

Research of Early Warning Data of Mental Health of University Students Empowered by Digital Intelligence

Jie Zhao, Jiexia Zheng^{Corresponding author}

Wenzhou Medical University, Wenzhou Zhejiang, 325000

Abstract: University students mental health problems are increasingly severe. Although government departments and university educators have paid more and more attention to mental health work, there are still some problems. The main channel to collect mental health information is static. Life information with reference value is fragmented. The direct managers lack professionalism. The traditional way can no longer meet the needs. In the era of big data, it is necessary to reconstruct the university mental health database, build early warning models and platforms, and combine all resources to help students with the help of digital intelligence technologies, so as to actively intervene in the process, strengthen supervision from the mechanism, effectively evaluate the effect.

Keywords: Big data; Empowerment; University students; Mental health; Early warning model

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In recent years, the mental health problems of university students have become increasingly prominent. The negative events such as suspension, dropout and even suicide caused by various psychological problems are on the rise, which not only bring burden and grief to the family, but also bring great pressure to the teaching and management of the school. However, in the era of big data, many digital technologies have been penetrated into every aspect of life and greatly improved our work efficiency. How to adapt to the development and seize the opportunities, so as to let big data technology play a better role in the mental health work of university students is an important issue to be solved urgently.

1. The dilemma of collection and application of mental health warning data of university students

Government departments and university educators pay more and more attention to mental health work. However, there are still some shortcomings and inadequacies.

The main channel to obtain mental health information is static. At present, the main mean of obtaining students' mental health information is psychological survey. Many students tend to avoid unfavorable options and choose the “correct” option because of privacy concerns, or fear of being labeled as a “mental illness”. In addition, due to the large scale of this survey, most universities carry out only once at the entrance of new students. No matter in which case the psychological survey can only reflect the state of the recent period of time, but can not obtain more information and predict changes that may occur when a stimulating event happen.

Life information with reference value is fragmented. Academic performance, consumption, participation in group activities, social network dynamics and other relevant information have important reference value for assessing mental health states. However, these data are often in the hands of different people. Attendance and academic performance data are held by the academic administration. It will take a lot of time and energy to get a comprehensive grasp of students' situation and key abnormal information from these fragmented information.

The direct performers of mental health work lack professionalism. Counselors or class teachers are the direct executors of students' mental health work. However, these educators do not necessarily have backgrounds in education, psychology or other related

disciplines. Most of them lack scientific understanding of mental illness, lack awareness of psychological crisis, and sometimes are inaccurate positioning of psychological work. At the same time, they are often required to undertake a variety of administrative tasks. Lack of energy and poor response, they also have panic and pressure on psychological work.

2. Application status of digital technology in collection of early-warning data

As mentioned earlier, the traditional way of mental health data collection and application can no longer meet the needs of mental health work in universities. In recent years, more and more researchers begin to explore the application of digital technology in mental health early warning work. The Digital Mental Health Network (IDMHN) is a worldwide group of top clinicians, regulatory and ICT experts, genetic scientists and other related support organizations dedicated to enabling digital innovation in clinical practice and transforming current mental health services. Mental health educators usually carry out a variety of psychological work and obtain a large amount of data including mental health measurement, crisis assessment, psychological counseling records, students' participation in psychological activities and other data closely related to mental health status, which have high application value in the construction of mental health early warning system in universities. Data mining technology has been widely applied in teaching and campus services in universities. Based on the statistical characteristics of university students' campus learning and life behaviors and the correlation between the characteristics, data mining technology provides a new method for university workers to understand and explain students' behaviors as a whole.

Based on the above literature, it can be found that scholars from different countries have done a lot of researches. However, there are still a few problems. Firstly, access to database information is limited. There is no comprehensive database that integrates life, study, psychology and network. Secondly, the existing data are still not fully utilized. The data processing work has not made full use for accurate early warning and intervention. Thirdly, there are more researches on the theoretical assumption and fewer researches on the practical application.

