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# Research on the Assessment and Optimization Path of English Listening Teaching Effect in Higher Education Based on Logistic Regression Calculation Model

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**Abstract** Listening ability is the core part of English language application in practice, so the evaluation of its teaching effect and the optimization of teaching design are the focus of improving the quality of English teaching in colleges and universities. In this paper, the sophomore English majors in college I are selected as the research object, and the English listening teaching evaluation system is established through the form of questionnaire survey. Then a logistic regression analysis model is established, which is used as an analysis method of the effect of English listening teaching in colleges and universities. With the support of the logistic regression model, the evaluation model of English listening teaching effect in colleges and universities is proposed. Through the logistic regression analysis of multiple influencing factors of teaching effect, the column-line diagram model is constructed for the evaluation of teaching quality. In the correlation analysis between different influencing factors and teaching effect, the correlation coefficient between teaching effect and teaching content is the highest among the four influencing factors at 0.936, which is more significant. The study points out that English listening teaching in colleges and universities should pay attention to the design and arrangement of classroom teaching content, and promote the improvement of English listening teaching effect by setting reasonable teaching content.

**Index Terms** logistic regression, English listening teaching evaluation, column-line diagram model, correlation analysis

## I. Introduction

Among the five skills of English listening, reading, writing and translating, listening is the most central and basic skill. Listening is not only an important way to acquire language knowledge, but also a main channel to learn the language [1]. In addition, listening plays a vital role in various forms of people's communicative activities [2]. It can be seen that listening teaching is in a very important position in college English teaching. However, in the classroom teaching environment, the traditional listening activities are carried out in the mode of teacher introducing relevant knowledge, playing listening, carrying out exercises and explaining, with the teacher in a dominant position and the students learning passively [3], [4]. The teacher and the students' tendency to take the test in the listening classroom makes the listening classroom boring, and the few interactions are mainly in the question and answer session [5]. And the question and answer can only be confined to the conversation with individual students to solve the problems of small groups, other students are usually in a silent state, and can seldom communicate directly with the teacher about the problems in listening [6]. Such a teaching mode cannot effectively promote the development of students' listening ability, and the problems encountered by many students in listening activities are not found for a long time, much less solved, and they will gradually lose confidence in improving their listening level [7], [8]. Obviously, this is not in line with the position that listening teaching is in. Based on this, the teaching assessment method is introduced into university English listening teaching, which infiltrates the assessment into each teaching link and is supplemented by necessary interventions, integrating prediction, diagnosis and correction, so that teaching, training and assessment can be carried out at the same time, so as to build a high-quality English teaching strategy for higher education [9]-[11].

Teaching assessment is an important part of university English listening teaching, which helps to understand the characteristics and potentials of students' cognitive history, learning transfer and cognitive ability changes, and provides teachers with reference to carry out instructional design. Liu, Z. et al. showed that the motivation of adult English listening and learning under the multiple evaluation model changed, and their drive for independent learning changed from external coercion to intrinsic interest-driven, which had a significant impact on adult English education [12]. Kao, Y. T. and Kuo, H. C. carried out a dynamic assessment of English listening instruction using

