A Study of the Need for Data Capabilities in Military Academies

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Abstract . Military data is an important strategic resource to support national defense and military construction. To further promote the integration of data analysis with the actual needs of the military for trainees. This paper explores the relevance to the actual military business domain and clarifies the application of data capabilities in the force demand scenarios.

Keywords: data application, military field, demand scenarios

1   Application of Military data Introduction

With the continuous development of data acquisition, storage and analysis technology, military data has received more and more attention. The relevant military business is interpreted and presented in a digitalized manner as a basis for revision and supplementation of management and decision-making, which is constantly promoting the construction of war-preparedness and combat capabilities based on data to be deep-going in theory and practice, and practical in theory and feasible in practice. The data are not only new technology, resources and infrastructure generated under new requirements, but also their application ability has become an integral part of the army's fighting capacity in the new era[1].

Military data are an important strategic resource for supporting national defense and military construction, and military big data ability and big data sovereignty of various countries have become the new focus of the game playing of big powers after land power, sea power and air power[2]. In order to better realize the training of cadets' data application ability, military academies should actively figure out the needs of army construction, explore the relevance with actual military business fields, and cultivate cadets' practical ability to integrate data analysis with the actual needs of the army. With the continuous research and development of military data related technologies, the application scenarios of data capabilities in the troops are mainly reflected as follows.

2   The Need for Modernization of Military Management Promoting

For a long time, departments at all levels have accumulated massive training and business data. However, due to the limitations of the factors such as institutional mechanisms and technology management of confidential information, the compatibility of information and data in all departments is not strong, with no high availability rate, which seriously affects the data value density. With the improvement in acquisition, processing and analysis computing capabilities of military big data, military data reorganization is gradually improved, and the military big data service application platform is progressively being constructed. Through this platform, the strengthening of information communication and interaction between departments at all levels can be realized, which is conducive to achieving the unification and sharing of data format, thereby improving management efficiency, and making management collaboration between departments more smooth and coordinated. Through the introduction of data sharing technology, the life and training of officers and soldiers are grasped in real time. Additionally, it will be more convenient and efficient for military personnel to use the big data platform to recall data information. And the time required for data acquisition, processing and analysis will be greatly shortened, with work efficiency vastly improved. The troops urgently need to use relevant technologies to innovate militarized management, carry out model innovations in military business fields such as combat training, political work, and logistics equipment support, and comprehensively improve the troops' ability to prepare for war and win.

Moreover, military big data is still in its infancy, with a gap from the full application of big data. The system of big data acquisition, storage, computing and visualization is not specific enough. Most of the control means and measures at each stage have not entered the actual operation level. The process management mechanism from data acquisition to application is still imperfect, with little relevance to the actual military business field insufficient. Most troop personnel, lacking the concept of big data, pay no enough attention to the improvement of decision-making ability by big data, with doubts about the implementation and application of relevant technologies in the military field. And they often tend to rely on personal experience and the will of the officer to make decisions rather than data and analysis. This is an artificial disadvantageous factor in the big data capacity building of military academies.

Military academies need to train relevant talents with data application ability, who can explore from the successful practice of military data projects. The course teaching system, content, teaching methods and course teaching practice mode required for relevant ability training are investigated to practically improve the ability and level of the data application in cadets. Through theoretical learning, combined with business practice, and with the help of novel ideas and methods, such as the Internet, swarm intelligence knowledge of industry circles, and continuous evaluation and improvement, the teaching is continuously improved, with the cultivation of data talents with data application ability and innovative spirit.

3   The need for modernization of military decision making

Under the modern war morphology, commanders not only need to master excellent strategic and tactical thinking, with good basic qualities and abilities of military personnel, such as cooperation, coordination, innovation, analysis and judgment abilities, but also change their thinking concepts to adapt to the war mode under the conditions of the modernization and informationization. Multiple studies have shown that the modern army should actively shift from relying on the experience and intuition of decision-makers to being based on data and rationality. In-depth exploration is made from the traditional military decision-making process (logical analysis, finding causality and making decisions) to the big data decision-making one (mining data, discovering relevance and assisting decision-making).

The modern army urgently needs to realize intelligentization and scientization of the command system through comprehensive analysis of military data. In this process, commanders need to analyze and arrange through scientific methods, comprehensively understand the information, intuitively and accurately grasp the battlefield situation, and then make decisions. In order to improve the pertinence, scientificity and accuracy of decision-making, and avoid the phenomenon of disconnection from reality caused by blind empirical decision-making, in the decision-making implementation stage, the exploration into real-time access to feedback information during decision-making implementation, mastery of whether the decision-making is implemented as planned, and effective supervision of the implementation of the decision-making can also be made through data analysis and monitoring. When the decision-making implementation is completed, big data technology can also be used to establish a system for decision tracking and process monitoring to provide dynamic feedback on the implementation of the decision-making. The scientificity of military decisions is practically improved.

Additionally, the decision-making environment of military big data changes rapidly, and intricate environmental factors affect the acquisition and analysis of military decision-making information. As a result, there are problems such as imitation and omission in data acquisition, which makes it difficult to eliminate the false and retain the true, remove the rough and discard the dross and select the essential in decision-making analysis, with failure in effective identification, thereby affecting correct judgments of decision-makers on the situation, with great difficulty in extracting effective information. During the decision-making, it is the most critical link to perform the correlation analysis of the acquired data and find out the value information generated by the interaction between the data to serve the decision-makers. There are many problems with military data resources, such as environmental heterogeneity, data redundancy and inconsistent standards. This makes it difficult to extract basic data quickly and accurately, with failure in thoroughly analyzing the information and knowledge hidden in basic data, which is not beneficial for decision makers to make optimal decision schemes. The above are main technical difficulty factors in realizing the modernization of command and decision-making.

