

A Preliminary Exploration of Talent Cultivation for Intelligence Analysis in Emergency Management in the Big Data Era: Postprint

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Abstract

[Purpose/Significance] The establishment of China's Ministry of Emergency Management heralds a new era for domestic emergency management talent cultivation and capacity building. Investigating the cultivation of intelligence analysis professionals for emergency management in the big data era aims to enhance China's emergency response capabilities. [Method/Process] Through literature review and web-based surveys, this study analyzes existing problems and deficiencies in the current cultivation of emergency management intelligence analysis talents in China, and proposes corresponding recommendations. [Results/Conclusion] The findings indicate that with the advent of the big data era, demand for professionals in emergency management and intelligence analysis is growing rapidly, with increasingly stringent requirements. The state should enact legislation concerning emergency management intelligence personnel, establish and improve relevant institutions, formulate unified training standards, standardize curriculum frameworks, enhance faculty development and specialized direction construction, expand collaborative training models through increased exchange and cooperation, and implement training effectiveness evaluations. These measures would cultivate a cohort of specialized intelligence analysis professionals capable of responding to emergencies, thereby improving the efficiency and effectiveness of emergency management.

Full Text

Preamble

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Preliminary Exploration of Information Analysis Talent Training for Emergency Management in the Big Data Era

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Abstract

[Purpose/Significance] The establishment of China's Ministry of Emergency Management signals a new era for domestic emergency management talent training and capacity building. This discussion on cultivating information analysis professionals for emergency management in the big data era aims to enhance China's capacity to respond to emergencies. **[Method/Process]** Through literature review and online investigation, this paper analyzes existing problems and deficiencies in current domestic training of emergency management information analysis personnel and proposes corresponding recommendations. **[Result/Conclusion]** The study finds that with the advent of the big data era, domestic emergency management and information analysis work and talent demand are growing increasingly strong, with constantly rising requirements. The state should enact laws related to emergency management information personnel, establish and improve corresponding systems, formulate unified training standards, standardize curriculum systems, strengthen faculty and specialized direction construction, increase collaborative training models through exchanges and cooperation, and implement training effectiveness evaluations. These measures would cultivate a professional team of information analysis specialists for emergency response, thereby improving the efficiency and level of emergency management.

Keywords: emergency management; emergency information analysis talent; emergency information analyst; talent training

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Human society has entered a stage of “global risk society” where various emergencies occur with higher probability, greater destructive power, and stronger influence. To respond more effectively to emergencies and maintain public safety, the Chinese government has attached great importance to emergency management for more than a decade. In May 2004, the General Office of the State Council issued the “Framework Guide for Provincial (Regional, Municipal) People's Governments' Overall Emergency Response Plans for Public Emergencies.” In 2006, the State Council promulgated the “Opinions on Comprehensively Strengthening Emergency Management Work.” In 2007, the “Emergency Response Law of the People's Republic of China” was enacted. Most importantly, in April 2018, China established the Ministry of Emergency Management [1] on the basis of the original emergency management system, integrating emergency resources, emphasizing comprehensive disaster reduction, strengthening unified command of emergency management organizations, smoothing information channels, and enhancing national emergency management capabilities. Emergency management of emergencies is a comprehensive process that includes prevention and preparedness, monitoring and early warning, emergency

response and rescue, and recovery and reconstruction [2]. Information related to emergencies forms the foundation and basis for emergency management. Practice has shown that timely prevention and rapid, effective emergency management require solid information collection and processing work. However, current emergency management processes in China suffer from information management problems such as imperfect systems and unsmooth communication channels, particularly the lack of professional and well-trained information management personnel [3]. In the big data era, sources of emergency management information will be massive and dynamic, with increasingly diverse and complex sources and forms—challenges that traditional emergency department staff cannot handle. Against this background, professionals who can efficiently collect and process big data while closely integrating with emergency management needs to quickly analyze and form emergency intelligence to support decision-making are urgently needed by emergency management departments in today's high-risk society. This paper explores the training of emergency management information analysis talent in the big data era, aiming to provide references for relevant departments or units in formulating talent training plans and promoting the construction of emergency management intelligence capabilities in China under the big data background.

