Research Article

Analysis of University Student Cadres’ Retreat Actions in China Based on K-Core Algorithm and FCM Model

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In recent years, there have been constant disputes over college student cadres. Starting from the public opinion crisis of College Students’ autonomy and using the “K-core” algorithm, this paper found that the college student cadres could not realize their own correct roles. The fuzzy cognitive map (FCM) model was used to analyze 49 influencing factors of N University’s retreat action. It is found that the five factors of mass support, ability, ideology and morality, work tasks, and performance evaluation are important factors leading to the retreat action. This research proposes role reconstruction and system rectification strategies for the five variables in order to achieve a true feeling of student autonomy and good governance.

1. Introduction

In the context of college student autonomy, the department is the most basic unit of a student organization. The retreat of student cadres means the loss of student cadres, which is equivalent to resigning from the public office of university students. Most of the previous studies focus on the selection and working process of student cadres, but there is still a gap in the causes and influencing mechanism of the phenomenon of student cadres retreating. However, in recent years, it is found that the action of retreating cannot be explained by the special circumstances of individual cases, but it more and more prominently reflects the overall, systematic, and structural mechanism of the current college students’ autonomy. The deep-rooted reasons behind the action of retreating from college often reflect the university student cadres’ loss of their role, their disapproval of the system design, and other common considerations in reality. Therefore, based on the investigation in N university from 2013 to 2022, this paper has finished the college student cadre role consciousness and the system of fuzzy cognitive map (FCM) experiments. And then, this paper has discussed the effects of the factors, the effect of back action mechanism, the role of college student cadres, and system design. Finally, it puts forward suggestions and countermeasures on the role remodeling and system correction of student cadres, hoping to improve the good governance of college student cadres.

The Chinese academic circle has never stopped touching the “identification sign” and the attempt to change the bureaucracy in the study of student cadres [1–3]. In contrast to the Chinese setting, western institutions do not emphasize “identity” and “positional leaders” in the context of student cadres, but rather “universal representation” and “members,” with the belief that leaders can be formed from all directions and strata [4, 5].

The following is a summary of the research: Section 2 discusses the cognition of student cadre’s role and the suggestion of system. Section 3 discusses the research on FCM model of student cadre retreat. Finally, the conclusion and discussion bring the paper to an end in Section 4.
2. The Cognition of Student Cadre’s Role and the Suggestion of System

There are many types of research on the role and system of university student cadres in related fields. Through empirical investigation, Liu Zhengzong and others (2019) believed that the overall quality of student cadres in universities was high and the bureaucratic atmosphere was not too strong on the whole. To a certain extent, this shows that the current self-cognition of university student cadres is more positive, but this does not mean that the self-role cognition of university student cadres is clear. Dong Leiming and others (2018), with the help of the analysis of symbolic self-completion theory, believed that the so-called “formalism” and “bureaucratic” were student cadres’ excessive emphasis on their own identity and self-symbolization and demonstrated the unsustainability of self-symbolization in maintaining the authority of student organizations, revealing the inevitability of the demise of “identity symbols.” The study aims to face the structural problems of student organizations and shift the research perspective from the role action to the institutional foundation of organizational structure. From the perspective of the autonomy of university students, this study argues that Student cadre is the human form of student management system and the student management system is the safeguard of the student cadres. In view of the overall reform of student cadres, the leader of the college should not only correct the role cognition of student cadres, but also change the student management system. Of course, these two factors cannot change at the same time. This complex problem should be understood from a historical, dialectical, and practical perspective.

2.1. Social Network Analysis of Student Cadres. To accurately realize the role of remodeling and system correction of university student cadres, first of all, from the background of public opinion crisis, the actual situation of the current social public cognition of the role of university student cadres. This study uses popular web crawler technology to collect news information from major websites. Keywords such as “student cadre” and “student union cadre” were searched for by Baidu.com in China, and 65 pages were collected for each word. A total of 11,023 pieces of news data were captured, 260 repeated links were removed, and 10,763 pieces of effective data were obtained, including page number, keyword, title, URL, summary, and domain name. After extracting the news headline data, the K-core algorithm of NetDraw and Pajek visualization software were used to stratify and modify the news headline data, so that the data can accurately reflect the nodes with the strong relationship between the keyword “student cadre” and network public opinion. This depicts the distribution of information connected to student cadres, as seen in Figure 1. Through node classification, the data reflects the different public opinion information combinations about student cadres in a total of 8 gathering regions from ① to ⑧.

