Research Article
Exploring the Design of Teaching Mental Health of College Students Based on Data-Driven Learning

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1. Introduction

The twenty-first century is an era of dreams and trials, challenges and opportunities, hopes and despair, successes and setbacks, and pleasures and pains, and human beings generally face severe challenges of the new era [1]. The rapid changes in science and technology, the accelerating process of economic globalization, and the growing competition in society have led to unprecedented impacts and challenges for people today [2]. The essence of this impact is that the network technology and its applications have formed a new network environment in the information age, creating a new state of existence, interaction space, and development conditions for human beings, so that people’s vision, imagination, and thinking are expanded and extended [3] [4]. It is also related to the overall quality of Chinese talents and affects the realization of the goal of building a moderately prosperous society and the great rejuvenation of the Chinese nation [5].

The psychological confusion is common in the growth of contemporary students, such as study and work pressure, emotional frustration, and unpromising employment prospect, demands more on their overall quality, especially their psychological quality [6]. Therefore, contemporary students must have strong psychological resilience and regulation ability [7]. The development of psychological wellness education in schools is mainly reflected in the introduction of psychological wellness education courses,
The establishment of psychological counseling and consultation centers, and the creation of specialized institutions for psychological wellness education [8]. The DDL method is based on constructivist learning theory, which is task-oriented and emphasizes the subjectivity of students [9]. The choice of content for many psychological education classes and activities is based on the perceptual understanding of psychology teachers or in accordance with other programs, while psychological wellness education cannot be carried out without the grasp and judgment of the psychological development of our students [10].

Pay attention to students’ psychological wellness and actively carrying out psychological wellness education has become a general consensus among decision makers at all levels and all sectors of society [11]. However, the advent of the era of big data has caused education to shift from empirical and logical to empirical [12]. In the shift to empirical education, data-driven decision modeling is the ideal way to achieve this shift [13]. The main idea of DDL is to guide students to independently observe a large corpus of data to generalize and summarize specific usage phenomena and patterns, thus changing the traditional teacher-centered teaching model [14]. In the data-driven psychology classroom, students change from participating in activities according to the course teaching objectives and psychological wellness teachers’ requirements to inquiry-based learning and interactive experiences that focus on problem solving and task completion, and students’ initiative and motivation to participate in learning are increased [15]. In this sense, DDL-based psychological wellness instructional design for students has important value and significance in driving psychological teaching.

The innovative points of this paper are as follows:

1. This paper investigates and researches the current psychological wellness education of students, finds out the problems of the current psychological wellness education in schools according to the survey results, and comprehensively sorts out the psychological wellness education of students. Based on the theory of positive psychology, this paper provides useful ideas for optimizing entrepreneurship education in universities from the background of national entrepreneurship and innovation in the era of “Internet+” and the development of Internet industry.

2. The integration of DDL theory (including socio-cultural theory and cognitive theory) and its insufficient empirical research make DDL theory very important for practice.

3. This paper uses DDL and learning analytics to explore the learning behaviors of learners, teachers, and other learning subjects, and to replace traditional achievement and experience decisions with data decisions, which is a requirement for the future development of education.

The research framework of this paper consists of five major parts, which are organized as follows:

The first part of this paper introduces the background and significance of the study, and then introduces the main work of this paper. The second part introduces the work related to teaching psychological wellness of students, DDL. The third part makes a review of the framework method of constructing psychological wellness education based on DDL, and the method of constructing mental health-driven decision model, so that the readers of this paper can have a more comprehensive understanding of the design ideas of mental health teaching for students based on DDL. The fourth part is the core of the dissertation, which completes the description of the application analysis of DDL in college mental health teaching from two aspects: data quality analysis and analysis of data-driven control algorithm. The last part of the thesis is a summary of the full work.

