A study on the construction of digital portraits of human resource management students

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ABSTRACT

With the deepening of digital transformation, the field of human resource management (HR)is experiencing unprecedented changes. In the face of this trend, how to cultivate HR talents who can adapt to the needs of the future workplace has become an urgent problem. The purpose of this paper is to explore the construction of digital portraits of HR management students, through the integration of a multi-dimensional theoretical foundation, designing innovative data dimensions and collection methods, using advanced analysis technology, deepening the application scenarios, and proposing innovative breakthrough directions. This study not only provides methodological support for HR talent cultivation but also provides practical reference for education digital transformation.

1. Introduction

In the era of digitalization, data has become a key element driving the development of all industries. The education field is no exception, especially in the face of human resource management, a discipline that is highly dependent on data and information for decision-making, how to effectively use data to optimize the process of talent cultivation has become a common issue for educators and researchers.[1] As one of the important applications of big data technology in the field of education, digital portraits can comprehensively and accurately depict individual characteristics through multi-dimensional data analysis, providing powerful support for personalized teaching and talent training.

2 Background and significance of the study

2.1 Change in HR talent demand in the context of digital transformation

The impact and reshaping of artificial intelligence and big data on traditional HR positions: with the rapid development of artificial intelligence and big data technology, traditional HR positions are experiencing profound changes [2].Automated recruitment processes, intelligent talent matching systems, employee behavior analysis,and other emerging applications continue to emerge, greatly improving the efficiency and accuracy of HR work. However, this also puts forward new requirements for HR talents, that is, not only do they need to master solid professional knowledge, but also need to have data analysis, technology application, and other cross-field capabilities.

Changes in the core competency requirements of HR talents in the future workplace: The future workplace will pay more attention to the innovation, collaboration, and strategic thinking ability of HR talents [3]. In the context of digital transformation, HR needs to be able to use data to drive decision-making, optimize talent management processes, and improve organizational effectiveness. At the same time, in the face of an increasingly complex workplace environment, HR also needs to have good communication and coordination skills to promote collaboration and consensus among teams.

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The popularization of digital HR tools (e.g. People Analytics) has an impact on education: the popularization of digital HR tools makes it necessary for higher education to follow the pace of the times and update the teaching content and methodology, and the application of tools such as People Analytics not only requires HR students to master data analysis skills, but also the ability to tran sform data into practical decision-making[4]. The application of tools such as People Analytics not only requires HR students to master the skills of data analysis but also the ability to transform data into practical decisions. Therefore, colleges and u niversities need to strengthen the integration of data science, information technology, and other courses to meet the needs of the fu ture workplace.

2.2 Innovations in student assessment in the era of Education 4.0

Analysis of the limitations of the traditional academic evaluation system: The traditional academic evaluation system mainly reli es on quantitative indicators such as test scores and coursework, ignoring the individual differences and overall development of students[5]. This evaluation system is often difficult to fully reflect the real ability and potential of students limiting the implementation of personalized teaching.

The application value of digital portrait in education assessment: Digital portrait can integrate multi-dimensional data, including academic performance, behavioral trajectory psychological traits, etc., to provide students with comprehensive and three-dimensio nal assessment, this not only helps teachers understand students' learning status and needs more accurately, but also provides power ful support for personalized teaching.

The urgent need for personalized talent cultivation: Under the diversified and personalized education demand, the traditional one -size-fits-all teaching mode is difficult to meet the needs of students [6]. The application of digital images can help students find their strengths and weaknesses, and make personalized learning plans and development paths, thus realizing the precision and efficiency of talent cultivation.

2.3 Multidimensional representation of the value of research

For Institutions, they can carry out precise talent training program design, through the construction of student digital portraits, i nstitutions can more accurately grasp the needs and characteristics of students, and design targeted training programs for different s tudent groups [7]. This helps to improve the quality and efficiency of talent training and promote the sustainable developme nt of institutions.

For students, they can plan their personalized career development paths [8]. Digital port traits can help students understand their interests, strengths, and potentials, and provide a scientific basis for career planning, based on the results of t he portrait, students can formulate personalized career development paths to improve their employment competitiveness and career satisfaction.