computer technology and software, which helped to gain a comprehensive understanding of English learners' listening ability by accurately identifying and diagnosing their listening problems and needs, so as to design a targeted teaching method [13]. Wardhono, A. and Spanos, S. designed a mobile application-based English speaking and listening assessment tool with multimedia online delivery features that both increase learner communication and interaction and enable diagnosis of students' listening and speaking needs, which is conducive to strengthening learners' interest in conversational English [14]. Morales, H. S. and Fernández, L. C. examined the benefits and significance of introducing authentic assessment in the teaching of English listening and specified that the development of assessment instruments will provide English learners with more reliable, valid, fair and credible feedback [15]. Derakhshan, A., and Shakki, F. Applying dynamic assessment methods to classroom instruction for developing learners' English listening skills significantly improved learners' listening comprehension by utilizing a more systematic and comprehensive strategy and methodology to replace the traditional classroom assessment tools that were only concerned with the product of learning [16]. Kvasova, O. G. et al. established a methodology for teaching and assessing independent listening, combining teaching and assessment in order to guide students' reflection and thus improve their ability to listen independently, after fully understanding the learner's interest tendencies, type of material and other characteristics related to listening learning [17]. Slamet, J. and Mukminatien, N. addressed problems such as subjectivity in traditional listening assessment methods by designing an innovative listening skills assessment tool through a Learning Management System (LMS), which has both oral proficiency assessment and listening resource pushing functions, and can provide positive feedback on learners' listening learning [18]. Xue, S. et al. constructed a multidimensional evaluation model for English listening and speaking courses from four aspects: peer evaluation, self-evaluation, performance evaluation and teacher evaluation, which can effectively predict students' academic performance and at the same time propose teaching interventions for students in need [19]. Based on this, with the support of the English listening teaching assessment system, teachers can guide students to make listening learning plans, evaluate the listening learning process, adjust the listening learning progress and plan, and guarantee effective listening teaching.

This paper takes the sophomore English majors in college I as the research object, and initially establishes the evaluation system of English listening teaching in colleges and universities. By testing the reliability and validity of the scale, it shows the rationality of the structure and content of the system. Secondly, the basic concepts and operational procedures of logistic regression are elaborated, and based on the logistic regression analysis method, a model for evaluating the effectiveness of English listening teaching in colleges and universities is established and the model variables are determined. Then, through the correlation analysis, we explore the influence of different factors on the effectiveness of English listening teaching. Finally, organize the sample data and launch the logistic regression analysis of learning effect. Construct the column-line graph model of teaching effect and evaluate the teaching quality of English teachers in I colleges and universities.

## II. The Construction of the Evaluation System of English Listening Teaching in Colleges and Universities

### *II. A. Subjects of study*

In this paper, in January 2023, the sophomore English majors in college I were selected to conduct a questionnaire survey on their English listening learning. In this questionnaire survey, 523 questionnaires were distributed and 489 valid questionnaires were returned, with a recovery rate of 93.5%. The research tools of this paper include learning situation questionnaire and SPSS statistical software.

### *II. B. The Establishment and Testing of the Evaluation System of English Listening Teaching*

The evaluation scale of English listening teaching in colleges and universities was constructed, which included 4 subscales with a total of 30 questions, which were scored on a Likert scale, which was divided into "1 point" (strongly disagree), "2 points" (disagree), "3 points" (agreed) and "4 points" (strongly agreed), and the higher the score, the higher the evaluation of English listening teaching.

The English teaching background subscale examines the contents of program setting, philosophy, and teaching conditions of English listening teaching in colleges and universities. The English Teaching Input subscale aims to examine the contents of hard and software facilities, teaching equipment, use of teaching materials and regulations of English listening teaching. The English teaching process subscale examines the process of teacher instruction, the cultivation of students' English listening skills, and the application of modern educational technology. The English Teaching Effectiveness Subscale aims to assess students' English listening ability, the level of comprehensive application of listening, communication and cooperation skills, and their satisfaction with the effectiveness of listening teaching.

#### II. B. 1) Scale Reliability

The reliability of the research questionnaire was tested with a Cronbach's alpha coefficient of 0.968 for the total scale, and with Cronbach's alpha coefficients of 0.894, 0.929, 0.943, and 0.940 for the four subscales, namely, teaching background, teaching commitment, teaching process, and teaching effectiveness, in that order.

#### II. B. 2) Scale Validity

First, exploratory factor analysis. Exploratory factor analysis was conducted on the questionnaire data, and the results showed that the KMO value was 0.964. The $\chi 2$ value was 11260.138, P<0.001, which was suitable for factor analysis. Principal component analysis was used to extract the common factors of each entry, and there were four factors with initial eigenvalue >1, named English teaching effectiveness, English teaching process, English teaching input and English teaching background, with a cumulative variance contribution rate of 75.30%.

