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Feasibility study on sea related physical education curriculum in our university -- Taking Shandong Jiaotong University as an example

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Abstract. The implementation of the maritime power strategy is not only an important background to promote the training of navigation professionals, but also a prerequisite for the establishment of sea related physical education courses.The feasibility of curriculum development is affected by many factors. This paper studies and combs the factors affecting curriculum development between 2011 and 2021 by using neural network algorithm.According to the relationship between the development of sea related courses and influencing factors in Weihai Campus of Shandong Jiaotong University, a binomial logistic regression equation model is constructed to judge the feasibility of the development of sea related physical education courses.The binomial logistic regression equation model logitp = -3.209 + 1.497 teachers + 2.226 policy support -0.726 infrastructure + 0.704 curriculum construction level (1) + 1.609 curriculum construction level (2) + 2.309 curriculum construction level (3), the summary is that the level is 72.5%. Based on this, it is predicted that the feasibility of sea related physical education curriculum in Weihai Campus of Shandong Jiaotong University is logitp (sea related physical education curriculum) = 0.009, and the result is close to 0, The course can be carried out.

Keywords: The feasibility of；Physical education curriculum；Feasibility study.

1. Introduction

The implementation of the maritime power strategy promotes the improvement of the training quality of maritime professionals in China[1]. The construction and development of sea related physical education curriculum has become the basis for training maritime professionals.The feasibility of curriculum development is affected by many factors. Summarizing the relevant influencing factors and constructing the feasibility prediction model of curriculum development can effectively help colleges and universities predict the development of curriculum[2].The construction of logistic regression model can predict the dynamic trend of some things to a certain extent based on relevant influencing factors[3].This study investigates and codes the current situation and influencing factors of sea related courses in Weihai Campus of Shandong Jiaotong University, summarizes the data by using quantitative statistics, and forecasts the feasibility of sea related physical education courses in Weihai Campus of Shandong Jiaotong University by using logistic regression analysis method[4], so as to provide assistance for the training of navigation professionals, It provides an important guiding basis for colleges and universities to set up relevant courses.

2. Object and method

2.1 Object

This study takes the feasibility of sea related physical education courses in Weihai Campus of Shandong Jiaotong University as the research theme, and takes the feasibility of curriculum development (0: feasible, 1: infeasible) as the dependent variable to build a prediction model for the opening of sea related courses, so as to judge the feasibility of sea related physical education courses in the campus.

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2.2 Methord.

2.2.1Questionnaire

The research uses neural network to capture the relevant literature on curriculum development published on China HowNet from 2011 to 2021, and sort out and summarize the influencing factors. The top four influencing levels are policy support, teachers, infrastructure and curriculum construction.Based on these four factors, this study investigated the relevant experts and teachers who presided over the sea related sports courses in Weihai Campus of Shandong Jiaotong University, and obtained the research data on the feasibility of sea related sports courses in Weihai Campus of Shandong Jiaotong University by means of questionnaire survey The summary is used as the basis of the prediction model to predict the feasibility of sea related physical education curriculum.

2.2.2Logistic regression analysis

This paper studies and collects the actual situation of relevant sea related courses in Weihai Campus of Shandong Jiaotong University in recent three years, and makes data statistics, so as to build a logistic regression model.

The dependent variable of this study is the feasibility of carrying out sea related courses in Weihai Campus of Shandong Jiaotong University (0: feasible, 1: not feasible). The influencing factors include policy support (0: supported, 1: not supported), teacher level (0: feasible, 1: not feasible), sea related teaching facilities (0: supported, 1: not supported), Current situation of sea related physical education curriculum construction (1: high level; 2: medium level; 3: low level; 4: no construction).

In the study, the single factor analysis is conducted first, and the meaningful independent variables are selected for multi factor analysis to prevent the meaningful independent variables from being eliminated. The test level is set to $P < 0.1$. Since the variables are recognized as meaningful, multi factor analysis can be carried out.