For enterprises, it can help them to carry out efficient talent screening and cultivation reference, and enterprises can utilize digit al imaging technology to quickly screen talents that meet their needs and improve recruitment efficiency and quality. At the same ti me, the results of the image can also provide enterprises with a reference basis for talent training, helping enterprises build an effici ent talent management system.

3 Directions for building the theoretical framework

3.1 Multidimensional representation of the value of research

3.1.1 Competency model

The competency model refers to a combination of a series of different competency elements required of an incumbent to comple te a certain task and achieve a specific performance goal, including knowledge, skills, abilities, attitudes, values, etc. [9]. It depicts a unique combination of behaviors, knowledge, and skills needed to effectively complete a specific j ob.

The constituent elements include:

Knowledge: It refers to the understanding and mastery of a specific field, such as professional knowledge, industry knowledge, e tc.

Skills: They refer to the ability to use knowledge to complete specific tasks, such as programming skills, financial analysis skills, communication skills, etc.

Abilities: They usually refer to the individual's internal attributes that affect the exertion of skills, such as judgment, logical thin king ability, leadership ability, etc.

Attitudes: They refer to the individual's psychological tendencies towards work and related matters, including work enthusiasm, sense of responsibility, team spirit, etc.

Values: They represent the individual's basic beliefs and judgment criteria for things and influence the individual's decision-maki ng and behavior patterns at work.

A competency model is a comprehensive system that describes the knowledge, skills, abilities, and attributes that an individual n eed to have in a specific position or role. When constructing the digital portrait of students, we can draw on the iceberg model, HR competency model, and other theories to clarify the key competencies and qualities required for HR talents.

3.1.2 Learning to analyze theories

The theory of learning analytics is a theoretical framework that uses data analysis and mining techniques to understand and opti mize the learning process. Learning analytics involves measuring, collecting, analyzing, and reporting data related to learners and t heir learning environments to understand and optimize learning and the learning environment.

It aims to reveal the laws, patterns, and problems in the learning process through the analysis of a large amount of learning-relat ed data, thereby providing decision-making support for educators, learners, and educational institutions to promote the improveme nt of learning effectiveness.

Its main contents are as follows:

Learner analysis: Focus on the individual characteristics of learners, such as learning styles, knowledge levels, learning motivati on, learning attitudes, etc. By analyzing these factors, we can understand the strengths and weaknesses of learners, to provide them with personalized learning support and guidance.

Learning process analysis: Analyze the behavioral data of learners during the learning process, such as learning time, learning p aths, participation levels, interaction behaviors, etc. [10]. Through the analysis of this data, we can reveal the learning pat terns and habits of learners, identify the difficulties and problems in the learning process, and provide a basis for optimizing teachi ng strategies and the learning environment.

Learning environment analysis: Examine the environmental factors in which learning takes place, including learning platforms, t eaching resources, learning communities, etc. Analyzing the impact of the learning environment on learners helps to optimize the d esign of the learning environment and the allocation of resources and improve the adaptability and supportiveness of the learning e nvironment.

Learning outcome analysis: Mainly focus on the learning achievements of learners, such as examination scores, completion of as signments, project outcomes, etc. Through the analysis of learning outcomes, we can evaluate the learning effectiveness of learners, understand the achievement of teaching objectives, and provide feedback for the improvement of teaching quality.

Common methods and techniques include:

Data mining: Discover potential patterns, relationships, and trends from a large amount of learning data. For example, through association rule mining, we can find the associated patterns of learners' use of learning resources, and through clustering analysis, we can group learners with similar learning behaviors.

Machine learning: Use machine learning algorithms to build predictive models to predict learners' learning performance, learni ng needs, etc. For example, classification algorithms can be used to predict whether learners can pass an exam, and regression algo ri thms can be used to predict the relationship between learners' learning scores and learning time.

Visualization techniques: Present the results of learning analytics in an intuitive visual way, such as learning progress charts, kn owledge graphs, and learners' behavior trajectory charts[11]. Visualizatio techniques help educators and learners to more intuitively understand learning data and discover problems and trends.