Second, validation factor analysis. In terms of structural model fit index, convergent validity and discriminant validity, this study used AMOS 28.0 to construct the structural equation model of the scale. Table 1 shows the fit indices for evaluating the overall fit of the model, and the structural model was well adapted and the fit validity passed the test.

Table 1: Overall fitting coefficient (structural validity)

| | | |
|---|---|---|
| $x^2$/df (Chi-square degree of freedom ratio) | 3.962 | <5 |
| RMSEA (approximate error root mean square) | 0.076 | <0.08 |
| GFI (Fit optimization index) | 0.0876 | >0.85 |
| CFI (Compare fit index) | 0.95 | >0.85 |
| IFI (Incremental fit index) | 0.95 | >0.85 |
| RMR (residual mean square and square root) | 0.013 | <0.05 |

The results of the convergent validity test showed that the combined reliability (CR) of the four subscales were all >0.8 and the average variance extracted (AVE) were all >0.5, and these scales had good convergent and validity. In the test of discriminant validity, the dimensions were significantly correlated (P<0.001), and the correlation coefficients were all less than the square root of the corresponding AVE, and the scale discriminations were in a desirable state.

## III. Construction of a model for evaluating teaching effectiveness and determination of variables

### *III. A. Logistic regression*

#### III. A. 1) Basic concepts

Logistic regression is a generalized linear regression analysis model, and multiple linear regression has a lot in common with its compared to multiple linear regression added Logistic distribution, for the application of binary classification problem is more common, indicating the possibility of an event.

There are random variables $Y$ and random variables $X$, where $Y \in \{0,1\}$, $X \in R^n$, $P(Y \mid X)$ denotes the probability of $Y$ occurring given $X$, and for a given instance dataset $D = \left\{\left(y_i, x_i^k\right)\right\}$, $i$ denotes the $i$ th sample, $k$ denotes the $k$ th random variable $X$, and assuming that there exists a positive effector $y_i^+ = f(x_i)$ with $y_i = 1$ and a negative effector $y_i^- = g(x_i)$, such that $z_i = y_i^+ - y_i^-$, we have Equation (1):

$$y_i = \begin{cases} 1 & z_i > 0 \\ 0 & z_i \le 0 \end{cases} \tag{1}$$

Based on the linear model can be envisioned as in equation (2):

$$\begin{aligned} y_i^+ &= X_i\varphi + \delta_i \\ y_i^- &= X_i\gamma + \tau_i \end{aligned} \tag{2}$$

where $X_i$ denotes the $i$th sample independent variable vector, $\varphi$, $\gamma$ denote the parameter vectors of the model, and $\delta_i$, $\tau_i$ denote the error terms and are independent of each other obeying the normal distribution, with Equation (3):

$$\begin{aligned} \beta &= \varphi - \gamma \\ \varepsilon_i &= \delta_i + \tau_i \end{aligned} \tag{3}$$

Then Eq. (4) can be obtained according to Eqs. (1) and (2):

$$\begin{aligned} z_i &= X_i\beta + \varepsilon_i \\ P(y_i = 1) &= 1 - F_\varepsilon(-X_i\beta) \end{aligned} \tag{4}$$

where $F_\varepsilon$ is the cumulative distribution function of the error term $\varepsilon$ of the random variable, $\varepsilon$ obeys the normal distribution with expectation of $\mu$ and variance of $\sigma^2$, then its standard normal cumulative distribution function, since there is no analytic expression for the cumulative distribution function of the normal distribution, according to the logistic distribution is highly similar to the normal distribution, the logistic distribution function is used to approximate it.