2. Related Work

2.1. College Students’ Mental Health Teaching. Along with the increasing expectation of psychological wellness education work in universities, the current mental health problems of students are becoming more and more prominent, and tragedies caused by psychological problems occur from time to time. Therefore, in today’s world, it is necessary to establish a comprehensive scientific view of health and pay great attention to mental health. In this paper, some problems in the current psychological wellness education of students in China are addressed, and research methods such as literature collection and data analysis are used to study the current psychological wellness education of students in China.

Boulton introduces the psychological wellness education model of American universities, which is a school counseling work system built on the basis of the theory of invitation education. The basic concept of invitational education is that schools should respect the value and potential of each individual in all aspects of the educational process, and fully mobilize all school personnel and material conditions [16]. Tute et al. creatively proposed a “six-in-one” psychological support network model for students in the social context of the information age, according to the laws and characteristics of students’ psychological development, with the purpose of “helping people to help themselves and growing up with mutual help,” with students as the main body, with the network as the carrier, and with environmental construction as the basis [17]. “Mens et al. proposed a comprehensive model of psychological counseling, the core idea of which is to highlight the status and role of counseling teachers in school education and to specify the role of counseling teachers [18]. Garner combined the optimistic explanatory style theory with the earlier “learned helplessness” theory to form a unique perspective of positive psychology [19]. Mcgee proposed a model of online psychological wellness education based on the special characteristics of the target audience of online psychological wellness education, and proposed an organic combination of “teacher-student-parent” and development of online psychological wellness education [20].
Thus, it can be seen that psychological wellness education for contemporary students is the urgent need for social development, the important condition for universities to cultivate high-quality talents, the need for family harmony, and the necessary condition for the mental health development of contemporary students.

2.2. Data-Driven Learning. China generally uses such simple methods as indoctrination, coercion, and punishment in the psychological wellness education of students. To a certain extent, these methods ignore the subjectivity of students and also lack the education work of details such as world view and life view. Therefore, it is necessary to correctly understand and determine the orientation of psychological wellness education for students, actively consider the ways and methods to carry out psychological wellness education under the new situation, and continuously promote the in-depth development of psychological wellness education for students. Education informatization has successfully transferred learning from the original campus to the Internet and mobile devices and turned learning into a long-term career that needs to be persisted in life.

Chao and Huang proposed that learner-centered learning, using learning analytics to analyze and predict the learning characteristics and learning progress of each learner and assigning task schedules to each learner to adapt to each student’s learning progress, so as to achieve the purpose of being able to provide personalized teaching services to different learners [21]. Shang et al. argued that DDL-based indexed learning provide numerous authentic evidences that enable students to observe how these words behave in their close context [22]. They bring a new experience to mental health learning. Chi et al. state that the DDL model is still more effective than traditional mental health pedagogy for learners who are not trained in the operation of DDL and at an elementary level [23]. Geluso and Yamaguchi “Corpus word indexing for modern DDL” provides authentic corpus resources and tools. Using the corpus, classroom word indexing can be conducted, and through learner participation, information about mental health can be retrieved in real time and a typical learner difficulty can be analyzed [24]. Chujo et al. stated that paper-based materials can remove the barriers encountered in using a corpus-based DDL model and allow the DDL model to gain more adherents. This is because primary level and those less qualified learners do not have sufficient a priori knowledge and a model to follow [25].

Therefore, the “discovery” approach of DDL helps to improve the learners’ overall knowledge of psychological wellness, while at the same time stimulating their interest in learning and developing their ability to learn independently.