2.1.1. Algorithm Introduction. K-core algorithm is an analysis method proposed by S. B. Seidman. The principle of
the K-core algorithm is to divide the network hierarchy structure according to the K-core value of nodes. In the analysis of big data network public opinion, clustering tens of thousands of pieces of public opinion information is an important process to judge and find out the hot spots of public concern, and the K-core algorithm provides technical support for the realization of this action. K-core in the network refers to the subgraph in which any node is adjacent to at least K nodes in the network. K-core value reveals the core degree of nodes and is used to divide the network hierarchy, namely, K-shell.

2.1.2. Algorithm Analysis Results. This study concludes that the socialized cognition of online public opinions does not need much student effort. On the one hand, the subjects of favorable and neutral public opinion themes are primarily university administrators, whose goal is to preserve a positive image of student cadre work, advertise work performance, and carry out routine work operations. Second, we should respond to social concerns, quell conflicts, and end public opinion crises. On the other hand, negative public opinion topics are strongly related to individual cases, and the contents and public opinion emotions involved further consolidate “identity symbols” and negate student cadres.

In short, in the current socialized public opinion environment, people generally use the “identity symbol” to define whether a student is a student cadre, and the position is the only social cognitive element for the establishment of a student cadre. Because of this ostensibly defined role cognition, some university student cadres are too concerned with obtaining positions and emphasizing “state symbols.” It is not difficult to discover that the public’s cognition is skewed in some way. They believe that “having a position is a student cadre” on the one hand and that “talking about position and state is bureaucratic” on the other hand. Student cadres in colleges and universities cannot extricate themselves in the vicious circle of antipathy to bureaucratic psychology, and their role loss becomes inevitable.

2.2. The Role Cognition and the Realistic Feedback. In the study of student cadres, the Chinese academic circle has never stopped touching the “identity symbol” and the attempt to amend the bureaucracy [1]. Compared with the Chinese environment, “identity” and “positional leaders” are not emphasized in the context of student cadres in western universities, but “universal representation” and “members” are, and it is believed that leaders can be generated in all directions and strata [2]. Some studies have shown that identity contributes comprehensively to the leadership education of individual students [3], but it does not consider the impact of the strengthening of student cadre identity on the overall work efficiency and social demonstration of the organization, even though the work contents of student cadres at home and abroad are different. In terms of orientation, the leadership studied by western educational principles in Chinese colleges and universities lacks practical space in the interaction between teachers and students. Model rights and expertise rights are the major ways to keep student cadres running in the interaction. A legal right, reward right, and punishment right are almost blank for student cadres. On the one hand, the identity fantasy with only responsibility and no power leads to boring research on student cadres under the cognitive framework of “identity theory.” On the other hand, it makes students have unrealistic identity fantasy about self-concept and further intensifies the bureaucratization of student cadres.

Employing N University student cadre’s prophase research interviews, this paper found that the current student cadre role cognition exists from the identity to the transformation of the state. The state refers to a kind of cognitive framework of student cadre; N University teachers and students generally accept that college student cadre’s true identity is still a student. Student cadre is the student under the working condition of the students. Progressiveness is the core feature of the establishment of the concept of student cadre. A senior student at N University said, “In our eyes, the student cadre identity is weakened, more emphasis is the student work, once any students are engaged in work, he or she will be the student cadre. Once the end of any student work, to do other things, such as the exam review, cultural and artistic performance, the scientific research activities, he or she will not be a student cadre, but students.” This role recognition based on working state has become the focus of attention of teachers and students of N University to student cadres. At the institutional level, although the student organization of N University has a bureaucratic organizational structure on the surface, it does not work following the hierarchical “command-obedience” empowerment model [6] in the actual operation process. Instead, it works following the typical matrix organizational structure and independently improves the implementation of the system.