Big data technology to assist decision-making is specifically reflected in several aspects. First, it can provide accurate support for combat decision-making by analyzing

intelligence data such as enemy conditions, terrain, and weather. It can predict the enemy's actions and formulate the best combat plan. Second, big data technology can help the army fully grasp the real-time situation of combat by analyzing multi-source data, providing accurate and comprehensive information support for combat command. Third, analyzing and managing logistics data, can improve the management efficiency and accuracy of army logistics. Fourth, big data technology can strengthen decision-making support and improve the efficiency and accuracy of command decisions. Finally, it can predict equipment protection needs, reduce equipment maintenance costs, and improve equipment reliability and service life. Big data technology can play an important role in military operations with fine management in peacetime and precise guarantees in wartime.

In the construction of teaching-training, it is necessary for military academies to pay attention to the training of practical skills in data analysis and improve the supporting resources for relevant experimental practice. Based on knowledge theory, teaching cases with more practical significance are identified and screened out combined with the actual military field. The cadets' ability to process semi-structured and unstructured data is cultivated to extract the effective information contained in the data, thereby improving the application ability of actual combat.

4   The need for intelligent improvement of weapons and equipment

Weapon and equipment data is an important part of military big data. Massive data have been accumulated in training and drills at ordinary times, including combat weather, environmental characteristics, soldiers' vital signs, equipment model number, use frequencies, fault rates, maintenance capabilities, etc[3]. Big data technology can help realize data research on existing weapons and equipment. And it is used to perform data mining and analysis for continuous improvement, thereby achieving the development of high efficiency, intelligence and automation of weapons[4]. This provides valuable support for the improvement and research of weapons and equipment so that cadets adapt to modern and future battlefields[5].

Furthermore, equipment data is typical highly confidential data. Due to factors such as national conditions, organizational structure and institutional environment in different fields, mainstream big data analysis platforms often fail to meet the actual data analysis needs of our army. Data analysis involves the whole process cycle of applications like data acquisition, statistics, analysis and computing and visualization, such as the problems including the cataloging design of database data structure, the standardization of acquisition task planning process, the use of acquisition tools, acquisition process and system, and data use authority. This is a realistic institutional factor that needs to be considered in the big data capacity building in military academies.

Military academies need to select data processing platforms that conform to relevant rules and institutions, with consideration of the data acquisition process and requirements in troops, carry out relevant group project-oriented practice combined with the

actual business, and effectively cultivate cadets' good communication, expression, organization, management, coordination and communication abilities required for engineering projects.

5   The need for intelligent education reform

Numerous effects on school reform have resulted from the expanding use of big data in the field of education. Here are some examples of applications in particular areas:

1. Personalized instruction: Big data can monitor and analyze each student's academic progress and behavior to identify their learning preferences, aptitudes, and weaknesses. This can aid educators in better understanding their pupils and delivering individualized instruction and counseling. In addition, students can use data analysis to pinpoint areas for improvement in their learning processes.

2. Curriculum and assessment system: The curriculum and assessment system may be optimized by analyzing a significant amount of student performance data. For instance, if a course's student pass rate is poor, the teaching materials and techniques might be further investigated to identify areas for improvement. Additionally, it may serve as a guide for suggesting questions and further optimize the test content by analyzing data on the distribution of exam outcomes and the complexity of exam questions.

3. Increasing teaching efficiency: Big data may assist teachers in identifying which teaching strategies and tactics are more successful and which require improvement. In order to change the pace of the classroom and the way that lessons are taught, it is feasible, for instance, to analyze students' learning behaviors to determine when they are most likely to pay attention.

4. Student management: By analyzing daily behavioral data, schools can learn about students' mental health and quickly spot and address possible issues. At the same time, it may offer more suggestions for student management by analyzing data like students' attendance rate and involvement rate in extracurricular activities.

5. Management of educational resources allows for better use and management of a variety of resources, including classrooms, equipment, and literature. For instance, classroom allocation may be changed to improve utilization rate by analyzing data on classroom usage.

The use of big data in education reform, in sum, strives to enhance the personalization, efficacy, and efficiency of education and deliver greater support for students' entire development.

In recent years, big data technology has been gradually introduced into relevant fields and disciplines, and the research in military academies has entered a bottleneck period, still in the initial exploration stage. The education big data of military academies is widely distributed, with profound historical data accumulation, huge research potential and broad application prospects. Military academies should actively transition from traditional teaching methods to big data methods, and improve the scientificity of research in military academies. In the process of managing research in military academies, the gradual achievement of the replacement of small samples by large samples, the replacement of logical analysis by data mining and matching, the replacement of

traditional statistics by big data algorithms, and the replacement of correlational relationship calculus by causality computing and so on is made. Through the analysis and computing of big data, more objective and scientific research conclusions based on data are obtained, with the improvement in the quality and efficiency of management of military achieved[6].

6 Conclusion

In modernized warfare, with increased data volume and improved data processing technology, the military business can be built on accurate data for description and analysis. And the forward-looking and leading position of data application in the military field is gradually prominent. Currently, our military informatization talents are often familiar with programming hardware and software information management, and proficient in data mining and collation. However, there is a relative shortage of applied talents who can make big data analysis and judgment quite well combined with the objective background of special military decision-making.

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