3. Teaching Design Ideas of Students’ Mental Health Based on DDL

3.1. Method of Constructing Psychological Wellness Education Framework Based on DDL. Psychological wellness education for students is a systematic work, so it is necessary to fully mobilize all parts of the school in the process of work, open up various channels, use various methods, and build in an all-round and multilayer way [26]. Usually educational big data are collected from data directly generated in the process of teaching activities such as classroom teaching and test scores, student information, family information, staff information, school information, and other data collected in the process of educational management [27]. In the usual case, the available measurement information, will depend on the current moment. For example, if there is complete data from the moment 0 to \( r \), then the measured information can be written as follows:

\[
P_{\text{data}} = \left\{ (r, y, u) \in R \times U \times Y | P_r \left( \frac{u - u_{\text{data}}}{y - y_{\text{data}}} \right) = 0 \right\},
\]

where \( P_r \) is the time truncation operator, i.e.,

\[
P_r(x(t)) = \begin{cases} x(t), & 0 \leq t \leq r, \\ 0, & \text{other}. \end{cases}
\]

However, how to perform data mining and analysis to obtain valuable information resources is an important challenge for data-driven decision-making models. The instructional design of psychological wellness education courses is a systematic project, and the aspect of instructional evaluation for the courses is the most important one that cannot be neglected [28]. A schematic diagram of the instructional design process of a psychological wellness education course is shown in Figure 1.

Faced with the enormous pressure of the talent market, many students also feel a sense of inner crisis, but they cannot lift their spirits when they really have to study hard. In psychological wellness education activities, there are also mutual interactions of virtual subjects and objects, as well as differences of virtual subjects and objects [29]. The criterion functions generally used are the error sum-of-squares criterion function and the weighted mean squared distance sum criterion. If degenerate division is included it is called degenerate C fuzzy division space. Let

\[
V = \left( \sum_{j=1}^{m} \frac{r_{ij}^m x_{ij}}{\sum_{j=1}^{m} (u_{ij})^m} \right). 
\]

The premise of personalized development is to know oneself, understand one’s strengths, weaknesses, interests, knowledge composition, ability deficiencies, learning goals, etc., and then to achieve the improvement of knowledge level and ability through suitable educational environment, platform, and resources. The teaching service support platform stores learning behavior data of different dimensions, each of which shows different characteristics of learning status. The classroom DDL, on the other hand, introduces corpus resources into the regular classroom, allowing learners to engage in data-driven learning in a traditional classroom without computers. In order to prevent acute psychological crises of students that lead to malignant consequences and avoid irreparable damage to students, families, and schools, a DDL-based psychological wellness education framework is established, as shown in Figure 2.
By conducting regular mental health assessments of students, a dynamic mental health profile of students is formed. The teacher selects and classifies the retrieval results, and according to the teaching needs and learner characteristics, the corresponding learning materials are developed and output as paper texts. And when the value function is stored using Lookup tables, this iterative process ensures that the function converges to the optimal value 1.

$$y_{ij} = \frac{x_{ij}}{x_{j}^{\text{max}}}, \quad (i = 1, 2, \ldots, n; \quad j = 1, 2, \ldots, m). \quad (4)$$

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$$Q_{t+1}(s, a) = (1 - \alpha_t)Q_t(s, a) + \alpha_t[r_t + \gamma \max_{a'} Q_t(s_{t+1}, a')]. \quad (5)$$

Some students pursue the principle of “I do what I want” in the world, focus too much on the self, pay attention to the status of the self in interpersonal communication, consider their own needs too much, while ignoring the needs and existence of others, and lack of concern and understanding for others, which leads to pretentiousness and oversensitivity in interpersonal communication. Training of teachers, classroom teachers, and volunteers is conducted in conjunction with off-campus mental health academic institutions, resulting in efficient completion of postscale assessment interview tasks and reduced assessment error. The approach no longer requires learners to have direct access to computers, thus freeing them from the limitations of computer application skills. In order to improve the instructional design of school psychological wellness education programs, it is also necessary to combine the above theoretical analysis with instructional practice.

### 3.2. Construction Method of Mental Health-Driven Decision-Making Model

Instructional design of school psychological wellness education curriculum refers to the process of analysis and planning of many elements involved in educational activities by psychological wellness education teachers according to the characteristics of students' physical and mental development and social needs, based on the principles of group dynamics, combined with the nature and target requirements of the curriculum, and integrated operation system approach before conducting teaching activities [30]. This can make the psychological wellness education of students effective and can really solve all kinds of psychological problems faced by students today, make the psychological wellness education of students systematic and relevant, and give full play to the role of psychological wellness education of students. The functional system of mental health-driven decision-making model is shown in Figure 3.