**III. A. 2) Model form**

If $X$ is a continuous random variable and obeys a Logistic distribution, the graph of its distribution is an S-shaped curve, and the expression of its logistic distribution function is equation (5):

$$F(x) = \frac{1}{1 + e^{-(x-\mu)/\gamma}} \tag{5}$$

where $\mu$ is the position parameter and $\gamma > 0$ is the shape parameter, Eqs. (6)-(8) are obtained by substituting Eq. (4) according to Eq. (3):

$$P(y_i = 1) = 1 - F_\varepsilon(-X_i\beta) = 1 - \frac{1}{1 + e^{X_i\beta}} \tag{6}$$

$$P(y_i = 1) = \frac{1}{1 + e^{-X_i\beta}} \tag{7}$$

$$P(y_i = 0) = \frac{1}{1 + e^{X_i\beta}} \tag{8}$$

**III. A. 3) Parameter estimation**

Unlike linear regression, logistic regression dependent variable is non-continuous, so its parameter estimation no longer uses the least squares method, but the great likelihood estimation, by maximizing the product of the estimated probability of each sample point to estimate the $\beta$ parameter vector, for the $y_i \in \{0,1\}$ binary classification its likelihood function is expressed as Eqs. (9)-(11):

$$f_i = X_i\beta \tag{9}$$

$$\hat{y}_i = g_i(f_i) = \frac{1}{1 + e^{-f_i}} \tag{10}$$

$$L = \prod_{i=1}^{n} g_i(f_i)^{y_i}(1 - g_i(f_i))^{1-y_i} \tag{11}$$

For ease of operation, the natural log-likelihood is simplified and changed from extremely large to extremely small to obtain equation (12):

$$LL = -\ln(L) = \sum_{i=1}^{n} -y_i \ln(g_i(f_i)) - (1 - y_i)\ln(1 - g_i(f_i)) \tag{12}$$

In finding the best estimate $\hat{\beta}$ of the parameter vector $\beta$, $L$ is equivalent to $LL$, and Eq. (13) can be obtained from the chain rule for partial derivatives:

$$\frac{\partial LL}{\partial \beta}=\sum_{i=1}^{n}\frac{\partial LL}{\partial g_i}\cdot\frac{\partial g_i}{\partial f_i}\cdot\frac{\partial f_i}{\partial \beta} \tag{13}$$

where each partial derivative function is Eq. (14), respectively:

$$\begin{aligned}\frac{\partial LL}{\partial g_i}&=-\frac{y_i}{g_i(f_i)}+\frac{1-y_i}{1-g_i(f_i)}=-\frac{y_i}{\hat{y}_i}+\frac{1-y_i}{1-\hat{y}_i}\frac{\partial g_i}{\partial f_i}\\&=g_i(f_i)\cdot(1-g_i(f_i))=\hat{y}_i\cdot(1-\hat{y}_i)\frac{\partial f_i}{\partial \beta}=\frac{\partial X_i\beta}{\partial \beta_p}=X_i\end{aligned} \tag{14}$$

Equation (13) is substituted into equation (14) to obtain the partial derivative vector of the parameter vector $\beta$ as in equation (15):

$$\frac{\partial LL}{\partial \beta}=\sum_{i=1}^{n}(\hat{y}_i-y_i)X_i \tag{15}$$

The estimate $\hat{\beta}$ of the parameter vector $\beta$ can be found by combining it with the gradient descent method.

**III. A. 4) Regression coefficient tests**

Based on the measurement theory of great likelihood estimation, the distribution of the great likelihood estimators approximates a normal distribution with no or little bias when in the case of large samples. By implication, the variance and covariance of the set of great likelihood estimates can be obtained from the second order partial derivatives of the log-likelihood function of the model parameters estimated at the great likelihood estimate, and then the test statistic can be constructed with reference to the form of the t-statistic, a test known as the wald test. Let $G$ denote the $p*p$ matrix of second-order partial derivatives of the log-likelihood function and $p$ denote the number of dimensions, i.e., equation (16):

$$G_{ij}=\frac{\partial^2 \mathrm{L}(\beta)}{\partial\beta_i\partial\beta_j}(i,j=0,1,\cdots,p) \tag{16}$$