2 Literature Review

Theoretical research on modern emergency management in China truly began only after the fight against SARS in 2003. During the 1960s-1980s, Western academia experienced a surge in emergency management research, expanding from political fields to economic and social domains, with research objects extending from natural disasters to public emergency management, forming two independent yet mutually integrated disciplinary branches: enterprise emergency management and public emergency management [4]. Information is the foundation of emergency management. Current emergency management practices in China reveal problems such as the lack of specialized information management agencies adapted to emergencies, poor information communication mechanisms, and particularly the shortage of professional information management personnel [3].

This study first used the professional search function of the CNKI full-text journal database, constructing the search formula: SU=('intelligence talent'+ 'intelligence personnel'+ 'intelligence researcher'+ 'intelligence analyst'+ 'intelligence engineer'+ 'intelligence analyst') AND TI=('quality'+ 'skill'+ 'training'+ 'education'+ 'cultivation') obtaining 527 documents (data as of June 29, 2018). Using the same search terms, 641 and over 20,000 documents were retrieved from Wanfang Database and Baidu Academic Search Platform respectively. After strict screening and integration, 420 relevant documents were obtained. To understand the training situation in the emergency management field, the author used CNKI's result search function to conduct a limited search on the initial results with the professional search formula SU='emergency'+ 'emergency event'+ 'crisis

management', which returned 0 documents, indicating that research in the emergency management field is extremely scarce. Similarly, using advanced search in Web of Science, Emerald Management Journal Database, and ScienceDirect with the search formula: TS=(intelligence talents OR intelligence officer OR intelligence agent OR intelligence engineer OR intelligence analyst OR intelligence professionals) AND TI=(quality OR accomplishment OR skill* OR technical ability OR cultivat* OR train OR educat*), and adjusting according to each database's rules, over 3,000 documents were retrieved and integrated. To understand research on intelligence talent training in emergency management and under the big data background, the Web of Science database was used to refine the initial results with the formula: "emergency response OR emergency decision OR emergency management," which returned only dozens of documents, with few truly relevant ones. Thus, academic attention to intelligence talent training in emergency management is clearly lacking.

The above documents were obtained through expanded searches; no literature specifically addressing this paper's theme was found. However, some scholars mentioned intelligence personnel issues in their research on emergency management information assurance. The general situation is as follows: Foreign research on intelligence analysts emerged earlier, focusing on knowledge and skill requirements and competency qualities in specific fields. In the 1970s, seven renowned American intelligence scientists published the book *The Intelligence Profession* [5], clearly elaborating on the emergence of intelligence analysts, intelligence entrepreneurs, and intelligence managers in the intelligence industry under the new technological revolution, and providing detailed descriptions of intelligence personnel quality requirements and professional titles. Due to significant differences in work environment, objects, and content, intelligence analysts have various titles, such as intelligence analysts, crime analysts, imagery analysts, and all-source analysts [6]. Foreign intelligence talent education originated from intelligence courses first offered by Case Western Reserve University in the United States, followed by Japan, the United Kingdom, and many other countries gradually establishing specialized intelligence programs. Regarding the competencies intelligence talent should possess, M. Jerry proposed in 1996 that competitive intelligence workers should have various abilities, including creativity, keen intuition, willpower, analytical thinking, and learning ability [7]. S. Neil in 1999 proposed three soft skills for competitive intelligence personnel: personal ability, interpersonal skills, and social organization ability, emphasizing that intelligence workers should not only master relevant professional knowledge and skills but also focus on communication and coordination with others [8]. In law enforcement and security fields, the FBI's "Core Competency List" for intelligence analysts stipulates that they should have collaboration and cooperation ability, critical thinking, organization/planning/coordination ability, and computer skills and literacy [9]. The FBI's recruitment requirements for intelligence analysts also propose personal leadership and quality competencies, including firm belief, innovative spirit, integrity, and honesty [10]. Additionally, the United States emphasizes written expression ability and professional

ethics standards. Given the importance of emergency management to national life and property safety, emphasizing intelligence analysis talent in this field is extremely necessary.