First, before using the DDL model for teaching mental health, all factors that may influence the teaching and learning process must be collected in terms of basic information about the learners, motivation, learning needs, teacher beliefs, and learning strategies in order to ensure effectiveness. The study used a bottom-up rooting theory analysis of the data to complete the coding of the three levels. If the behavioral information system is not identified then it indicates a change in the environment, otherwise it indicates that there is no change in the environment. We define the environmental trigger function as follows:
\[ h(s) = \begin{cases} 0, & (a(x) = a(y)) \land (d(x) = d(y)), \\ 1, & (a(x) = a(y)) \land (d(x) \neq d(y)), \end{cases} \]

where \( a(x) \) represents action selection for behavioral \( x \) and \( d(x) \) represents behavior \( x \) is acceptable or unacceptable.

The environment model is constructed by building a probabilistic transfer function of states to track changes in the environment for new exploration, but it requires a lot of learning experience and cannot be learned online. Instead, the three levels are level 1 coding (open log-in), which reads the content of respondents' responses and performs a word-by-word log-in for initial coding. Thus, representative points with some individuality are used to replace the class mean representative class with commonality. The quantitative value of the contribution of each dimensional indicator to the classification is extracted. The data-driven control law is as follows:

\[ u(x) = k_p e(t) + k_i \int_0^t e(t) dt + k_d \frac{de(t)}{t}. \]

Or in the form of the following transfer function:

\[ G(s) = k_p + k_i s + k_d s, \]

where \( k_p \) is scale factor, \( k_i \) is integral factor, and \( k_d \) is differential coefficient.

Second, the complexity of motivation, learning preferences, and learning needs must be taken into account. Teaching and learning is driven by quantitative education, and analyzing learning data to personalize “teaching” and “learning” for teachers and students is a key component of instructional decision making. The data-driven output signal can therefore be expressed as follows:

\[ u = \left( k_p + \frac{k_i}{s} \right) (r - y) - sk_d y. \]
introduce high-frequency thousand disturbances. Therefore, the above equation can be written as follows:

$$u(s) = \left( k_p + \frac{k_i}{s}\right)(r - y) - \frac{sk_1y}{\varepsilon s + 1}. \quad (10)$$

This is used as an inspirational knowledge to define the weighted distance between sample points and representative points, which is used as a similarity measure between sample points and classes. It is not necessary to specify a specific control system, and is independent of the structure, system parameters, and order of the control system model, so it is applicable to nonlinear discrete-time systems with time-varying structure, time-varying order, time-varying parameters, and time-lagged, time-varying, and nonminimum phase. Its physical meaning is obvious, i.e., when the control input increases, the corresponding system output at the next moment should be undiminished. The secondary coding (axial log-in) takes all the presented primary coded data and analyzes them in depth, selecting those that appear more frequently for recategorization.

Finally, the three elements of the nature of mental health learning, informative feedback and respectful trust need to be integrated in the process of data analysis to ensure a two-way understanding between teachers and learners. The current state of students’ mental health and the factors influencing students’ psychological development are discussed with psychological teachers, supervisors, parents, professional institutional psychologists, and ethical workers on how to target penetration and improvement in the school psychological education process. The third level of coding (core coding) means that the core concepts are analyzed again in the previous coding, which serves as an “outline” and is elevated to a more theoretical coding. This condition can also be described as a “linear-like system characteristic” of nonlinear systems. Combined with the practice paths already carried out, the design and development of a school psychological services network information platform will further improve the efficiency and accuracy of data processing, and facilitate data collection and deep mining.