$G$ is called the Hessian matrix. If the elements of the Hessian matrix are estimated at the great likelihood estimator $\beta=\hat{\beta}$, then the large sample covariance of the regression coefficients is approximated by equation (17):

$$Var(\hat{\beta})=-G(\hat{\beta})^{-1}=(X^TVX)^{-1} \tag{17}$$

The square root of the diagonal elements of this covariance matrix is the large sample standard error of the regression coefficient. In Equation (17), the matrix $X^T$ denotes the transpose of the matrix $X$, the matrix $(X^TVX)^{-1}$ denotes the inverse matrix of the matrix $X^TVX$, and the matrix $V$ is the diagonal matrix of $n*n$, with $n$ being the number of samples. The main diagonal is the variance estimate for each observation, i.e., the $i$ th diagonal element of $V$ is equation (18):

$$V_{ii}=\hat{y}_i(1-\hat{y}_i) \tag{18}$$

So the null hypothesis is set as equation (19):

$$H_0:\beta_j=0,\quad H_1:\beta_j\neq 0 \tag{19}$$

Its test statistic is equation (20):

$$Z_0=\frac{\hat{\beta}_j}{se(\beta_j)} \tag{20}$$

This statistic is tested with reference to the standard normal distribution, and also with reference to squaring $Z_0$ and comparing it to a chi-square distribution with 1 degree of freedom.

### *III. B. Modeling and Identification of Variables*

#### III. B. 1) Topic design

Based on the English teaching model in colleges and universities, combined with the professional course of listening, the questionnaire items are designed on the basis of existing teaching and evaluation. The questionnaire consists of two major parts: basic information about the students and the teaching effect of the course, including gender, age, teaching effect and so on, totaling 30 items. The measurement items in the questionnaire are set on a 5-point scale, and the levels are arranged from low to high, so that students can choose the most suitable options according to the actual situation in the learning process.

#### III. B. 2) Modeling

The teaching effect is positioned as an explanatory variable, and the grades are categorized as very poor, poor, moderate, good and excellent, and the influencing factors of each type of teaching effect (course selection, teaching content, course planning, study guide) are taken as explanatory variables. In order to better reflect the hierarchical relationship of the variables, this paper adopts Logistic regression model to analyze the way and degree of influence of each explanatory variable on the teaching effect of the listening course in the English teaching mode, and its established fixed-order Logistic regression model is shown in equation (21):

$$\log\left(\frac{p\left(y=j(x)\right)}{1-p\left(y=j\middle|x\right)}\right)=\alpha-\sum_{i=1}^{k}\varepsilon_i x_i \tag{21}$$

In this model, the teaching effectiveness of the listening course is set as the explanatory variable $y$. In its teaching model, each influencing factor of teaching effectiveness is the explanatory variable $x_i\left(i=1,2,3\cdots k\right)$, and $j$ stands for the rating $(j=1,2,3,4,5)$ that influences the teaching effectiveness. The probability formula for when the teaching effectiveness rating is $j$ is obtained by conversion as in equation (22):

$$p\left(y\le j\right)=\frac{e^{\alpha-\sum_{i=1}^{k}\varepsilon_i x_i}}{1+e^{\alpha-\sum_{i=1}^{k}\varepsilon_i x_i}}=\frac{1}{1+e^{-\left(\alpha-\sum_{i=1}^{k}\varepsilon_i x_i\right)}} \tag{22}$$

By constructing the Logistic regression model, the correlation coefficients of 19 independent variables can be obtained. These coefficients reveal the direction and level of significance of each of the 18 influences on the teaching effectiveness of the listening course. If $\varepsilon_i=0$, then $x_i$ has no effect on the teaching effect $y$. If $\varepsilon_i>0$, with other explanatory variables unchanged, the teaching effect gradually increases as $x_i$ increases, and the influence factor $x_i$ will positively affect the teaching effect. If $\varepsilon_i<0$, with other explanatory variables held constant, teaching effectiveness gradually decreases as $x_i$ increases, and the influence factor $x_i$ will negatively affect teaching effectiveness.

## IV. Testing and evaluation of teaching effectiveness evaluation models

In this chapter, by organizing the data from the questionnaire of students in I university, we successively carry out the correlation analysis between the four influencing factors in the evaluation system and the teaching effect, as well as the logistic regression analysis of the students' listening learning effect. Based on the results of the logistic regression analysis of the students' listening learning effect, the column-line diagram model of the teaching effect is constructed to verify the validity of the teaching effect evaluation model.