Domestic academia truly began researching intelligence analysis personnel in the early 21st century. The development of the market economy created enormous competitive pressure for enterprises, rapidly increasing demand for competitor and competitive environment intelligence and highlighting the importance of competitive intelligence analysts, thus sparking related academic research. In the CNKI academic journal database, searching with subject terms “intelligence analysis,” “intelligence analysis (person) personnel/intelligence analysis talent,” and “intelligence analyst” yielded thousands of documents, of which 9 were relatively relevant and 7 strictly relevant. Among the 7 documents studying intelligence analysts, 3 examined the U.S. law enforcement intelligence analyst professional training certification system [11], training standards [12], and training programs and curricula [13]; the other 4 respectively studied China’s police intelligence analyst selection and recruitment mechanism [14], the status and responsibilities of competitive intelligence analysts in enterprises [15], a comparison of competency requirements for intelligence analysis personnel between China and the United States [16], and an interview on the future role of intelligence analysts [17]. Among them, Men Ting provided a relatively standardized definition of competitive intelligence analysts in the digital age, defining them as professionals engaged in market and technology intelligence investigation, acquisition, analysis, and utilization—comprehensively analyzing and processing competitive information from inside and outside enterprises to generate valuable competitive intelligence products, bearing important responsibilities for providing decision support and crisis warnings for enterprises [15].

Summarizing domestic and foreign research reveals several findings: First, while there is considerable research on emergency information management regarding its connotation, types, source distribution, acquisition channels, characteristics, functions, communication, technology, systems, and plans, studies on information and intelligence personnel supporting emergency management are relatively few in overall quantity. Second, research focuses on intelligence analysts in law enforcement, mainly concerning competency studies for public security and police departments. Third, research emphasizes introducing U.S. intelligence analysts, particularly focusing on law enforcement intelligence analyst training systems, with Xie Xiaozhuan being a representative scholar in this field. Fourth, domestic research lacks studies on intelligence analysts in specific fields. Academia generally equates information analysis with intelligence analysis, rarely distinguishing between information analysts and intelligence analysts, creating a clear gap in intelligence analyst research. Drawing on the above research, this paper argues that emergency management intelligence analysts refer to professionals engaged in emergency event-related information collection, intelligence analysis, emergency information dissemination during emergencies, and participation in emergency decision-making to a certain extent.

3 Emergency Management Intelligence Analysis Talent in the Big Data Era

The true significance of big data lies in the value generated after its analysis. Currently, humans remain the primary performers of intelligence analysis tasks [18]. Human resources are the first and strategic resources. In every stage of emergency management—data collection, organization, analysis, and decision-making—intelligence analysts play a crucial role. This requires a large number of composite emergency management intelligence analysts who can adapt to the big data environment and possess both technical and emergency management knowledge.

From an academic research perspective, numerous scholars have proposed their own concepts regarding training content or the competency structure that intelligence talent should possess, as shown in Table 1 .

Table 1. Relevant Perspectives on the Competency Structure of Intelligence Analysis Talent

From the perspective of British and American practice, intelligence analyst qualifications generally include: good report drafting skills; information collection, analysis, and evaluation abilities; good communication, cooperation, and organization skills; critical thinking and logical reasoning abilities; strong adaptability and perseverance, with strong curiosity and learning ability; other abilities or qualities, such as the United States emphasizing critical thinking and logical reasoning, the United Kingdom requiring cultural sensitivity and personal charisma, while Japan advocates a “spirit-first” idealistic intelligence philosophy, believing this to be a tremendous driving force for fully tapping the potential of intelligence personnel and exerting subjective initiative [25]. Influenced by this philosophy, Japanese intelligence analysts often demonstrate absolute loyalty and self-sacrifice. While the UK and US emphasize relevant professional skills and individual traits, Japan focuses more on examining the spiritual performance of intelligence analysts.