The research first makes the correlation analysis between the feasibility of offering sea related courses and policy support, determines the internal relationship between them according to the results, and continues to screen factors one by one, including the strength of teachers, sea related teaching facilities and the current situation of sea related course construction. After determining the meaningful single factor, carry out multi factor analysis, and carry out model test and classification results according to the results of multi factor analysis.

Check the significance and effect of the model to ensure the significance level and effectiveness of the model, and finally establish a prediction structure model to predict the feasibility of sea related physical education courses in Weihai Campus of Shandong Jiaotong University:

$$LogitP=B+A_1X_1+A_2X_2+A_3X_3+A_4X_4$$

3. Organization of the Text

3.1 Data analysis of current situation and influencing factors of sea related courses in recent three years

In the past three years, Weihai campus has opened a total of 80 sea related courses, investigated the relevant substitute teachers, and investigated the school policies, the level of teachers, infrastructure conditions and the current situation of curriculum construction in the early stage of curriculum development. The survey statistics are shown in Table 1:

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Table 1:survey of influencing factors and current situation of course offering

	(0: feasible)		(1: infeasible)	
Faculty				
Policy support				
Facility conditions				
Curriculum construction level	1-High level	2-Medium level	3-low-level	4-No construction

3.2 construction of feasibility prediction model for course offering

The dependent variables of this study are the feasibility of curriculum (0: feasible, 1: not feasible), the influencing factors include policy support (0: supported, 1: not supported), the level of teachers (0: feasible, 1: not feasible), sea related teaching facilities (0: supported, 1: not supported), Current situation of sea related curriculum construction (1: high level; 2: medium level; 3: low level; 4: no construction).The significance of logistic regression coefficient lies in the average change of y when x changes any unit. The significance of logistic regression coefficient is the average of logistic for every unit X changes. This variable has no professional practical significance.

① Screening meaningful single factor: single factor analysis, select meaningful independent variables.(Note: in order to prevent meaningful independent variables from being excluded by single factor analysis, the test standard is set as $P < 0.1$, which is considered meaningful.)

Table 2 selection of teacher strength factors

		B	Standard error	Wald	freedom	Significance	Exp(B)	95% confidence interval for exp (b)	
								lower limit	upper limit
Step1a	Faculty	.986	.467	4.469	1	.037	2.678	1.076	6.672
	constant	-.224	.336	.445	1	.508	.801		
Step1a	Policy support	1.505	.489	9.524	1	.003	4.501	1.732	11.695
	constant	-.406	.325	1.577	1	.208	.668		
Step1a	Facility conditions	.783	.466	2.816	1	.094	2.184	.878	5.433
	constant	-.046	.304	.022	1	.878	.954		
Step 1a	Curriculum construction level			4.987	3	.174			
	high-level	1.254	.707	3.117	1	.076	3.502	.872	14.057
	Medium level	1.086	.635	2.958	1	.087	2.973	.857	10.267
	low-level	.247	.605	.162	1	.687	1.272	.392	4.143
	constant	-.242	.402	.359	1	.548	.787		

The results show that the p value of Wald test results of policy, teachers, facilities and curriculum construction are less than 0.1, and the level of policy, teachers, facilities and curriculum construction are meaningful factors.

In view of the above statistical results, this study can carry out multi factor analysis model.

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② Multivariate analysis

Using analysis regression binomial logistic regression analysis, check the probability and group members to ensure the prediction probability of each case and the feasible and infeasible results of the course. At the same time, check the "exp (b) feasible interval".