### *IV. A. Correlation analysis*

The correlation analysis function can study the degree of linear correlation between variables and present it with appropriate statistical indicators, including simple correlation analysis, partial correlation analysis, distance analysis and so on. The data were imported into SPSS software, and the results of correlation analysis between different influencing factors and teaching effectiveness were obtained as shown in Table 2.

The final results are as follows: the correlation coefficient between the evaluation index of teaching effect and the subject is 0.419, relatively speaking, the significance is low. The correlation coefficient between teaching effect and teaching content is 0.936, the significance is more obvious, which indicates that the relationship between teaching content and teaching effect evaluation indexes is extremely close, so the design of listening teaching should always pay attention to the content of the teaching, starting from the learning objectives, the learning objectives are in line with the standards of the English listening course in colleges and universities, and the content of the

teaching is accurate, and the descriptions should be exact the language should be explained thoroughly, easy to understand, and humorous. It is also necessary to consider the whole issue of content organization and content design. The correlation coefficient between teaching effectiveness evaluation indicators and curriculum planning is 0.836, and the result is significant. The correlation coefficient of teaching effectiveness evaluation indicators with study guides is 0.788 with significant results. Therefore, it can be presumed that teaching effectiveness evaluation indexes are closely linked to course topic selection, teaching content, course planning and study guide with significance, and their teaching effectiveness evaluation indexes are most significant with teaching content and least significant with topic.

Table 2: The correlation coefficient between different factors and teaching effect

| | Teaching effect evaluation index |
|---|---|
| Course selection | 0.419** |
| Content of courses | 0.936*** |
| Curriculum planning | 0.836*** |
| Learning guidance | 0.788*** |

Note:* means P<0.05,** means P<0.01,*** means P<0.001, the same below

### *IV. B. Logistic regression analysis of learning effects*

Table 3 shows the results of logistic regression analysis of classroom thinking question scores of sophomore English majors in college I. The pre-preparation grade and classroom practice are independent influences on classroom reflection question grades, i.e., the probability that the pre-preparation grade improves from good to excellent and the probability that the classroom reflection question grade is excellent is 50.28 times higher than the original one. The probability that the classroom practice improved from good to excellent and the probability that the classroom reflection question grade was excellent was 14.53 times higher than the original one.

Table 3: Logistics regression analysis of classroom thinking test results

| Factors | | Preview grade | Classroom practice achievement | Post-class inquiry performance |
|---|---|---|---|---|
| β | | 3.93 | 2.69 | -1.44 |
| Wald | | 9.26 | 5.44 | 1.02 |
| P | | 0 | 0.02 | 0.32 |
| Exp(B) | | 50.28 | 14.53 | 0.25 |
| Exp(B)'s 95% confidence interval | upper limit | 4.04 | 1.54 | 0.03 |
| | lower limit | 628.23 | 137.77 | 3.89 |

Table 4 shows the results of the logistic regression analysis of the course design grades of English majors' teachers in I colleges. Table 4 shows that after-school inquiry is an independent influence on course design grades, i.e., the probability of course design grades being excellent is 456.88 times higher than the original one when after-school inquiry is improved from good to excellent.

Table 4: Logistics regression analysis of course design results

| Factors | | Preview grade | Classroom practice achievement | Post-class inquiry performance |
|---|---|---|---|---|
| β | | 0.83 | 0.24 | 6.13 |
| Wald | | 0.12 | 0.02 | 20.62 |
| P | | 0.75 | 0.94 | 0 |
| Exp(B) | | 2.29 | 1.26 | 456.88 |
| Exp(B)'s 95% confidence interval | upper limit | 0.02 | 0.02 | 32.48 |
| | lower limit | 267.45 | 152.48 | 6428.29 |

### *IV. C. Columnar graphical modeling of teaching effectiveness*

#### IV. C. 1) Model construction and parameterization

A column-line diagram model was developed based on the factors influencing teaching effectiveness, and the parameters used are shown in Table 5.

