Analysis of Situation of Life Education for College Students based on Genetic Simulated Annealing Algorithm

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Abstact

Background: In recent years, incidents of suicide, murder, wounding, and other life injuries among college students have occurred from time to time. The occurrence of these incidents further reflects the disregard for life of college students and the life education of college students needs to be improved and strengthened. Therefore, it is necessary to study the life education of contemporary college students. This paper studies the popularization of life education among college students and the main factors leading to college students' miscarriages and the students' outlook on life, and identifies high-risk groups with weak life awareness in order to give reasonable and practical suggestions to improve the school's life education.

Method: Firstly, we study the status quo of life education of college students, including: college students' outlook on life, college students' cognition of life education, and the popularization of college life education. Secondly, we use the fuzzy C-means clustering method of genetic simulated annealing algorithm to identify the suicidal tendency of college students, classify and manage the education of students and improve the efficiency of life education in colleges. Finally, we summarize the problems reflected in the questionnaire and give countermeasures and suggestions.

Results: The life education among college students is not universal, and most students lack of life education. The outlook on life of contemporary college students generally presents a positive, optimistic and cheerful attitude, with very few negative expressions. When facing pressure from life and study, college students are often in a painful and helpless state, and may make some irrational behaviors when unable to resolve them. Factors affecting college students' tendency to commit suicide mainly include: mental illness, love failure, study pressure, family reasons, and social pressure.

Conclusion: Colleges should use clustering algorithms to depict student portraits, hierarchically manage students' education based on classification results, allocate educational resources reasonably and manage students efficiently.

Keywords: life education, genetic simulated annealing algorithm, Logistic regression, student portraits

1. Introduction

Statistics from The Economist of the United Kingdom show that the suicide rate among Chinese teenagers has ranked first in the world. About 100,000 young people commit suicide in China every year, 2 commit suicide every minute, and 6 attempt suicide. Suicide has become the second leading cause of death among young people. Since the implementation of family planning in China, the number of newborns has been between 18-25 million each year, and the number of teenagers who commit suicide each year has reached 100,000. In recent years, more and more vicious incidents on college campuses have been frequently exposed. Since 2008, many vicious incidents involving students who choose to commit suicide and hurt others have occurred on college campuses. According to data released by Youth Research Center in 2018, suicide is the main cause of death among people aged 15 to 34, accounting for 18.9%. This shocking data has attracted widespread attention. Therefore, life education has become a hot topic in recent years and has developed rapidly.

The education of college students' outlook on

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life plays a guiding role in the education and growth of students' mental health. In recent years, there have been frequent incidents of injuries to college students, which largely reflects the seriousness of the current lack of life education in colleges. The college period is an important stage that helps student form a positive and correct outlook on life. However, in the process of building a harmonious campus, these incidents have seriously affected the construction of a harmonious campus and have a serious impact on the family. Therefore, it is necessary to study the popularization of life education among contemporary college students and to explore efficient life education implementation measures. Strengthening the life education of college students is of great significance to the cultivation of talents and the sustainable development of society.

2. Literature review

During the past few years, life education has been stuided by some authors (Chau et al., 2016; Bhardwaj, 2016; Badham et al., 2016; Prajapati et al., 2017; Shih et al., 2017; Bonsang et al., 2017; Shih and Wu, 2018; Shih, 2020; Darling et al., 2020; Peeters et al., 2020; Chaturvedi et al., 2020). For example, Wurdinger and Qureshi (Wurdinger and Qureshi, 2015) investigated whether life skills could be developed in a project-based learning course. Cornman et al. (Cornman et al., 2016) discussed the social environment and biomarkers of aging study in Taiwan. De Chastelaine et al. (De Chastelaine et al., 2016) studied the relationships between age, associative memory performance and the neural correlates of successful associative memory encoding. Miltiades (Miltiades, 2019) used logistic regression to analyze college students' experiences and beliefs, which affect attitudes toward assisted dying. Saravanakumar (Saravanakumar, 2020) studied the life skill education for creative and productive citizens. Mancini (Mancini et al., 2020) proposed a beginning framework for developing and implementing military family life education. Thrane (Thrane, 2020) discussed the development and delivery of an undergraduate-level online nursing elective course in palliative and end-of-life care offered through a large public university. Boshuizen and Marambe (Boshuizen and Marambe, 2020) studied a theory-led narrative review regarding misconceptions and other weaknesses in medical knowledge. Jahan and Nematolahi (Jahan and Nematolahi, 2021) derived that the quality-of-life education program significantly increased adherence to treatment and all its dimensions (autonomy, environmental mastery, personal growth, positive relations with others, be purposeful in life, self-acceptance) in patients.