The main application areas of this theory include:

In the field of education: It helps teachers better understand students' learning situations, achieve personalized teaching, and im prove teaching quality; it helps students understand their learning processes and deficiencies, adjust their learning strategies, and e nhance their learning effectiveness.

In online learning platforms: Optimize the curriculum design and recommendation system and recommend appropriate learning resources and learning paths according to the characteristics and behaviors of learners; at the same time, improve the functions an d user experience of the platform by analyzing user data.

In educational research: Provide empirical data support for educational research, help researchers deeply understand the essenc e and laws of the learning process, and promote the development of educational theories. The theory of learning analytics provides a data-driven approach for the field of education to understand and optimize learning and has important theoretical and practical values. With the continuous development of information technology and the increasing richness of educational data, the application prospects of the theory of learning analytics will be even broader.

Learning analytics theory focuses on mining and analyzing educational data to reveal students' learning behaviors, patterns, and effects. By applying the learning analytics theory, we can collect and analyze students' academic data and behavioral trajectories to provide rich data sources for portrait construction.

3.1.3 Career Development Theory

Career development theories, such as Super Career Development Theory, can help students understand the stages, tasks, and strategies of career development, when constructing digital portraits, relevant elements of career development theories can be incorporated to provide students with personalized career planning advice.

The relevant elements of the career development theory usually include the following aspects: Individual factors are as follows:

Ability: It covers general abilities such as intelligence, observation ability, memory ability, etc., as well as special abilities such a s music ability, painting ability, sports ability, etc., and also includes vocational abilities such as programming ability, financial anal ysis ability, marketing ability, etc. Ability is the foundation for an individual to engage in career activities and directly affects the ch oice and development of a career.

Interest: It is a positive preference tendency for specific career fields or activities. Interest can stimulate an individual's work ent husiasm and motivation, prompting them to invest more energy in the career they are interested in and making it easier to obtain career satisfaction.

Personality: It refers to an individual's stable psychological characteristics and behavior patterns, such as being extroverted or introverted, cheerful or calm, decisive or hesitant, etc. Different personality types are suitable for different career environments and work contents. For example, an extroverted personality may be more suitable for jobs that involve dealing with people, such as sales and public relations, while an introverted personality may have more advantages in fields such as scientific research and writing.

Values: They are the individual's evaluation criteria for the importance and significance of things. In career development, values affect the expectations and choices regarding career rewards, work environment, social status, etc. For instance, some people attach great importance to the balance between work and life, while others value career achievements and wealth accumulation more.

Career factors are as follows:

Career requirements: Different careers have specific requirements for the knowledge, skills, abilities, experience, etc. of practitio ners. For example, doctors need to have solid medical knowledge and excellent clinical skills, and teachers need to master education al and teaching methods and relevant subject knowledge. Understanding career requirements is an important basis for individuals to make career choices and develop their careers.

Career rewards: They include material rewards such as salary, bonuses, benefits, etc., as well as spiritual rewards such as career achievement, social recognition, job satisfaction, etc. Career rewards are one of the important driving forces for an individual's care er development and also an important indicator for measuring the success of career development.

Career development path: It refers to the promotion channels and development trajectories from entry-level to senior positions within a specific career field. A clear career development path helps individuals clarify their career goals and development directio ns and formulate reasonable career plans. For example, in an enterprise, the general development path of management positions m ay be from grassroots employees to supervisors, managers, directors, etc.

Environmental factors are as follows:

Social environment: It includes the social and economic development situation, employment policies, cultural traditions, etc. [12]. When the social and economic development is good, there are more employment opportunities and emerging i ndustries keep emerging; employment policies will affect the supply and demand relationship in the job market and the direction of career development; cultural traditions will also have an impact on the social status and recognition of certain occupations.

Organizational environment: It refers to factors such as the culture, atmosphere, management system, and teamwork of the wor k organization where an individual is located[13]. A good organizational environment can provide individuals with more development opportunities and support, promoting career development; on the contrary, a poor organizational environment may li mit an individual's development.

Family environment: The family's economic situation, parents' occupations and educational backgrounds, and the family's expec tations for a career will all have an impact on an individual's career development. For example, a better family's economic conditio n may provide individuals with more educational and training opportunities, and parents' professional experience and personal con nections may also be helpful for an individual's career choice and development.