Table 5: Nomogram model analysis parameters

| Variable | Name | β | S.E. | Waldx2 | P |
|---|---|---|---|---|---|
| Constant | | -0.275 | 0.884 | 0.098 | 0.757 |
| Classroom teaching quality rating | X1 | -0.015 | 0.007 | 4.587 | 0.033 |
| Award of teaching competition | X2 | 1.05 | 0.385 | 7.452 | 0.007 |
| Teaching project or teaching article | X3 | 0.993 | 0.388 | 6.572 | 0.011 |
| Complete teacher training | X4 | 1.676 | 0.687 | 5.960 | 0.016 |
| The number of teaching problems reported | X5 | 0.602 | 0.335 | 3.231 | 0.073 |

**IV. C. 2) ROC curves and calibration curves of the model**

The internal validation of the effectiveness of English listening teaching in college I was conducted, and the ROC curves of the column-line diagram model were plotted in Fig. 1. The consistency index (AUC) of the column-line diagram model in predicting the failure of its teaching effectiveness was 0.733 (95% CI:0.666~0.808), suggesting that the column-line diagram model has good efficacy.

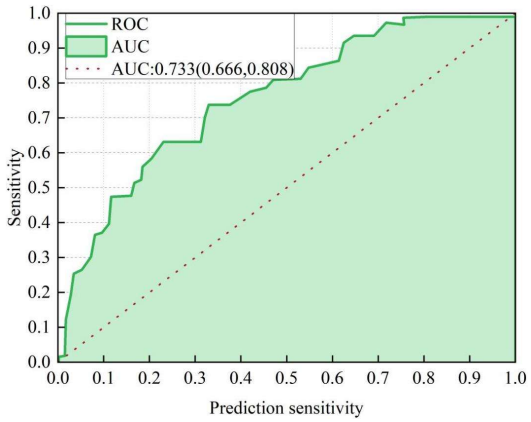


Figure 1: ROC curve of the nomogram model

The calibration deficiencies of the plotted column-line diagram model are shown in Fig. 2. The calibration curves show that the observed and predicted values of the column-line diagram model are in good agreement, suggesting that the model has good accuracy.

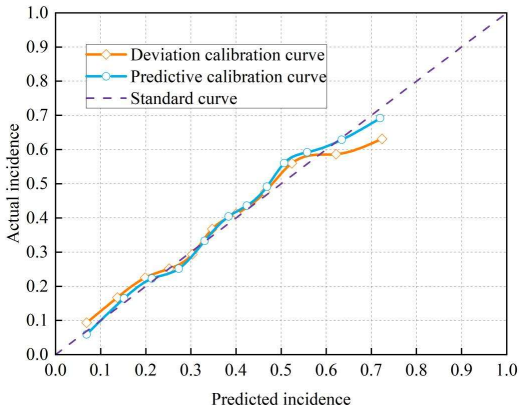


Figure 2: Calibration curve of the nomogram model

## V. Conclusion

Based on the logistic regression model, this paper designs a set of reasonable evaluation model for English listening teaching effect in colleges and universities. It not only expands the application scenario of logistic regression model in teaching evaluation in colleges and universities, but also provides effective technical support for the evaluation and optimization of English listening teaching in colleges and universities.

In the correlation analysis between different influencing factors and teaching effect in the college English listening teaching effect evaluation model, the correlation coefficient between teaching effect and teaching content is the highest among the four influencing factors, which is 0.936, and the significance is more obvious. In the column-line diagram model based on teaching effect, the consistency index (AUC) for predicting the failure of teaching effect is 0.733 (95% CI: 0.666~0.808), and the observed and predicted values are in good agreement, which indicates that the evaluation model of teaching effect of listening to English in colleges and universities has a good degree of efficacy and accuracy. Combined with the results of the analysis, research suggestions are given to rationalize the arrangement and design of course teaching content so as to effectively improve the teaching effect.

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