2.2.1. Role Cognitive Transformation from “Identity” to “State”. In the observation of the life of student cadres in N University, it is found that the attributes of part-time jobs and task-orientation determine that student cadres are “state” rather than “identity.” First, we have the part-time attribute. First of all, student cadres are part-time cadres of the league and student organizations at all levels of the university. The “part-time” attribute is different from the “full-time” one. Chinese universities do not give special treatment to student cadres in the requirements for students' graduation. Therefore, student cadres can only use extra-curricular time to complete student work. Second, full-time attribute means to specialize in one job. Because the working hours of student cadres are difficult to determine, student cadre is not a full-time job.” Therefore, the cognition of “identity” contradicts the attribute of a part-time job, while the cognition of “state” fits the requirements of the extension of the attribute of a part-time job. Third, we have the task-oriented attribute. Because of the complexity of student work, student cadres must go deep into student groups and understand all kinds of things in student life. In the face of these work contents, student cadres cannot structure them. Finally, it can only be defined as a vague political task. To be sure, the solution of the fuzzy tasks necessarily need
motivation, the motivation is bound to make the process of fuzzy identity embarrassing, the student cadre's original single identity, namely "identity" cognitive is inconsistent with multiple clear identities, such as continue with "identity" cognitive for examination and assessment of the student cadre, is not clear for different state under different tasks individually quantitative evaluation. In other words, there will be the phenomenon of "inconsistent and asymmetric power and responsibility," while the cognition of "state" will be more flexible and efficient. Teachers and students of N University will often think that a student who is often engaged in student work is a student cadre, rather than paying attention to the expression of other identical symbols such as "announcement of transition" and "transition ceremony."

2.2.2. From "Bureaucratic" to "Matrix" System Implementation Improvement. Research on student cadres based on project life cycle is a specific embodiment of "state" cognition and matrix system [7] and also a true reflection of the work mode of student cadres in N University in the real-life world. "Project" means student work in a broad sense. The concept of student cadre comes into being with the generation of the project and ends with the end of the project. Without the project conditions, the student cadre no longer has any form of existence either in personal or in organizational development. Student cadre the project life cycle determines the student cadre. In essence, it is impossible for student cadres to adapt to the hierarchical relationship. The leadership of student cadre is different and changes as the project. Considering the different student cadre's special features and characteristics of different project matching, it will lead to the "dual leadership." The matrix model is a real scenario of the daily work of N University students.

3. Research on FCM Model of Student Cadre Retreat

Kosko [9] proposed fuzzy cognitive map (FCM) by integrating Zadeh’s fuzzy set theory and Axelrod’s cognitive map theory. Figure 2 shows the basic structure of the FCM. It is equivalent to a nonlinear dynamic system and can be regarded as an object-oriented neural network, which can simulate fuzzy reasoning through the propagation of causality between concepts. The model simulates the dynamic action of the system through the interaction between various concepts in the whole network. Similar to the neural network, the FCM model can map the input to the output equilibrium state. The FCM state space is determined by initial conditions. And then, this model can propagate automatically through threshold-dependent vertex functions, through non-one-time pulses, until static is reached. This model directly reflects the movement process of the nervous system, so it can completely express the internal complex relationship between factors. When FCM reaches a stable finite cycle state or fixed point, the causal reasoning of the whole process is completed. Through the FCM model experiment, this study accurately found the most important factors influencing the dropout action of university student cadres and demonstrated the influence mechanism of each factor on the dropout action, which will provide strong experimental evidence for the role remodeling and system correction of university student cadres.

3.1. Experimental Methods and Design. Interviews were conducted with one student union instructor, two undergraduate students in their third year, two undergraduate students in their second year, and two undergraduate students in their first year in the secondary college of N University, and a mental model with "student cadre retreating" as the target variable was obtained and constructed.

The researchers told the participants before the interview that they should use the Likert scale question writing method to determine the causal weight of each relationship, with values ranging from 0 to 1, with 0 representing a very weak causal relationship and 1 representing a very strong causal relationship. To confirm the validity and theoretical relevance of fuzzy cognitive maps, the researchers did not define student cadres other than the basic mapping rules, which had no effect on the participants' ability to generate causal maps. In the enlightenment part of the interview, the retreat of student cadres is given as the starting point. Then, respondents will get some initial concept cards. Some key factors are marked on these concept cards. Firstly, respondents need to establish a causal relationship between the factors and the initial concept and determine the strength of
the relationship. Secondly, respondents need to expand the scope of causality on this basis until they think and completely construct their own mental model. Thirdly, respondents can create or modify concept cards to improve the model. These “starting concepts” were written on index cards and given to participants, who were free to modify, add, and delete them as appropriate to ensure that their cognitive map was a true mental model. In the second step, participants thought about causality and strength among selected, revised index cards, then plotted these concepts on a large card, and labeled the causality.