4. Application Analysis of DDL in Students’ Mental Health Teaching

4.1. Data Quality Analysis. The data used for the analysis in this chapter are data generated from a college and students in the process of distance learning. The results of the questionnaire survey showed that the students thought that there was a real need for a psychological wellness education course, and the specific findings of the demand for psychological wellness education are shown in Table 1.

The data obtained in each experiment are used to calculate the gradient of the indicator function for each controller parameter and finally, the controller parameters are updated until the optimal indicator is satisfied. The initial data often have many problems such as too many dimensions, unsuitable mining algorithms, and data distributed in multiple tables. Therefore, a quality analysis of the data is required. The comparison curve of systematic error with and without quality analysis is shown in Figure 4.

First, we check whether there is “dirty data” in the original data. Dirty data include missing values, abnormal values, inconsistent values, and duplicate data. The data obtained above were screened and filtered to obtain data relevant to the study, and then the screened data were preprocessed. A psychological census test was organized by the college counseling station to collect psychologically relevant data from new students, such as suicidal ideation, schizophrenic tendency and score, depressive tendency and score, neurotic tendency and score, UPI validity, and health level. This indirect approach to DDL retains the characteristics of DDL, i.e., discovery learning by learners based on corpus resources while greatly reducing the demands on learners. Based on the data from the psychological survey, the data are classified and graded by professional psychologists: primary core indicators, secondary core indicators, and tripolar core indicators. Next, the effect of the value of the momentum term gain $\alpha$ on the convergence speed of the system was taken as 0.5, 1.5, and 2 for $\alpha$, respectively, and other initial values were not changed. The system output curves and system error curves for different values of gain taking are shown in Figures 5 and 6.

Secondly, missing values, inconsistent values, and repeated values can be excluded by observation and simple statistical analysis. The outliers can be identified by the outlier identification criteria provided by the box chart. The graded data will be sent back to the second-level colleges, and then the second-level college counselors will reevaluate the data obtained from the psychological survey through interviews and fill in the new student psychological interview record form. In order to solve the balance between “exploration” and “utilization” in a dynamic environment, it is necessary to solve the problem of how the intelligence body perceives the changes in the environment, so as to explore the new environment. Under the guidance of professional faculty, mental health clubs can conduct regular mental health outreach efforts among students to increase their enthusiasm for mental health learning.

Finally, the data objects and attributes needed for the analysis and the creation/change of attributes are selected and entered into the student psychological dynamics tracking and evaluation form, and then through the “Early Warning” module in the system: receiving, querying, and checking the student psychological dynamics and tracking, alarming, and prompting for the corresponding level (the main alarm is the main targets are students with A or B grades), etc. The core idea is the same as the iterative feedback algorithm for linear systems, which is an extension and improvement of the iterative feedback algorithm for nonlinear systems and proposes a general controller for nonlinear systems. Physiological changes in students cause emotional changes, and these changes generally do not flow, and even if they cause emotional fluctuations, they can often be controlled without manifesting themselves due to the development of willpower during this period, which is the basis of the emotional and volitional aspects of occlusion. Therefore, in order to realize the innovation of psychological
wellness education concepts, principles, and methods, and to promote the theoretical construction and practical application of psychological wellness education, we must first understand the characteristics of the networked lifestyle and the changing nature of the relationship between the educational subject and object in the Internet era.

4.2. Analysis of Data-Driven Control Algorithm. The rapid development of computer technology makes high-speed, high-capacity, and low-cost computer applications more and more widespread, which also provides an important basis for new control theory and methods that can be realized. Because the data-driven control algorithm does not require any information of the mathematical model of the controlled object, and only uses the I/O data of the system to realize the design of the controller, so the algorithm has become one of the current hot spots of the control community research.

First of all, the position of $P$ representative points in space is determined by each dimensional component of the points, so the role of each dimensional indicator in the classification (i.e., the contribution to the classification) varies in size. The mean square of the error within any one factor class is smaller than the mean square of the difference between classes, and $P = 0.001 < 0.004$, indicating that each factor differs significantly between classes, and Figure 7 below shows the ANOVA of mental health factors.