3.1.4 Talent Assessment Theory

The theory of talent assessment refers to a theoretical system that uses scientific methods and technologies to measure and eval uate talents in terms of knowledge, skills, abilities, personality traits, career inclinations, etc.

Its main theoretical foundations are as follows:

Psychological measurement theory: It holds that human psychological traits can be measured [14]. Through the design of reasonable measurement tools and methods, the psychological traits of individuals can be quantitatively evaluated. For example, intelligence tests are used to measure people's intelligence levels, and personality tests are used to measure people's personality characteristics.

Differential psychology theory: It emphasizes that there are differences in psychology and behavior among individuals, and thes e differences will affect individuals' performance at work and career development. For example, people with different personality t ypes may play different roles in team cooperation. Extroverted people may be better at communication and coordination, while int roverted people may be more proficient in focusing on specific tasks.

Person-job fit theory: Its core is to match individuals' abilities, personalities, interests, etc. with the requirements of the job, to a chieve the rational allocation of human resources and the goal of making the best use of talents. For example, people with strong lo gical thinking abilities and numerical sensitivity may be more suitable for jobs such as finance and data analysis.

Its main contents include:

Ability assessment: It includes general ability assessment (such as intelligence, memory, observation ability, etc.) and special abi lity assessment (such as musical ability, painting ability, mechanical ability, etc.). Through various testing methods, the levels of in dividuals with different abilities are evaluated to determine whether they can engage in specific occupations or positions.

Personality assessment: It mainly measures individuals' personality traits such as personality, temperament, and values. Common assessment tools include the MBTI and the Big Five personality model, etc. Understanding individuals' personality traits helps to pr edict their behavior styles at work, team cooperation methods, and adaptability to different working environments.

Career interest assessment: It aims to understand individuals' interest inclinations in different career fields [15]. Commonly used assessment tools include the Holland Occupational Interest Inventory. Assessment, can help individuals disco ver their career directions, improve the satisfaction of career choices, and enhance work enthusiasm.

Comprehensive quality assessment: It comprehensively considers various factors such as individuals' knowledge, skills, abilities, personalities, and career interests, and conducts a comprehensive evaluation of their overall qualities, providing a comprehensive r eference basis for talent selection, cultivation, promotion, etc.

The main characteristics of this theory are as follows:

Scientific nature: Based on scientific theories and methods, after a large number of empirical studies and verifications, it has hig h reliability and validity. For example, standardized psychological tests have been revised and improved many times, and can accu rately measure individuals' psychological traits.

Objectivity: It tries to reduce the influence of subjective factors. Through standardized assessment processes, objective scoring s tandards, and scientific statistical analysis methods, the objectivity and fairness of assessment results are ensured.

Comprehensiveness: It evaluates talents from multiple dimensions, comprehensively considers various factors of individuals, an d can comprehensively and accurately understand the characteristics and advantages of talents.

Predictability: Through the assessment of individuals' current abilities, personalities, and other aspects, it predicts their perform ance and development potential in future work, providing a forward-looking basis for human resources management decisions.

At present, its main application fields are as follows:

Recruitment and selection: It help enterprises screen candidates who meet the job requirements, improve the accuracy and effic iency of recruitment, and reduce recruitment costs. For example, through ability tests and personality assessments, talents who not only have professional abilities but also match the corporate culture are screened out.

Training and development: According to the assessment results, understand employees' strengths and weaknesses, formulate per sonalized training plans for employees, help employees improve their abilities, and promote their career development.

Career planning: It helps individuals understand their abilities, interests, and personality characteristics, to formulate reasonabl e career plans and choose suitable career paths.

Team building: Understand the personality and ability characteristics of team members, reasonably allocate team members, and improve the collaboration efficiency and overall performance of the team. For example, assign different roles according to the pers onality characteristics of team members, so that team members can complement each other's advantages.

Talent assessment theory mainly focuses on the application of psycho-metrics in talent selection and evaluation. Through the us e of psychometric tools and methods, we can collect and analyze the data on students ' psychological traits and occupational tende ncies, which provides an important reference basis for the construction of profiles.