From China’s reality, Xi Jinping pointed out that “being good at obtaining data, analyzing data, and using data is a basic skill for leading cadres to do their work well” [26]. In the big data era, effectively collecting, integrating, and analyzing massive, complex, and rapidly changing data to provide emergency intelligence decision support is the foundation for emergency management work. In the big data environment, the specific work content of emergency intelligence analysts includes: specifically responsible for collecting, storing, and organizing all data from various stages of emergency management, discovering suspected emergency event data from big data, and cleaning messy emergency event data; forming problem-solving information for emergencies, organizing presented information, and generating data warehouses and knowledge bases; using various tools and methods to analyze and process emergency-related information, ultimately forming analysis reports and decision plans for emergency prevention and monitoring, situation monitoring, emergency decision-making, and post-

event recovery, creating intelligence to support emergency decision-making for emergency managers at emergency sites.

Combining the above research and practical requirements, this paper summarizes that China's emergency management intelligence analysts should possess a competency structure comprising three aspects: individual traits, knowledge structure, and professional skills, as shown in Figure 1 [Figure 1: see original paper].

Figure 1. Competency Model for Emergency Management Intelligence Analysis Personnel

4 Current Problems in Domestic Emergency Management Intelligence Talent Training

The personal competencies of emergency intelligence analysts and decision-makers affect the scientific handling of emergencies, yet China's training mechanisms for professional emergency intelligence personnel are not well-developed [27], and the construction of emergency management intelligence talent teams is inadequate [28]. Based on existing literature and actual investigation, several problems exist in domestic emergency management intelligence talent training:

4.1 Vague or Absent Regulations and Talent Training Systems

According to emergency management laws and regulations published on China's central government website, there are over 90 laws and regulations regarding four major categories of emergencies (natural disasters, accidents, public health incidents, and social security incidents) and specific event types under each category. However, regulations on emergency management talent training are scarce, with no mention of emergency management intelligence analysis talent. For example, the "Emergency Response Law of the People's Republic of China" passed in 2007 only briefly addresses this, such as Article 36: "The state encourages and supports qualified teaching and research institutions to cultivate specialized emergency management talent, and encourages and supports teaching and research institutions and relevant enterprises to research new technologies, equipment, and tools for emergency prevention, monitoring, warning, emergency response, and rescue." Article 44 stipulates that after issuing level three and four alerts and entering the warning period, governments at or above the county level should "organize relevant departments, institutions, professional technical personnel, and relevant experts to conduct analysis and assessment of emergencies at any time, predicting the magnitude, impact scope, and intensity of possible emergencies, as well as the possible emergency levels" [29]. Although the emergency management intelligence analysts proposed in this paper fall within the scope of specialized emergency management talent mentioned in these regulations, the expressions in the regulations clearly lack specificity, pertinence, and concreteness.

Additionally, China has relatively few laws and regulations for intelligence workers, focusing mainly on national intelligence personnel. For example, the “National Intelligence Law of the People’s Republic of China” passed on June 27, 2017, applies only to national intelligence agencies and their personnel, including state security organs, public security intelligence agencies, and military intelligence agencies [30], and does not cover emergency management intelligence analysts at the broad social level. This shows that China has not yet emphasized the construction of intelligence talent teams in the emergency management field, with incomplete relevant laws and regulations, making it difficult to have rules and laws to follow in practical work, which is extremely detrimental to the training of intelligence analysis talent for emergency management. Currently, no relevant emergency management intelligence talent training systems have been introduced domestically.