After the interviews, the researchers asked the participants to reexamine their cause-and-effect maps and explain the concepts and the causal connections between them to ensure the accuracy of the information. FCMapper is a fuzzy cognitive mapping software solution that can automatically carry out social learning in the mapping process for complex models for which it is difficult to quantify and effectively solve complex crossover problems [10]. By FCMapper and Pajek software, Figure 3 is implementation of college student cadre of 49 of the influencing factors of the relationship between network. All indexes and weights are transferred from the original cognitive map. If the two concepts are linked in the mental model of multiple respondents, but their understanding of the intensity of causality is different, the final result will be the average of the two. Table 1 shows the basic information of interviewees in the experiment.

3.2. Experimental Results. Through the experiment, the author team has finished a test for student cadres. They have drawn the factors of the relationship in the network. In the result, there are no exogenous variables and return loops. The FCM outputs the calculation of check matrix, index, and a few steps. After 20 iterations, the relationship of various factors have been stable. According to the calculation, the following is about the arrangement of influence intensity (Figure 4) and the centrality of mental model (Figure 5).

Figure 4 reflects the influencing factors leading to the retreat of student cadres. Through the analysis of the influence intensity of the factors leading to the retreat of university student cadres, it can be found that the lack of mass support and the ideological and moral problems of student cadres are the most important factors leading to the retreat of university student cadres, which reflects the double pressure that university student cadres are facing from teachers’ assessment and mass support. In addition, there are some factors here, just like difficult to deal with ambiguous political tasks, difficulty to deal with the relationship between teachers and students, pressure of student cadres’ performance appraisal, and other 9 items. The influence intensity of these factors on a exceeds 0.8. It fully illustrates the cadres are strict with the students and also confirmed that the elimination of student cadres in Chinese universities is relatively high [11].

Figure 5 reflects the centrality of influencing factors in the relationship network. The centrality output of FCMapper shows that the lack of ability and the lack of support from the masses are the factors of high central value, which reflects the higher requirements of college student organizations for ability and the high attention to the support of student cadres and the masses. Through consulting the Student Handbook of N University, it was found that N University proposed the following when selecting outstanding student cadres: “The selection of outstanding student cadres adopts the grass-root veto system, and the selection of outstanding student cadres by the student organization at the next level must be approved by the student’s college and class; otherwise, the election is invalid.” This further proves the important position and function of mass support in the evaluation of university student cadres. In addition, the student cadre’s ideological and moral problems, difficult to deal with vagueness and political task and pressure on
Factors affecting the Retreat of student cadres
(Sorted by impact intensity from highest to lowest)

- Insufficient classmates support
- There are problems of ideological character
- Difficult to deal with ambiguous political tasks
- It is difficult to handle the teacher-student relationship well
- Pressure on student cadres' performance appraisal
- Lack of ability
- Lower work goals and balance academic performance
- Mistakes are frequent and confidence is lost
- The training system is not perfect
- The flow of student cadres is fast
- Student leaders have strained relations with other students
- Low productivity
- Interpersonal feelings are frustrated
- Promotion space is limited
- Aversion to unspoken rules
- Bureaucratization of student cadres
- Work has less meaning and less fulfillment
- The teachers of professional courses do not understand
- The student cadres did not complete the assigned tasks
- Compress entertainment time and rest time
- Reduce the interest of life
- Low academic performance
- Abilities vary widely
- Students' thinking changes rapidly and is difficult to grasp
- The students did not understand

Table 1: Information about 7 respondents.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Instructor</th>
<th>Student cadre A</th>
<th>Student cadre B</th>
<th>Student cadre C</th>
<th>Student cadre D</th>
<th>Student cadre E</th>
<th>Student cadre F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept cards</td>
<td>12</td>
<td>18</td>
<td>15</td>
<td>21</td>
<td>19</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Contact</td>
<td>16</td>
<td>18</td>
<td>16</td>
<td>21</td>
<td>20</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Average empowerment</td>
<td>0.744</td>
<td>0.611</td>
<td>0.576</td>
<td>0.615</td>
<td>0.545</td>
<td>0.448</td>
<td>0.620</td>
</tr>
</tbody>
</table>

Figure 4: Intensity of influence of student cadre retreat factors.
student cadre performance centricity among various factors top three factors, by comparing impact strength analysis, the further study found that these five factors on the college student cadres department action play an important role.