4 Preliminary design of a digital portrait of the student

4.1 A framework for the construction of digital portraits

The construction of a digital portrait of HRM students is based on the closed-loop process of data collection-indicator modeling-algorithmic analysis-visualization presentation-educational application", combining educational data mining (ED) and HRM profess

ional competency model to form a quantifiable and assess comprehensive quality portrait of students [16]. Combi ned with educational data mining (EDM) and human resource management professional competency model, a quantifiable and assessable comprehensive quality portrait of students is formed. The basis and standards for the construction of students' portraits are: i n the dimension of professional theoretical knowledge, the basis for the construction is the SHRM knowledge system, and the industry standard is the National Occupational Standard for Enterprise Human Resource Managers; in the dimension of practical ability, the theoretical basis is the Koch's Four-Level Evaluation Model (Reaction-Behavior-0utcome), and the industry standard is the skill requirements of the JD of enterprise HR positions; in the dimension of professionalism, the theory is the China Human Resource Services Model (HRSM), which is the most comprehensive model of human resource services. In the dimension of professionalism, the theory is based on China's Code of Ethics for the Human Resource Service Industry, and the industry standard is the CHRA certification assessment index.

4.2 Data sources and collection methods

The data source of this study starts from three aspects of data type, specific content and collection method, the first data source is academic data, which mainly includes course performance (such as theoretical exams, case studies, E-HR system operation) [17]. This part of the data can be collected in the faculty system, online learning platforms (Superstar, MOOC); th e second data source is behavioral data, which includes classroom The second data source is behavioral data, the specific content in cludes classroom attendance, group discussion participation, online learning hours, quiz distribution of wrong questions, the collect ion mode includes classroom sign-in system, learning behavior log; the third data source is practice data, the main content includes simulated labor dispute mediation performance, employee satisfaction survey report, enterprise practical training scores, the collect ion mode is the practical training platform, teacher evaluation, feedback from the enterprise tutor; the fourth data source is professi onalism data, The fourth source of data is professional literacy data, the main contents of which include: professional qualification certificate (human resource manager), intern ship experience, performance in clubs/competitions, which can be collected through s tudent records, Linked In-style professional resume database; the fifth source of data is psychological and attitudinal data, the speci fic contents of which include occupational tendency test (e.8., MBTI), course satisfaction surveys, self-assessment of conflict manag ement ability, and the methods of collection include: questionnaires, psychological assessment tools, questionnaire surveys, and self -assessment of conflict management ability. Questionnaires, and psychological assessment tools.

4.3 Design of the indicator system

Based on the core competencies of human resource management (SHRM model) and the objectives of the course "Employee Rela tionship Management", we have constructed a student portrait system with "5 dimensions + 15 indicators"， As shown in Figure 1:

Figure 1 Student portraits.

4.3.1 Professional theoretical knowledge indicators include:

Mastery of labor contract law (correct rate of test), score of labor dispute handling case analysis, proficiency in E-HR system oper ation (data of training platform); evaluation is based on SHRM certification standards, course syllabus talent training program of the college, and talent training objectives of the specialty.

4.3.2 Practical application skills Indicators in this area include:

The success rate of simulated mediation (role-playing score), the quality of the design of the employee satisfaction survey progra m (teacher/enterprise mentor score), and the completion of the tasks of the enterprise internship (KPl achievement rate). Evaluation are based on the HR job competency model of the enterprise and the job competency model of the program. As shown in Table 1:

Table 1. Competencies and Paths to Achievement for Human Resource Students.