4.2 Insufficient Specialization of Existing Talent Training

Currently, institutions related to emergency management intelligence talent training mainly fall into three categories: first, party schools, administrative colleges, and cadre training institutions; second, universities offering emergency management-related majors and training bases affiliated with universities and research institutes; and third, library and information education units or institutions that train intelligence talent for different industries. These three categories conduct emergency management intelligence talent training from both academic education and vocational training perspectives. The first two categories mainly train emergency management theory and operational knowledge, with little professional training in intelligence skills. For example, the National Administrative College established an Emergency Management Training Center (China-EU Emergency Management Institute) [31], which mainly undertakes emergency management education, training, and related scientific research, participates in researching and formulating national emergency management plans, standards, norms, and training plans, carries out emergency management personnel training and emergency management teacher training, builds emergency management disciplines, and conducts master’s and doctoral education. Investigation of training information published on its official website reveals that although the training content is highly targeted, focusing on emergency management theoretical knowledge and practical exercises, the curriculum has considerable randomness and dispersion, and no unified training standards have been issued in formal documents. Similarly, Jinan University’s undergraduate talent training goal for emergency management is: “to cultivate specialized talents with interdisciplinary knowledge in public administration and management, preliminary mastery of the emergency management knowledge system, who can engage in public management in government emergency management departments and enterprises and institutions and are proficient in crisis assessment and emergency management work” [32]. Both clearly neglect the cultivation of intelligence literacy and form their own systems in emergency management talent training. The third category mainly trains intelligence capabilities to meet industry

needs for intelligence talent. For example, the Professional Library Branch of the Chinese Library Society, affiliated with the National Science Library of the Chinese Academy of Sciences, cultivates professional and applied library and information talent for various types of libraries and intelligence agencies nationwide [33]. Each training session sets different topics according to practical development and actual needs, offering certain flexibility and adaptability to practical needs, and can meet the intelligence talent needs of many industries. However, no systematic and professional training on emergency management-related knowledge has been found. In addition, some provincial and municipal emergency offices have actively carried out business training for relevant staff, but rarely include intelligence analysis courses. Overall, China has not yet started building relevant training standards for intelligence analysis talent in the emergency management field, with each institution forming its own system lacking pertinence and uniformity.

4.3 Urgent Need to Supplement and Improve the Education and Training System

As mentioned above, emergency management intelligence analysis talent is a new interdisciplinary specialized talent whose knowledge structure integrates cross-boundary knowledge. Although domestic intelligence science education has existed for many years, it generally lacks curriculum systems and specialized talent training objectives that rely on and integrate with the emergency management field. Currently, only about 20 institutions in China offer emergency management professional education, covering undergraduate, master's, and doctoral education. For example, Jinan University, Henan Polytechnic University, and Institute of Disaster Prevention have emergency management departments, Beijing Normal University has the Institute of Disaster Reduction and Emergency Management, and various universities offer emergency management master's and doctoral directions, mostly relying on undergraduate majors in management science and engineering, public (affairs) management, safety science and engineering, and engineering management. Relevant training from government emergency offices and society is also increasing, but rarely involves emergency intelligence. Whether academic education or short-term training, a complete education and training system comprises multiple elements, mainly including training organizations, curriculum systems, faculty teams, software and hardware support systems, and effectiveness evaluation mechanisms. Among these, the curriculum system is the core and soul, the faculty team is the executor and interpreter, and the effectiveness evaluation mechanism is the measure of training quality. "Curriculum, faculty, and evaluation" are the three major problems in China's current emergency management intelligence analysis talent education and training system.

4.3.1 Incomplete Curriculum System Many institutions providing emergency management or intelligence talent education and training share common problems of incomplete curriculum settings and training directions that empha-

size only single objectives. For example, the School of Public Administration at Jinan University, which established an emergency management direction in 2009, offers courses including public affairs management, management, political science, social conflict theory, administrative law, social policy, operations research, social public opinion analysis, public health management, emergency management introduction, emergency management legal system, disaster science introduction, risk assessment, public economics, terrorist organizations and terrorism, public sector human resource management, advanced mathematics, social science research methods, and information technology and applications [34]. The curriculum reveals obvious weaknesses in cultivating students' intelligence theory and skills, particularly in intelligence theory and data analysis skills—precisely the key capabilities needed by China's emergency management personnel in the big data background. To solve this practical problem, curriculum construction must be improved.

4.3.2 Unreasonable Faculty Structure In many emergency management talent training institutions, the lack of a stable and comprehensive training faculty team is a common problem. The faculty of the National Administrative College's Emergency Management Training Center mainly consists of full-time teachers and part-time professors (senior emergency management experts, doctoral supervisors, and senior foreign government officials and experts). Full-time teachers are the main force, with part-time professors playing a supplementary teaching role. The college attempts to improve trainees' emergency management capabilities by teaching emergency management theoretical knowledge and practical skills. However, this structure neglects the composite and comprehensive characteristics of emergency management talent, fails to consider the massive data information faced in actual emergency management work and the importance of intelligence services for emergency decision-makers, and lacks faculty construction in data analysis and intelligence analysis. This faculty structure is far from sufficient for building a professional emergency management intelligence analyst team and must coordinate with the curriculum system to provide adequate, professional, and comprehensive talent reserves for emergencies.