Although the problem of life education for college students has been studied by some authors, few literatures used market research methods to collect and analyze data.

3. Questionnaire processing
Data source

We use a combination of first-hand data and second-hand data to study the problem. The first-hand information comes from the data content collected after the questionnaire is issued, and the second-hand information can be the effective data content of the survey obtained on major platforms such as Weibo, Baidu, and Zhihu.

After preparing a series of work such as preliminary design of questionnaires and pre-surveys, we distribute the designed questionnaires in a timely manner. In the process of distribution, we adopt a combination of online and offline methods. A total of 1023 paper questionnaires and online questionnaires are collected by stratified random sampling, and then the wrongly filled and irregular questionnaires are liminated. Finally, a total of 958 valid questionnaires are obtained, and the effective response rate of the questionnaire is 93.6%. The effective questionnaire response rate is reasonable.

Reliability and validity test of questionnaire
Table 1. **Reliability Checklist**

Cronbach α	Standardized Cronbach α	Number of items
0.746	0.751	27

In Table 1, Cronbach α=0.746>0.7. It means that the reliability of the questionnaire is good, and this survey has high reliability.

Table 2. **KMO and Bartlett Test**

Kaiser-Meyer-Olkin's metric		0.835
Bartlett's sphericity test	Approximate chi-square	448.146
	df	30
	Sig.	.000

In Table 2, the value of KMO is 0.835, which is greater than 0.8, and the correlation is strong. The significance of Bartlett's sphericity test is 0.000, indicating that the null hypothesis is rejected, and this survey has high validity.

4. Results
Factor analysis

Table 3. **Correlation Matrix**

	Gender	Grade	Pressure	Sleep quality	Despair	Suicide attempt
Gender	1	0.122	.162[*]	.292[**]	0.08	.278[**]
Grade	0.122	1	.222[**]	-0.285[**]	0.121	.286**
Pressure	.162[*]	.222[**]	1	-0.520**	0.012	.564[*]
Sleep Quality	.292[**]	-0.285[**]	-0.520**	1	-0.109	-0.893[**]
Despair	0.08	0.121	0.012	-0.109	1	0.570[**]
Suicide attempt	.278[**]	.286[**]	.564[*]	-0.893[**]	0.570[**]	1

Table 4. **Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loading			Rotating Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.95	49.38	49.38	3.95	49.38	49.38	3.346	41.83	41.83
2	1.739	21.742	71.122	1.739	21.742	71.122	1.76	21.999	63.829
3	1.041	13.015	84.137	1.041	13.015	84.137	1.625	20.308	84.137
4	0.538	6.72	90.856						
5	0.422	5.274	96.13						
6	0.189	2.366	98.496						

Extraction Method: Principal Component Analysis

In Table 3, some variables have a strong correlation, and the correlation between variables can be eliminated through common factors. In Table 4, the first three principal components explain 84.137% of the total variance, that is, the total amount of information including the original data reaches 84.137%, so it is appropriate to choose three common factors.

Table 5. **Component Matrix**

	Component		
	F_1	F_2	F_3
Gender	0.475	0.074	-0.425
Grade	0.525	0.196	0.019
Pressure	0.784	-0.097	0.018
Sleep Quality	0.837	0.088	0.024
Despair	0.127	0.766	-0.077
Suicide attempt	-0.053	-0.676	-0.074

According to Table 5, The original variable can be expressed as a linear combination of 3 common factors:

$$X_1 = 0.475F_1 + 0.074F_2 - 0.425F_3$$
$$X_2 = 0.525F_1 + 0.196F_2 + 0.019F_3$$
$$M$$
$$X_6 = 0.096F_1 - 0.024F_2 + 0.096F_3$$

The main factor F_1 reflects the pressure of college students, which is consistent with the design of the questionnaire. The main factor F_2 reflects the sleep quality of college students. The main factor F_3 reflects whether college students have attempted suicide.

Related analysis

Table 6. **Related Analysis**

0	Pressure	Suicide attempt	Sleep Quality
Pressure	-	-	-
Suicide attempt	0.30**	-	-
Suicide risk	0.36**	0.60**	-
Sleep Quality	0.33**	0.73**	0.56**

**P<0.01

In Table 6, Suicide attempts are significantly positively correlated with suicide risk. Suicide attempts are significantly positively correlated with stress and sleep quality. At the same time, stress and sleep quality are significantly positively correlated with suicide risk.