The controller parameters that minimize this indicator function are searched for and eventually the controller parameter vector converges to a local minima. The reference signal is very close to the reference signal used in the first experiment to ensure that its output signal is close to the output signal of the first experiment. The application configuration functions as a connected system using configuration through an ASP.NET application to define configuration settings for a web server, website, or individual application. It can be seen that in the process of mental health teachers using the DDL model for mental health instruction, teachers must enrich their own learning, this is because teachers’ lack and limitations in learning may lead them to not be able to interpret the learners’ questions or instructional materials accurately to meet the learners’ actual needs.

4.2. Analysis of Data-Driven Control Algorithm. The rapid development of computer technology makes high-speed, high-capacity, and low-cost computer applications more and more widespread, which also provides an important basis for new control theory and methods that can be realized. Because the data-driven control algorithm does not require any information of the mathematical model of the controlled object,
environment, if the environment does not change, the simulated annealing selection strategy will be used for action selection. If the change of environment is tracked, the exploration learning of new environment will be achieved by controlling the temperature of the simulated annealing strategy. The performance comparison of different strategies is shown in Table 2.

The Q-learning algorithm and SA-Q algorithm do not have an environmental trigger mechanism for timely exploration, and therefore learn slowly and consume more average steps than the data-driven control algorithm. As can be seen in Table 2, the data-driven control algorithms have step counts of 24, 19, and 17, respectively, and therefore reach the optimal path.

Learners expect mental health teachers to use flexible and varied teaching methods in the classroom and expect the teachers themselves to be knowledgeable and helpful in their own mental health learning. Thus, authorized functions such as managing applications and other information can also be managed using components provided by Windows or database roles defined by the users themselves. In order to eliminate the incommensurability associated with different scales and scale units, the feature indicators should first be standardized before clustering. Each mental health factor has a different impact on the clustering results, and Figure 8 below shows the mean square comparison between classes for different health factors.

Finally, if the sample point is closer to a class representative point, the sample point is assigned to the class represented by that representative point. When this happens, a data validity interval should be selected, and the data used to determine the authenticity of the controller should be within this validity interval. It is practically impossible to know the relative concentration of the Kth region in the space where the sample points to be searched are naturally formed. If the performance index is chosen in the form of an integral, the integral interval should be varied, but for general systems it is possible to do without this effective interval. The algorithm uses the uncertainty of the behavioral information system to establish the environmental trigger mechanism, where the uncertainty refers to the uncertainty of the action behavior of the intelligent body triggered by the environmental changes, so that the behavioral attributes only consider the actions of the intelligent body.

5. Conclusions

School psychological wellness education is a hot issue in the current quality education, and the most urgent task is to strengthen the construction of school psychological wellness education curriculum, and the teaching design of the curriculum has an extremely important role in the construction of the curriculum. A healthy mind is the condition and foundation of a person's overall development, and it has a positive and far-reaching impact on the quality of China's future talents. Therefore, psychological wellness education should be a system that includes educational objectives, educational contents, operation mechanism, and its educational approaches and methods. The DDL method can effectively promote the learning of mental health information for low and middle level learners, thus confirming the feasibility of applying DDL to mental health classroom teaching and providing a basis for the application of DDL in regular classroom teaching. Based on the summary of the great changes brought by big data in education and the current status of domestic and international research, the article proposes a framework for teaching mental health of students based on DDL and the overall framework for personalized education through teaching content reengineering and teaching process reengineering. The DDL-based mental health teaching method for students combines quantitative research and qualitative research to verify that the embodied teaching model of high school psychological
wellness education can improve the mental health quality of high school students, making full use of the Internet and corpus resources, changing the traditional one-way indoctrination teaching model of conclusion, and creating an authentic mental health environment for learners.

Data Availability
The data used to support the findings of this study are included within the article.

Conflicts of Interest
The authors declare that they have no conflicts of interest.

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