4.3.3 Inadequate Effectiveness Evaluation Mechanism The emergency management training effectiveness evaluation system is a process that uses scientific theories, methods, and procedures to collect data from training results and connect them with organizational needs and objectives to determine the advantages, value, and quality of training programs [35]. Whether compared with foreign practices or from a professional practical perspective, China's existing emergency management personnel training evaluation mechanisms are inadequate. For example, Jinan University's assessment system for emergency management students mainly follows the same credit system as other majors, where students can graduate after completing required credits through course examinations. While higher education must follow unified examination systems, the particularity of the emergency management major should be considered.

This major has relatively high requirements for students' practical skills, including emergency management business capabilities and data processing skills, which are difficult to assess through written examinations alone. To meet the current demand for intelligence analysis talent in the emergency management field, besides establishing a scientific curriculum system and reasonable faculty structure, learning outcomes should be evaluated from multiple perspectives. Clearly, we are still far from establishing such an evaluation mechanism and system.

5 Recommendations for Promoting Emergency Management Intelligence Analysis Talent Training in the Big Data Era

Intelligence originates from data, information, and knowledge but is superior to them. The big data era means emergency management intelligence analysts generate emergency intelligence from broader, multi-source, multi-type datasets around various dimensions of emergency information, thus placing higher demands on big data processing skills. China's big data higher education began in 2012 when Capital University of Economics and Business, Peking University, Chinese Academy of Sciences, Renmin University of China, and Central University of Finance and Economics jointly established the "Big Data Analysis Master's Training Collaborative Innovation Platform," launching big data master's talent training. In 2016, Peking University, University of International Business and Economics, and Central South University became the first three universities to offer the undergraduate major "Data Science and Big Data Technology." Subsequently, other universities applied, with 32 universities approved in the second batch in 2017. The latest list of new majors issued by the Ministry of Education in March 2018 shows that 248 universities were approved for this undergraduate major, totaling 283 institutions that can grant engineering or science degrees. Currently, the Data Science and Big Data Technology major mainly uses statistics, computer science, and mathematics as foundational support disciplines, lacking specific field and application direction support. Therefore, like intelligence science and emergency management, although Data Science and Big Data are major sources for future emergency management intelligence analysis talent, they lack communication and integration among each other, which is unfavorable for training emergency management intelligence analysis talent in the big data background. To serve the practical needs of emergency management, long-term planning for interdisciplinary talent training is necessary.

5.1 Establish and Improve the Emergency Management Intelligence Analysis Talent System

No profession can develop without legal and institutional guarantees. Taking the United States as an example, after the 9/11 incident, it successively issued relevant training documents for law enforcement intelligence analysts. After about a decade of development, a relatively mature law enforcement intelligence analyst

professional training certification system has been formed, making law enforcement intelligence analyst a professional occupation in the United States that has been institutionalized, forming a complete system including intelligence analyst competency standards, training content standards, certification standards, and career development roadmaps [11]. Japan is also advanced in intelligence analyst system construction and legal guarantees. In 2005, Japan passed the “Basic Emergency Measures Law,” which emphasized intelligence capabilities for responding to emergencies and advocated establishing an intelligence minister, cabinet intelligence committee, and intelligence evaluator system. The “Defense Program Outline” passed in 2010 also mentioned strengthening intelligence collection activities and intelligence talent training [36]. These documents all propose requirements for intelligence analyst training and construction from the institutional and legal levels and have established a complete education and training system.