Module	Pedagogical content	job competencies	Civic elements	realization paths
Module 1 Introduction	Meaning human resources and human Resource management; Origin and development Human resource management	Knowledge: Review the meaning of human resources management; list the six functional modules of human resources management Skills: Awareness of tool application, communication, and compliance Characteristics: Professional ethics and professional sense of responsibility	The National Strategy for the Strengthening of the Nation's Talent Dialectical thinking	Showing a clip of ” The Greatest Craftsman", which explains the relationship between skilled personnel and the modernization of the country simulate conversation. The personnel department of a state-owned enterprise in the 1980s and the HRBP an internet company in the 2020s, feel the change in management concepts.
Module 2 Human Resources Planning	The meaning content, procedures, and role of human resources planning; methods Forecasting human resources And demand supply	Knowledge: Understanding of the meaning and content of human resources planning; proficiency in the application of the human resources planning process Skills: Ability to plan and analyze Characteristics: Takes strategic and systemic view issues	strategic thinking Planning thinking	Playing “ Romance of the Three Kingdoms ” feeling Zhu Ge Liang's human resource. Talking about the 13th Five-Year Plan of the country. Experiencing the development and growth of our country
Module 3 Job Analysis	The meaning, Role and process of job analysis; analysis techniques and results	Knowledge: Oral presentation of the main processes of job analysis; description of the scenarios in which job analysis tools can be applied Skills : Ability to identify and solve problems Attributes: Possesses logical rigor and insight	social Responsibility Rights and benefits	Analyzing the duties, the position in the national strategy by taking the practical work of the current. Emerging business rural (e.g. e-commerce) an example ability to design job descriptions that complement the labor. Protection provisions of the job (e.g., high-temperature allowances, Mandatory rest systems)
Module 4 Recruitment of personnel	The staffing process; staff recruitment, selection, and hiring; the interview process	Knowledge: Master the recruitment process, recruitment principles, recruitment methods and channels, and other professional knowledge. familiar with relevant laws and regulations Skills: Good Communication coordination skills, ability to analyze data Characteristics: personable, responsible, and innovative	To establish a correct outlook on career choice, employment and employment; to develop fair and just professionalism; to develop a positive sense of competition and correct professional ethical standards; to be a team player and good communicator	Scenario Simulation: Simulate campus recruitment and "Survival on a Remote Island" in a leaderless group discussion. Group Debate: Which quality is more important, "virtue" or "talent"? Online Material Release: "The Comprehensive Mirror for Aid in Government" on the incisive discussion of virtue and talent; Zhu Ge Liang's " Understanding Human Nature". Social Research: Current recruitment situation. Video Discussion: The scene of selecting pilots in the TV series "Touching the Clouds". Practical Training Tasks: Write a personal resume; Design a recruitment advertisement

Module	Pedagogical content	job competencies	Civic elements	realization paths
Module 5 Training and Development	Principles of training and development; Types and methods of training; Training management process	Knowledge: Familiar with the employee training process. Skills: Possess excellent organizational and coordination skills as well as communication skills; proficient in using training management software or tools.Traits: Have a sense of responsibility and innovative thinking.	Cultivate students' persistent lifelong learning ability; Guide students to establish healthy competition; Foster self-awareness of recognizing one's weaknesses and striving for self-improvement.	Video Sharing: Through the growth and transformation journey of Wu Wan Li in The Battle at Lake Chang Jin clip, understand the significance of "training" for success.Training Video: Guide students to explore future skills. Case Analysis: HR Professional Quality. Practical Training Task: Design a questionnaire to investigate the training needs of a club in our college.
Module 6 Performance Management	The meanings and characteristics of performance and performance management Performance management tools The cycle of the performance management system	Knowledge: Be familiar with concepts related to performance management. Skills: Retell the cycle of the performance management system; Skillfully use performance management tools.Traits: Possess the qualities of amiability and integrity, and base one's work on standards and facts.	People-oriented Cultivate students' awareness of teamwork.	Data Sharing: The story of Hai di lao. Only by trusting employees can a win-win situation between employees and the organization be achieved. When explaining the Balanced Scorecard, guide students to discover that the successful implementation of the Balanced Scorecard requires mobilizing collective strength and strengthening cross-departmental teamwork.
Module 7 Compensation Management	The meaning of compensation and compensation management; Compensation management decisions; Design of the compensation structure; Performance-based pay and benefits	Knowledge: Be aware of the theory of compensation systems and the basic methods of compensation structure design.Skills: Have the operational ability of compensation data analysis tools.Traits: Reject compensation discrimination, respect the differences in labor contributions, and strictly adhere to the bottom line of compensation confidentiality and laws.	Common prosperity - narrow the income gap and reject pay discriminationEmployee careSense of social responsibility	Task-oriented: Calculate the Gini coefficient of the compensation of a certain enterprise and propose measures to narrow the income gap. Debate: Be able to debate the conflict between the "996 overtime culture" and healthy compensation and propose a legal overtime compensation plan. Case analysis: Elements such as equal pay for equal work for disabled employees and subsidies for returning to their hometown for employment are cited in the design of the compensation structure.
Module 8 Employee Relations Management	The meaning and characteristics of employee relations; The content of labor contract management	Knowledge: Be aware of concepts related to employee relations; Be familiar with the content related to labor contract management. Skills: Be familiar with the procedures and legal provisions for the conclusion, modification, termination, and expiration of labor contracts. Traits: View problems with a speculative mindset, know the law, understand the law, abide by the law, use the law, and safeguard the law.	Respect objective laws Abide by the law and be aware of the law.	Thought-provoking Question: Why was the employee relationship previously called the labor-capital relationship? Guide students to reflect that the transformation from the labor-capital relationship to the employee relationship is an inevitable result of history and the development of productive forces. Case Analysis: When labor disputes arise between workers and employers, learn to protect oneself with legal weapons.