3. Further exploration of early warning data of mental health of university students

The first step is to build a "Life - study - psychology - network" integrated mental health early warning database. Data collection. Daily life data include physical examination, economic poverty level, campus card consumption records and so on. Learning data include information such as academic performance, course selection and grade retention. Psychological data include personality characteristics, physical conditions, growth experience and so on. Network data include thoughts related to psychological crisis or farewell words published on networking platforms such as Wechat, TikTok and FaceBook. Data cluster analysis. Using the data mining technology such as CART decision tree algorithm, BP artificial neural network algorithm and pattern recognition network algorithm, the general characteristics of psychological problems and behavioral manifestations can be summarized. Data association rules mining analysis. Pearson correlation coefficient and FP-Growth association rule algorithm can be used to study the correlation between the mental state and behavioral performance.

The second step is constructing the intelligent warning model based on data mining technology. Determine the big data outlier dimensions. Based on the correlation between the abnormal values of life, study, psychology, network big data and psychological crisis, the dimensions of psychological crisis assessment of university students can be constructed. Realize the abnormal psychological and behavioral warning function. The experimental comparative analysis method should be used in this step to further study the relationship between the intensity of psychological crisis and other psychological states and behavioral characteristics of students. Using these correlation data, the dynamic trend of psychological crisis that may occur in psychological warning students is predicted. At the same time, the visualization technology can be used to quickly find the free point which means the mental health warning object, so as to provide intelligent warning tips for school administrators.

The next step is to build the intelligent early warning platform for university students' mental health. On the basis of the established model, the mental health intelligent early warning platform for universities and universities can be designed, and the efficient intelligent mining and analysis and fast intelligent warning prompts of psychological data can be realized. When there are big data outliers with psychological crisis risk, the platform can automatically send out warning information.

The follow-up measure is to form a closed loop of intervention. After the platform finds the warning objects and provides prompts, managers can provide help in life, study, psychological counseling, medical services and other aspects. After receiving help, the students' mental states can be improved, accompanied by data update and re-evaluation. The platform in turn pushes the latest warning data to the managers, who adjust measures according to the current situation. This cycle will last until the students recovered their mental health. A closed loop of "identification - attention and assistance - re-evaluation- return to health" can be formed.

4. The era of big data empowers mental health early warning work of university students

The theory of “empowerment” was first used in the field of human resource management. Based on this theory, Carmen et al. proposed three levels of empowerment: structural empowerment, resource empowerment and psychological empowerment.

Structural empowerment. Structural empowerment emphasizes the improvement of external conditions and the removal of obstacles from the levels of organization and concept. At the organizational level, multiple work departments such as student work, educational administration, teaching, logistics and so on jointly participate in the psychological education work as a community of education. At the concept level, the mental health work should be advanced from intervention and treatment to detection and prevention before psychological events occur, and the concept transformation from “Remedy after the fact” to “Prevention in advance” is realized.

Resource empowerment. The concept of resource empowerment centers around the sourcing, quality assessment, quantity evaluation, and appropriateness of resources. In terms of sources, the information barrier of departments is broken, The relevant work data of student work, educational administration, teaching, logistics and other departments are uniformly extracted. In terms of quality and quantity, the limitations of manual collection and fixed time collection are broken. Data from four dimensions of life, study, psychology and network are obtained in real time. In terms of appropriateness, relevant teachers with different backgrounds can obtain the warning information, so as to make appropriate responses.

Psychological empowerment. Psychological empowerment mainly manifests in improving the mental state of mental health workers themselves, reducing the pressure of collecting a large amount of information, alleviating the anxiety of being incompetent in professional background, increasing the confidence of multi-department collaboration, so as to improve the self-efficacy of student workers.

In the era of big data, we should make full use of existing technology to extract key and effective information in time from students’ numerous life events, identify them in advance, help them as soon as possible, and intervene in time, so as to insert “wisdom wings” for mental health early warning work of university students.

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