4. Conclusion and Discussion

This paper argues that, in order to achieve the ultimate goal of self-education, self-management, self-service, and self-supervision of university student cadres and form good student governance, it is necessary to reshape the role of student cadres, correct the system, and realize the cognitive transformation from “identity” to “state” at the role level through a series of analyses. At the institutional level, the state of the matrix system in the operation mode of student work is acknowledged, to reduce the loss rate of university student cadres from the source, avoid the retreat action, improve the stability of the whole student cadre team, and stimulate the spirit of entrepreneurship and the vitality of the student cadres. This study proposes the following five ideas and countermeasures for role remodeling and system rectification based on the five major factors of retreating action.

4.1. Mass Support: Return to Student Standard and Emphasize “State” Cognition. Mass support is the first factor for student cadres to get role identity and carry out daily student work normally. To win the masses’ support, student cadres must first be closely linked to students, emphasizing that student cadres are also students and that student cadres are only engaged in student activity. This role proposition stresses the “state” cognition. The image of student cadres serving students pragmatically can be developed through role reform, and student cadres have been acknowledged beyond the identity sign. University student cadre only have the courage to break the state symbol with the authority of the illusion, they can get out of the error role. And then, they can improve their support of the classmates. Finally, it can be formed a positive cycle, just like "pragmatic work-the more support-improve work enthusiasm, be more pragmatic."

4.2. Ability: Build Functional Group and Focus on Ability Training. For improving ability, college student organizations should give full play to the advantages of matrix working mode, strengthen the construction of the horizontal organizational structure, and build special functional groups focusing on ability training. The student organization flattening reform will be more effective with a matrix correction system rather than a hierarchical system, as it will be able to more clearly streamline business processes and implement the service students concept and it will make the system of college students more flexible. Therefore, the students work will also be finished more smoothly and efficiently. In the later stage of the establishment of the functional group, the university student organization should actively sum up the experience, consolidate the working mode of the matrix system, and do a good job in the transfer of student cadres, to effectively link up the student work and avoid the handover deviation.

4.3. Ideological and Moral Character: Strengthen Pragmatic Concept and Adhere to Seeking Truth from Facts. The role remodeling of “state” and the system correction of matrix system transformation have put forward higher requirements for the comprehensive quality of university student cadres, especially in the aspect of ideological and moral character, which requires university student cadres to strengthen their practical ideas and adhere to the implementation of student work from reality. On the one hand, the recasting of the role of the “state” allows student cadres to play a more flexible role. Teachers and students at colleges
and universities no longer see student cadres as having a set identity but rather focus on the actual results, and micro-corruption like cheating and fishing in turbulent waters will no longer have a place in college students’ political lives. On the other hand, college student cadres will master the ability to transform work flexibly. It means that “mastering many skills while specializing in” will become the norm. And the student cadre should clear their strengths and weaknesses. In the matrix system, the student cadres’ work can promote satisfaction of the classmates.

4.4. Task: Improve Matrix Efficiency and Speed Up Multidirectional Communication. To deal with the political task, college student cadre should make full use of the matrix system model to solve the fuzzy political task of system advantage. When the meeting is difficult to solve the problem of students work, they should promptly up horizontal communication and do not worry about the identity of the traditional model of the inherent differences or the rank order of sense. Student organizations in colleges and universities should improve organizational efficiency, speed up multidirectional communication, loosen the internal system, and tighten the external system to allow the existence of informal organizations to some extent, while resolutely maintaining centralized and unified voice and centralized and unified leadership externally to avoid the phenomenon of “spreading rumors.”

4.5. Performance Assessment: Explore Accurate Assessment and Award Excellent Performance Based on Actual Evaluation. The pressure of performance assessment of student cadres comes from the fuzziness and excessive comprehensiveness of the assessment. The original requirement of “all-round development” of student cadres has been alienated to “all-round excellence” of student cadres, which seriously violates the objective law of talent training. Because of the role lost in the traditional environment, university student cadres are often endowed with the expectation of a “perfect” personality. In the promotion of student cadres, a one-sided voting mechanism will be used in this so-called “pursuit of perfection” under the environment, resulting in student cadres losing the power of entrepreneurship and work passion as a result of the original “imperfect” environment. The role of the “state” can reshape the matrix of the system. It needs the student cadres make sure the characteristics of the administration, media, or public welfare. And then, they should combine precision evaluation based on the practice work to review best performance. All in all, the matrix of the system can liberate the student cadre from the error innovation and entrepreneurial passion. Finally it can realize the purpose and goal of “self-education, self-management, self-service and self-supervision” of the student union.

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

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

References

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