We should supplement and improve existing laws, introducing relevant bills as soon as possible to provide legal basis for intelligence analyst team construction. At the same time, institutional guarantees should be provided. Standardized system construction can proceed from three aspects: first, conditions, i.e., the scope of application of the system; second, rules, i.e., stipulating what should be done, how it should be done, what is prohibited, and how it is prohibited; third, accountability, i.e., stipulating the consequences and responsibilities that must be borne for violating the system [37]. Accordingly, a system for intelligence analyst positions can be established, clearly defining its scope of application as intelligence practitioners, specifying their responsibilities, behavioral norms, authority, and prohibited behaviors, and clearly defining the consequences and responsibilities for intelligence analysts who violate the system, enabling the intelligence analyst system to be established, recognized by society, and protected by law and institutions.

5.2 Establish Training Standards for Emergency Management Intelligence Analysis Talent

Establishing unified training standards is of great guiding significance for building a national team of emergency management intelligence analysis professionals. To address the problem of non-uniform training standards in China’s current emergency intelligence analysis talent training, we can learn from the U.S. experience in establishing minimum training standards for law enforcement intelligence analysts [12]. First, specialized organizations should be established to formulate training standards for emergency management intelligence analysis talent, providing organizational guarantees for the scientific and standardized nature of the standards and guiding and supervising national emergency management intelligence talent training. For example, the United States established GIWG (U.S. Department of Justice Global Justice Information Sharing Initiative Intelligence Working Group) and CITCS (Crime Intelligence Training Coordination Strategy Working Group), which are mainly responsible for

investigating intelligence training needs and formulating standards, playing an important role in introducing law enforcement intelligence analyst training standards. Second, adhere to the principle of coming from practice and going to practice, formulating standards on the basis of extensive investigation and active exploration. For example, in the process of formulating crime intelligence training standards, the U.S. working group evaluated representative training courses at home and abroad, conducted extensive investigations, distributed questionnaires to intelligence training institutions in various states, and held repeated discussions, taking several years to form corresponding training standards that are continuously revised and improved according to practical development. Furthermore, in formulating standard content, scientific, comprehensive, and professional principles should be adhered to.

5.3 Establish a Training System for Emergency Management Intelligence Analysis Talent

The standardized training of any specialized talent requires top-level design. The Ministry of Emergency Management and the Ministry of Education should maintain interaction, guiding educational institutions to set up training plans for big data emergency management intelligence analysis talent based on existing emergency management, intelligence science education, and emerging data science talent training to meet emergency management talent needs.

5.3.1 Standardize Curriculum and Develop Specialized Training Directions To address curriculum problems in China's emergency management intelligence analysis talent training and combine them with the competency requirements for such talent, relevant universities and education and training institutions should formulate clear talent training programs, determine various courses to be offered, clarify the setting principles for each course type, balance the proportion of different courses, and set relevant courses with emphasis and pertinence. A specialized major or direction specifically for training big data talent for the emergency management field should be branched out from existing majors. On the basis of setting mathematics and computer-related courses, courses on emergency management theoretical knowledge should be offered, supplemented by basic intelligence analysis theory courses, while promoting relevant textbook construction to cultivate a group of excellent talents skilled in using various technologies to collect and process massive data and applying relevant intelligence theory and emergency management knowledge to produce intelligence services or products that meet emergency decision-making needs. As a supplement, institutions should strengthen practical courses in emergency management intelligence talent training, arranging practical exercises such as internships at relevant departments or simulation drills according to actual conditions.

5.3.2 Improve Faculty Structure and Strengthen Faculty Team Construction Innovative measures must be taken to strengthen faculty training,

following the principle of “going out and bringing in”: selectively sending excellent teachers from the current training system to countries with mature emergency management intelligence analyst training, such as Japan, the United States, and the United Kingdom, for continuing education or training; and hiring foreign experts or teachers to teach at China’s talent education and training institutions, during which local teachers can also learn relevant experience to meet student training needs.

5.3.3 Utilize Existing Resources to Establish Joint Collaborative Training Models (1) Emergency Management + Intelligence Analysis Model.

