

# Exploring the application of Journal Club Teaching Method in Forest Fire Prevention Graduate Teaching

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## Abstract

Forest fire prevention is an important pillar of China's forestry development, and the training of fire prevention talents is indispensable. The Journal club teaching method can improve students' ability to summarize and organize literature, acquire cutting-edge information, read English, and accumulate knowledge and practical application skills. The Journal club teaching method is used as an experimental method to construct the expected evaluation, post-evaluation system and feedback questionnaire for students and teachers to explore the feasibility of the Journal club teaching method in teaching English to forest fire prevention graduate students.

## Keywords

Forest fire prevention; Journal club, Capacity enhancement; Evaluation system.

## 1. Introduction

Forests provide shelter for the Earth's biodiversity (MEA, 2005), providing habitat for 80% of amphibians, 75% of birds, and 68% of mammals. since 1990, more than 100 million hectares of forests have been adversely affected by fire, pests, and catastrophic weather. an analysis of the global area of forests affected by fire between 2003 and 2012 shows that each year approximately 67 million hectares burned. 90% of these fires were controlled in time and accounted for 10% or less of the total area burned, but the remaining 10% accounted for 90% of the area burned, resulting in the loss of human and animal life, significant damage to property and infrastructure, and unquantifiable environmental and economic losses. In the future, climate change is expected to bring longer fire prevention periods and more severe fires in most parts of the world. Therefore, it is significant to strengthen forest fire prevention, teaching and human resource development.

## 2. Current Status of Domestic and International Research

Journal club is a teaching mode to improve students' research literacy, English ability and reading habits by sharing the content, methods and ideas of the classical or latest literature in the field of study and discussing with the members of the group, and disseminating their critical thinking and sharing ideas. This teaching method can optimize students' research mode, exercise literature retrieval, fine reading and summarizing ability, further improve teaching quality and cultivate excellent talents.

Isaac A. Thangasamy[1] et al. used the Journal Club teaching method in urology and analyzed its validity using four indicators of participants' response, learning ability, behavior, and outcome as evaluation factors of the Kirkpatrick evaluation model after quantitative teaching. deenadayalan BPT IMMP BEHM[2] et al. used Journal Club pedagogy to improve their understanding of improving knowledge, research design, statistics, and critical evaluation with a database and evaluation system. The results showed that more than 80% of the members had

hints in improving knowledge and critical evaluation. Jon O. Ebbert[3] et al. used Journal Club teaching method in physicians' training to explore whether it was effective in improving medical knowledge, grooming skills, critical evaluation skills, improving reading habits, increasing knowledge of clinical pathology, biostatistics, and use of medical literature in practice clinics. The results showed that this teaching method can improve knowledge of clinical pathology, knowledge of biostatistics, reading habits, and use of medical literature in practice clinics. KHALID S. KHAN[4] et al. showed that the Journal Club teaching method can provide a platform for trainee physicians to improve their developmental skills and can provide them with a structured guide based on clinical questions, systematic literature searches, and article evaluations.

Chen Zhaolin[5] et al. used undergraduate pharmacy interns in the Department of Pharmacy of the First Hospital of the University of Science and Technology of China to explore the model of cultivating pharmacy undergraduate interns by combining Journal Club and PBL model of teaching. Zhang Yong[6] et al. used Journal Club to explore the model of medical undergraduate training literature reading habit and learning ability for undergraduate clinical medicine students in Hainan Medical College. Wang Juping[7] et al. applied the Journal Club teaching method to graduate students' advanced pathophysiology and scored items such as English reading, literature summarization and organization ability, and language expression ability under this teaching method. The results showed that the Journal Club teaching method was effective in improving the research literacy and ability of academic graduate students. LiXi[8] et al. explored the effectiveness of the student-centered application of the Journal Club teaching method in the development of research skills of graduate students in clinical medicine. The results showed that this method helped to improve the comprehensive research ability and learning autonomy of graduate students in this specialty. Han Yongmei[9] et al. used the Journal Club teaching method to analyze the correlation between five dimensions: learning attitude, classroom performance, research ability, teacher-student relationship, and student evaluation, and their correlation with the development of research ability, and the results showed that the graduate students' ability of literature reading and creative research thinking improved significantly after the Journal Club teaching method.

Journal club teaching method improves students' ability to summarize and organize literature, acquire cutting-edge information, read English, accumulate knowledge and apply it in practice, making the Journal club teaching method applicable to medical majors in domestic and international teaching. This teaching method is also applicable to forest fire research. Forest fire research includes 93 subjects such as environmental ecology, geology, meteorology, disaster science, etc., which mainly focus on forest fire research technology, and there are difficulties[10] such as huge frontier information, wide theoretical fields, inconspicuous interdisciplinary characteristics, and difficulty in obtaining practical data. The Journal club teaching method can quickly train graduate students in forest fire prevention and enable them to quickly and effectively grasp the highly advanced and broad field of forest fire technology.