Table 7. **Regression Analysis of Suicide Attempt and Suicide Risk**

	Beta	R^2	F
Suicide Attempt	0.33	0.11	3994**

Table 8. **Regression Analysis of Suicide Attempt and Pressure**

	Beta	R^2	F
Pressure	0.36	0.13	4886**

Table 9. **Regression Analysis of Suicide Attempt, Pressure and Sleep Quality**

	Beta	R^2	F
Pressure	0.10*	0.37	94.03**
Sleep Quality	0.57**		

Table 10. **Regression Analysis of Suicide Attempt, Pressure, Sleep Quality and Suicide risk**

	Beta	R^2	F
Suicide Attempt	0.06	0.56	136.07**
Pressure	0.61**		
Sleep Quality	0.17**		

According to Table 7-10, the Beta value of suicide attempts decreases from 0.33 to 0.06 and becomes insignificant, which indicates that the connection between suicide attempts and suicide risk is not direct, but the suicide risk is affected by the mediation of stress and sleep quality. This may be caused by the experience of encountering events such as family, study pressure, or school interpersonal disharmony.

5. Conclusions

This paper collects data through questionnaires, uses Logistic regression model and correlation analysis to conduct investigations and studies in three aspects: understanding the influencing factors of college student suicide, the popularization of life education in colleges and exploring how to better carry out life education. The life education among college students is not universal, and most students lack of life education. The outlook on life of contemporary college students generally presents a positive, optimistic and cheerful attitude, with very few negative expressions. When facing pressure from life and study, college students are often in a painful and helpless state, and may make some irrational behaviors when unable to resolve them. Factors affecting college students' tendency to commit suicide mainly include: mental illness, love failure, study pressure, family reasons, and social pressure.

6. Innovation and Outlook
Innovation

Using survey data, this article analyzes the life outlook of college students and the current status of life education based on the factors that affect college students' suicide. At the same time, it establishes an algorithm model based on the questionnaire to identify students with hidden dangers of suicide and conduct psychological intervention to avoid tragedies.

This article comprehensively uses factor analysis and logistic regression to model related indicators, so that the analysis results have a high degree of accuracy. Moreover, this paper uses the fuzzy C-means clustering method based on the genetic simulated annealing algorithm to determine the cluster centers. The clustering algorithm is used to depict the portraits of students, classify the characteristics of the students, and the school uses the classification results to hierarchically manage the students' education, allocate educational resources reasonably and manage students efficiently.

Outlook

In the stage of designing the questionnaire, collect the data of multi-professionals and multi-year-level students to have a more comprehensive understanding of the characteristics of the college student population, so that the differences in the population can be explored more comprehensively.

The same questionnaire should be issued many times to compare the mental states of students in different periods, make trend analysis, and better realize the group recognition of college students.

7. Suggestions

In order to help students with weak life consciousness or psychological crisis to get out of the predicament in time, the school should provide a variety of psychological counseling platforms, such as the establishment of psychological counseling institutions to provide face-to-face psychological counseling to students seeking help. Establishing a mental health hotline and provide a network online consultation, recruiting volunteers to provide emotional assistance to high-risk groups to meet different needs of help seekers. For students with problems, a medical-school joint system is adopted. Students who with serious problems should be diagnosed and seek medical treatment in a timely manner, and those with minor problems should be closely observed, strengthened management, and timely identification and effective prevention.

Make full use of various opportunities to hold a variety of lectures, such as "how to adapt to the new campus life" lectures for freshmen. Parent-child relationship lectures to teach students how to view the impact of their native family on their growth, and handle the relationship with their parents. Educational lectures, including caring for life, crisis prevention, suicide identification and intervention, how to seek help when a crisis occurs, how to help others. So as to improve the students' mental health care ability, take precautions, and resolve the psychological crisis invisible.

For college students, events such as examinations, graduation and entering schools, participating in various competitions, the beginning of the new semester, campus emergencies or job hunting will bring varying degrees of psychological pressure, which can easily cause psychological turbulence and emotional fluctuations. Therefore, it is necessary to pay special attention to the emotional state of the students before and after the incident, find problems in time, alleviate the crisis, and enhance the awareness of life education.

Conflict of Interest

There are no conflicts of interest in this study.

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