The main teaching content of existing emergency management intelligence analysis talent education and training institutions is divided into two major categories. This paper proposes a joint training model between “emergency management training centers” and “library and information training institutions” to meet practical needs. For example, the National Administrative College’s Emergency Management Training Center mainly cultivates talent with emergency management knowledge, while the Chinese Academy of Sciences Documentation and Information Center training class mainly cultivates library and information talent with intelligence theory knowledge and analysis skills. The main training content of both constitutes the two major competency elements of the professionals discussed in this paper. They can utilize each other’s training resources and results to establish a regular talent exchange and training model between the two institutions. Both must formulate joint training plans based on full communication to form an optimal training plan and jointly cultivate composite emergency management intelligence analysis talent.

(2) Theoretical Knowledge + Practical Operation Model. Emergency management intelligence analysts are talent with very high practical skill requirements. On the basis of theoretical knowledge training, practical combat capabilities must be emphasized. A collaborative system should be established between education and training institutions and emergency management departments. Education and training institutions can regularly recommend outstanding students in the major to relevant emergency management units for internships and practical operations, while emergency management units can appropriately accept and cooperate according to their actual conditions. Considering that emergency management work may vary in different regions, region-matched practical exchanges are recommended. Conversely, emergency management units can also dispatch internal intelligence workers or managers to education and training institutions for theoretical knowledge learning to improve their intelligence collection, analysis skills, and relevant computer skills. Of course, this model must be based on local policy support. Through this collaborative system, emergency management practitioners’ intelligence knowledge and skills can be enhanced, while emergency management students’ practical and adaptability abilities can be exercised, promoting each other and laying a solid foundation for emergency management intelligence analysis talent training.

5.4 Establish Effectiveness Evaluation and Professional Qualification Mechanisms for Emergency Intelligence Analysis Talent Training

Merely emphasizing various elements in the training process without effectiveness evaluation is insufficient; supporting effectiveness evaluation and talent assessment mechanisms must be supplemented. Relevant training entities are required to formulate a set of standardized assessment standards and procedures to collect and evaluate various training data of trained students. A complete training effectiveness evaluation mechanism should include four aspects: reaction evaluation, learning evaluation, behavior evaluation, and results evaluation [38]. According to training programs and standards, training effectiveness should be examined for its achievement of training objectives to provide reference for future education and training work.

Due to the hazardous and urgent nature of emergencies, emergency management workers must be strictly required in all aspects to minimize or even eliminate errors. After completing the evaluation and assessment of students by education and training institutions, a crucial step is to establish and improve a strict industry qualification access mechanism. Employers can strictly control industry access through three aspects during recruitment: first, theoretical knowledge assessment, mainly examining students' theoretical mastery of intelligence knowledge and emergency management knowledge through written examinations; second, practical skill assessment, evaluating students' theoretical application ability, adaptability, and key intelligence collection, analysis, processing, and production abilities through simulated scenario exercises, assessing students based on their final intelligence products or services and performance in the emergency process; third, ethical quality assessment, mainly through interviews and probationary periods.

The arrival of the big data era presents new challenges and opportunities for China's emergency management. Traditional emergency management personnel are already unable to collect, store, and organize massive, multi-source, and heterogeneous data, lack the ability to use new big data technologies and tools and big data thinking to analyze and process these data, and ultimately find it difficult to provide efficient and high-quality intelligence products and services to emergency decision-makers. Rapid response and effective response to emergencies in the big data environment cannot be separated from the support of emergency intelligence personnel. Therefore, cultivating professional intelligence talent with both emergency management knowledge and capabilities and intelligence analysis skills and professional ethics is increasingly important, which meets the requirements of the times and the development trend of emergency management work. Consequently, emergency management intelligence analysis talent should be recognized and valued, while current talent training in China is difficult to meet the needs of emergency decision-making. It is recommended to strengthen the training of emergency management intelligence analysis talent from aspects such as laws and regulations, systems, and education and training systems.

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Guo Chunxia: Proposed the research topic, overall structure framework, wrote and revised the paper, and finalized the manuscript;

Xu Qingmei: Conducted information collection and investigation, wrote and revised the paper;

Chu Jiewang: Provided revision suggestions, participated in paper revision and finalization.

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Note: Figure translations are in progress. See original paper for figures.

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