### **3. Journal Club Teaching Program**

#### **3.1. Research Subjects**

In each session, 50% of the students were randomly selected for the Journal club teaching method and 50% for the traditional teaching of English.

#### **3.2. Research Methodology**

In the Journal club method, the teacher leads the class and the students discuss the subject on their own. In 25% of the class time, the teacher gives normal lectures, such as terminology and vocabulary, grammar, foreign research, etc.; 50% of the class time, the teacher provides

research problems in the field of forest fire prevention for students to choose, and students are required to search foreign literature for compilation and review; the rest of the class time, students report the results and insights in the form of PowerPoint or video, and discuss freely under the guidance of the teacher, and discuss the research. In the rest of the class, students will report the results and insights by PowerPoint or video. Finally, the instructor will summarize and grade the students' performance. The traditional professional English teaching group teaches normally.

### 3.2.1. Literature Inclusion Criteria

Literature reading is an important element of the Journal club pedagogy, and the quality of the literature will directly affect the effectiveness of the teaching programme. After students determine their research direction, it is recommended that they choose Top journals or high-quality articles in their field published between 2016.1.1 and 2021.12.31; they should consider articles with major disasters, or climate change years, such as the 2019 California wildfires, the 2020 Australian super fires, and the 2008 freezing disaster; they should consider a small number of pre-2000 literature; students are encouraged to select high-quality SCI papers, literature with strong research methods and content borrowings, and good field integration; close reading of literature with rigorous scientific terminology, smooth and logical language, and novel research methods is encouraged.

### 3.2.2. Literature Inclusion Criteria

Long interval of Journal club teaching is ineffective; short interval is ineffective in improving students' ability. Journal club teaching is conducted once every 2 weeks, group members: less than 10 people, one group; more than 10 people, divided into units according to the percentage, a total of 8 groups; each teaching time of about 120 minutes, each group 8 minutes for literature analysis, the rest of the time under the guidance of the teacher for free discussion, and point out the shortcomings and questions of the study's methodology, content, results and other content. The lecture and PPT presentation should be in English or bilingual, and should introduce the research method, briefly describe the process, conclusions and significance of the literature, and present the shortcomings and doubts found when searching and reviewing the literature. Finally, the teacher will summarize and grade the presentation.

## 4. Assessment and Evaluation

### 4.1. Expected Evaluation

The pre-teaching assessment was conducted for all students, and the contents were professional English proficiency test (Table 1), forest fire knowledge level (Table 2), cutting-edge literature retrieval and summarization ability (Table 3), critical assessment thinking (Table 4), reading habit (Table 5), and skill and method mastery level (Table 6), and each assessment test was divided into 5 items, and each level was calculated quantitatively. The weight of each assessment content is scored by experts, see Table 7. The expected evaluation can determine the overall level of students, and compare and analyze with the assessment evaluation, the results can show that the Journal club teaching method has a great effect on those aspects of students' improvement.

**Table 1.** Professional English Proficiency Test Form

	Title content	Number of questions	Score
English Terminology Glossary	English-Chinese Translation	20	1
	Abstract Summary	1	20
English literature reading comprehension	Methodology Summary	1	20
	Conclusions in brief	1	20
English grammar usage	Writing	1	20

**Table 2.** Forest fire knowledge level test table

Type of assessment content	Number of questions	Score
Forest technology equipment	10	2
Forest fire prevention and control strategies	5	4
Forest combustibles	10	2
Forest fire warning forecast	5	4
Forest Fire Evaluation	5	4

**Table 3.** Test of frontier literature search and summarization ability

Type of assessment content	Score
Literature Review	20
PPT presentation	20
Language expression	20
Quality of retrieved literature	20
Frontier Literature Reading	20

**Table 4.** Critical assessment thinking skills evaluation scale

Type of assessment content	Grade	Calculate the score
No deficiencies identified	I	1
Identify scientific misrepresentation	II	5
Identify contradictions in conclusions and statements	III	10
Identify inadequacies in experimental and research methods	IV	15
Identify methodological errors in principle	V	20

**Table 5.** Reading habit evaluation scale

Type of assessment content	Grade	Calculate the score
No weekly reading of literature	I	1
Number of literature read in two weeks 2	II	5
Literature reading 1-2 articles per week	III	10
Literature reading 2-4 articles per week	IV	15
Literature reading 2-4 articles per week and recorded	V	20

**Table 6.** Skill and method mastery level evaluation scale

Type of assessment content	Grade	Calculate the score
No statistical or programming software other than office	I	1
Know 1 kind of mathematical statistics, programming, modeling software	II	5
Knowledge of various mathematical and statistical, programming and modeling software	III	10
Know 1 software and more than one algorithm	IV	15
Knowledge of multiple software and more than one algorithm	V	20