4.3.3 Communication and collaboration

Indicators in this area include: group task contribution (peer assessment + teacher assessment), frequency of classroom debates/ speeches (voice recognition analysis), and effectiveness of conflict management strategies (case simulation feedback); based on the Harv ard Business School HRM Competency Framework.

4.3.4 professionalism Indicators in this regard include:

Attendance discipline (number of late arrivals/early departures), acquisition of professional certificates (e.g., labor relations coordinator), Ethics case scores (e.g., compliance with confidentiality agreements). Evaluations are based on the CHRA Professional Standar d.

4.3.5 Development potential Indicators in this area include:

The slope of the learning curve (the speed of knowledge mastery); interdisciplinary ability (such as the combination of psychology to analyze employee behavior); the number of innovative solutions (such as the design of new types of employee incentives); and the basis for its evaluation: Mc Kinsey Future HR Talent Report [18]. The evaluation is based on the McKinsey Future H R Talent Report.

4.4 Construction methods and techniques

4.4.1 Data pre-processing

Handling of missing values: students with missing internship data were filled in using the mean values of similar students [11]. The following table summarizes the missing values Normalization: Normalize data of different magnitudes (e.g., percentile grades, 5-point scales) to the interval [0,1]. The following is an example of a normalization procedure.

4.4.2 Algorithm Selection Study

(1) Select K-means clustering, analyze the collected data such as students' basic information, media usage behavior, learning style , etc., select the number of categories for clustering by elbow method, use the profile coefficient to evaluate the performance of the clustering results(coefficient value is more than 0.5 or above), extract the labels and name them according to the clustering results, and finally cluster groups with similar labels together to get learners' Finally, the groups with similar labels are clustered together toget the learners' group portraits and different knowledge systems are designated for the recent knowledge development areas of diff erent group portraits[19]. Apriori association rules are carried out, such as the discovery of implicit patterns (e.g....., " high proficiency in E-HR operation- high score in case analysis"). In addition, random forest classification is used to predict the direction of students' career fit (e.8.payroll management, employee relations specialist)

(2) Visual presentation

After collecting enough data, student profiles can be visualized using data visualization too such as Power Bl and Google Data Studi o. The form of visualization can include charts, dashboards, heat maps, etc., to intuitively show the characteristics and trends of students.

Visualization of basic information: Display basic information such as gender, age, and geographical distribution of students in the form of bar charts and pie charts. Visualization of Learning Achievement: Use line graphs, bar charts, etc. to show the trend of students' learning achievement and the distribution of subject achievement. Behavioral data visualization: Display students' behavioral data such as attendance, classroom participation, and extracurricular practical activities through radar charts, scatter plots, and so on.

Psychological traits visualization: Using word clouds, sentiment analysis, and other visualization tools to show students' psychological traits and emotional states.

