育授業にて学修成果を高めるための条件: 学修者特性および学修・教授行動を要因とした決定木分析による検討 [Conditions for enhancing the learning outcomes of university physical education courses: Decision tree analysis with learner characteristics and learning/teaching behavior]. *Japan Journal of Physical Education, Health and Sport Sciences, 69*, 109–124. <https://doi.org/10.5432/jjpehss.23057>

- Nishizaka, S. (2003). 我が国における教師ストレス研究の現状と課題 [Future direction for the teacher stress studies in Japan: Review of recent studies]. *Journal of Educational Research*, 8, 13–24. <https://u-gakugei.repo.nii.ac.jp/records/30473>
- Oku, Y., Motomura, T., Maezuru, M., & Uchioko, S. (2004). データマイニングにおける二値データ解析: 決定木とロジスティック回帰分析 [Binary data analysis in data mining: Tree models and logistic regression models]. *Logistics Review*, 44, 1–14. https://rku.repo.nii.ac.jp/search?page=1&size=20&sort=controlnumber&search_type=2 &q=602
- Shinto, T., & Ozaki, H. (2004). 高等教育段階の授業における教授者のストレス過程: ストレッサー・対処行動の様相 [Teacher's stress processes in higher education teaching: Stressor appraisal and coping]. *Japan Society of Developmental Psychology (JSDP)*, 15(3), 345–355. <https://doi.org/10.11201/jjdp.15.345>
- Simsek, M. (2022). Predicting mathematics performance by ICT variables in PISA 2018 through decision tree algorithm. *International Journal of Technology in Education (IJTE)*, 5(2), 269–279. <https://doi.org/10.46328/ijte.296>
- Taguchi, M., Nishimori, T., Shinto, T., Nakamura, A., & Nakahara, J. (2006). 高等教育機関における初任者を対象としたFDの現状と課題 [The current situation of FD for junior faculty]. *Japan Journal of Educational Technology*, 30(1), 19–28. <https://doi.org/10.15077/jjet.KJ00004964108>
- The 4th JACET Survey Committee. (2018). 大学英語教育の担い手に関する総合的研究 [A comprehensive research on university English education leaders in Japan]. JACET.
- Yamauchi, K., & Kobayashi, Y. (2000). 小・中・高校教員の教職に対する自己意識: 教師に対する有効な学校コンサルテーションのために [Self-recognition on the part of primary, lower and upper secondary school teachers in relation to their perception of teaching: For effective school consultation to teachers]. *Osaka Kyoiku University Bulletin IV: Education, Psychology, Special Education and Physical Culture*, 48(2), 215–232. <https://osaka-kyoiku.repo.nii.ac.jp/records/2094353>
- Yonezaki, M., Tara, S., & Tsukuda, Y. (2016). 小学校外国語活動の教科化・低学年化に対する小学校教員の不安: その構造と変遷 [Primary school teachers' anxiety about teaching English as a compulsory subject and teaching English to middle-grade students: Structuring and transition]. *JES Journal*, 16(1), 132–146. https://doi.org/10.20597/jesjournal.16.01_132