Table 3 Results of multivariate analysis

			frequency	Parameter coding		
				(1)	(2)	(3)
classification variable code	Curriculum construction level	Highl-evel	20	1.000	.000	.000
		Medium level	20	.000	1.000	.000
		low-level	15	.000	.000	1.000
		No level	25	.000	.000	.000
		Chi square		Freedom		Significance
omnibus test of model coefficients	Step	27.503		6		.000
	block	27.503		6		.000
	Model	27.503		6		.000
model summary	-2 Log likelihood	Cox Snell r square		Negorco r square		
	81.595a	.291		.391		
classification table a	Measured		forecast			
			feasibility		Correct percentage	
			feasible	feasible		
	feasibility	feasible	25	9	73.5	
		feasible	13	33	71.7	
	Overall percentage				72.5	

The coding results of classified variables show that the research takes the level of curriculum construction as the reference for comparison. According to the omnibus test of model coefficients, the results of model summary and the results of classification table, the omnibus test $p < 0.05$ shows that the model is meaningful.The model effect shows that the closer the - 2 log likelihood ratio test is to 0, the more significant the effect is. The closer Cox Snell r square and negorco r square are to 1, the more significant the effect is. The classification table results show that the longer the model is, the more accurate the prediction accuracy of the model is 72.5%.

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Table 4 statistics of variables in equation

		B	Standard error	Wald	freedom	Significance	Exp(B)	95% confidence interval for exp (b)	
								lower limit	upper limit
Step 1a	Faculty	1.497	.599	6.236	1	.013	4.466	1.380	14.456
	Policy support	2.226	.639	12.131	1	.000	9.259	2.646	32.396
	Facility conditions	-.726	.560	1.683	1	.195	.484	.161	1.449
	Curriculum construction level			8.469	3	.037			
	Curriculum construction level(1)	.704	.700	1.014	1	.314	2.023	.513	7.972
	Curriculum construction level(2)	1.609	.798	6.039	1	.014	7.105	1.487	33.939
	Curriculum construction level(3)	2.309	.951	5.898	1	.015	10.069	1.561	64.932
	constant	-3.209	.787	7.891	1	.005	.110		

The final structure of the model is logitp = -3.209 + 1.497 teachers + 2.226 policy support -0.726 infrastructure + 0.704 curriculum construction level (1) + 1.609 curriculum construction level (2) + 2.309 curriculum construction level (3).

The logistic regression equation has certain significance. According to exp (b) and its 95% confidence interval, the feasibility of teachers is 4.466 times that of teachers' infeasibility. The impact of policy support on exp (b) is the most significant.

3.3 Feasibility prediction and analysis of sea related physical education courses in Weihai Campus of Shandong Jiaotong University

This paper investigates the policy support, teacher level, curriculum construction level and infrastructure status of sea related physical education courses in Weihai Campus of Shandong Jiaotong University.The results are shown in Table 11:

Table 5. investigation on Influencing Factors of sea related physical education curriculum

	(0: feasible)		(1: infeasible)	
Faculty	√			
Policy support	√			
Facility conditions	√			
Curriculum construction level	1-High level	2-Medium level√	3-low-level	4-No construction

The statistical results are incorporated into the prediction model, and the results are:

LogitP=-3.209+1.497*0+2.226*0-0.726*0+0.704*0+1.609*2+*0=0.009，The prediction result is close to 0. Therefore, it is feasible to set up sea related physical education courses in Weihai Campus of Shandong Jiaotong University.

4. Conclusion

Curriculum construction and development are influenced by policy support, the level of teachers, basic design and curriculum construction.Using the influence of various influencing factors on curriculum construction to deduce the feasibility of relevant curriculum construction in the future is

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of great significance to the educational development and curriculum construction of colleges and universities.Based on the current situation of sea related curriculum construction and the influence of four-dimensional factors in Weihai Campus of Shandong Jiaotong University, a binomial logistic regression model is constructed. The result of the model is logitp = -3.209 + 1.497 teachers + 2.226 policy support -0.726 infrastructure + 0.704 curriculum construction level (1) + 1.609 curriculum construction level (2) + 2.309 curriculum construction level (3), and the overall interpretation level is 72.5%.According to the factor results of setting up sea related physical education curriculum, logitp (sea related physical education curriculum) = 0.009, and the result is close to 0.Therefore, it is feasible to carry out sea related physical education courses in Weihai Campus of Shandong Jiaotong University.

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