5 the use of student portraits in education

5.1 Formulation of Individualized Teaching Plans

In today's diversified educational environment, accurately grasping the unique learning situations of students and carrying out teaching activities accordingly has become the key to improving the quality of education. With the help of advanced data analysis technologies and multi-dimensional information collection methods, teachers can construct comprehensive and detailed student portraits. Such a portrait is not just a simple listing of grades but covers various aspects of students' learning habits, such as their concentration duration in class and the frequency of independent learning; thinking modes, for example, whether they tend to be logical reasoning or image thinking; as well as their mastery of knowledge in past learning experiences.

Through in-depth analysis of student portraits, teachers can gain a profound understanding of each student's learning ability and interests [20]. For "practice-weak" students who are proficient in theoretical knowledge learning but lack a bit of practical operation ability, teachers can actively cooperate with various enterprises to secure more enterprise internship opportunities for them. Duringthe internship process, students can apply the knowledge learned in class to real work scenarios and quickly improve their practicalskills by experiencing the real project processes firsthand. For instance, among students majoring in computer science, "practice-weak" students can participate in the software development projects of enterprises, deeply engaging in the whole process from requirements analysis, and code writing to software testing, thus effectively enhancing their programming practical ability.

Regarding the weak links that students have in certain subject areas, teachers can design highly targeted tutoring plans and intensive training programs [21]. For example, if it is found that some students have difficulty understanding the function chapter inmathematics, teachers can carefully select a series of representative function questions, gradually transitioning from basic question types to extended ones for special practice.

At the same time, diverse teaching methods can be adopted. For example, by using multimedia animations to demonstrate the changing process of functions, abstract mathematical concepts can be made more intuitive and understandable; group discussions can be organized to encourage students to share their respective problem-solving ideas and inspire each other [22]. Through such targeted tutoring and intensive training, students' knowledge gaps can be effectively filled, their learning effectiveness can be significantly improved, and they can be assisted in making continuous progress in their studies and achieving all-round development .

5.2 Optimization of the allocation of teaching resources:

Schools can allocate teaching resources rationally according to the learning needs and trends in students' profiles, such as adjusting the curriculum and optimizing the teaching force [23]. For popular courses and subjects with high demand , schools can increase teaching input and faculty to meet students' learning needs. Adjust the teaching content according to the shortcomings of the group (e.g., increase the practical hours of the E-HR system).

5.3 Career development guidance for students:

By analyzing the information on students ' career tendencies and interests in their profiles, teachers can provide students with personalized career development guidance [24]. Schools can cooperate with enterprises to carry out internship training, career guidance, and other activities to help students better plan their careers, and export students' ability profiles (e.g., "good at conflict management + psychology background") to recruiting enterprises.

5.4 Assessment of teaching effectiveness and feedback:

Student portraits can be used as an important basis for evaluating teaching effectiveness Teachers can analyze student portraits to understand the teaching effect and students' learning progress [25]. Teachers can adjust their teaching strategies and methods to improve the quality of teaching in case of ineffective teaching. At the same time, student profiles can also be used as an import ant reference index for monitoring and evaluating the quality of teaching in schools.

5.5 Student mental health concerns:

Through visual analysis of students' psychological attributes, teachers can identify students' mental health problems on time and take appropriate interventions [26]. Schools can set up psychological counseling centers to provide students with professional mental health services and support.

6 Conclusions

The highlights of this article are as follows: First, it proposes a closed-loop process for the construction of digital portraits for human resource management major students, "data collection-index modeling-algorithm analysis-visualization presentation-education application". Second, combined with educational data mining and the job competency of human resource management major students it forms a student's comprehensive quality portrait that can be quantified and evaluated. Third, it constructs a student portrait system of "5 major dimensions and 15 indicators".

The construction, visualization, and educational application of the student profile of HR managers is a complex and detailed process.[27]By making full use of data visualization technology and educational psychology principles, we can better understand the learning needs and characteristics of students, and provide powerful support for formulating personalized teaching plans, optimizing the allocation of teaching resources, providing career development guidance, and evaluating teaching effects. Through this system, we can realize the change from 'score evaluation" to "competency mapping", and accurately support the cultivation of human resource management talents and job matching.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to i nfluence the work reported in this paper.

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