**Table 7.** Weighting table for each assessment element

Type of assessment content	Weights
Professional English Proficiency $A_1$	0.2
Forest fire prevention knowledge level $A_2$	0.15
Cutting-edge literature search and summarization ability $A_3$	0.2
Critical Assessment Thinking $A_4$	0.15
Reading Habit $A_5$	0.2
Skill and method mastery level $A_6$	0.1

These six expected assessments were administered to each student and recorded prior to the start of class. The overall score for each student is then calculated:

$$\text{Composite score} = 0.2A_1 + 0.15A_2 + 0.2A_3 + 0.15A_4 + 0.2A_5 + 0.1A_6$$

#### 4.2. After-effects Evaluation

At the end of each academic year, the students were tested on their English proficiency, their knowledge of forest fire prevention, their ability to retrieve and summarize cutting-edge literature, their critical assessment thinking, their reading habits, their skills and methodological mastery, and their overall scores. The evaluations of the members of the Journal club teaching group were compared item by item with the traditional teaching group, and the evaluations of the members of the Journal club teaching group were compared item by item with the pre-teaching assessment to analyze whether the Journal club teaching method was effective and which aspects of the students' improvement were significant. A feedback survey was also set up with students as the center and teachers as the center (Tables 8 and 9).

**Table 8.** Feedback survey form for traditional teaching group/Journal club teaching group

	Yes	No
1. Willingness to continue to participate in the study		
2. Whether satisfied with the teaching status		
3. Whether it will help you in your studies		
4. Whether the academic help is up to your expectation		
5. Willingness to be self/teacher oriented in the learning process		
6. Willingness to participate in Journal club teaching method / traditional teaching method lectures		
7. Whether professional English level has improved		
8. Is the level of professional English up to your expectations		
9. Has the level of forest fire prevention knowledge improved		
10. Whether the level of forest fire prevention knowledge meets one's expectations		
11. Has the ability to search and summarize cutting-edge literature improved?		
12. Does the ability to search and summarize cutting-edge literature meet your expectations?		
13. Critical assessment of whether thinking has improved		
14. Critically assess whether thinking meets your expectations		
15. Does the reading habit improve		
16. Are the reading habits meeting their expectations		
17. Whether the level of skill and method mastery has improved		
18. Whether the level of skill and method mastery is up to your expectations		

**Table 9.** Teacher Feedback Questionnaire

	Yes	No
1. Willingness to continue teaching		
2. Whether satisfied with the teaching status		
3. whether it is helpful to your work		
4. Whether the effect of teaching work meets one's expectation		
7. Whether the teaching task of professional English water is completed		
8. Whether the students' professional English level meets their expectations		
9. Is the task of teaching forest fire prevention knowledge completed		
10. Whether the level of students' knowledge of forest fire prevention meets their expectations		
11. Whether the task of teaching frontier literature search and summarization is completed		
12. Whether the students' frontier literature search and summarization skills meet expectations		
13. Critically assess whether the task of teaching thinking has been accomplished		
14. Students critically assess whether thinking meets their expectations		
15. Whether the task of teaching reading habit development is completed		
16. Whether students' reading habits meet expectations		
17. Skills and methods to master the teaching task is completed		
18. Whether the students' skills and methods mastery levels meet their expectations		

## 5. Conclusion

Journal club teaching method originated in foreign medical professions and is widely used in Europe and America, with the purpose of discussing the latest published research or scientific papers with clinical applications. Journal club teaching is usually held once every 10-15 days with the participation of the group supervisor, graduate students and other researchers. The graduate student is the main reporter, who selects the cutting-edge information and introduces, analyzes and discusses the main content and ideas of the paper; other members participate together and ask each other questions to improve the graduate student's ability to read literature and analyze problems and scientific research.

The number of graduate students in forest fire prevention is relatively small, but the multidisciplinary intersection of forest fire leads to a large number of researchers, including 93 disciplines such as environmental ecology, geology, meteorology, and disaster science. In order to cultivate academic and comprehensive forest fire professionals based on domestic and international forest fire teaching, focus on hotspots of forest fire research, and develop cutting-edge vision, the adoption of Journal club teaching method can comprehensively cultivate scholars whose academic level is at the beginning and deepening, and is conducive to exercising their literature review ability, critical thinking, and innovation consciousness, as well as improving English proficiency and realizing the gradual change of learning mode from passive learning to The students will be able to develop a deeper understanding of the forestry industry. Students will have a deeper understanding of the fundamentals and advances in forest fire prevention and related disciplines, and will be able to build a foundation for entering forest fire practice and graduate education.

The limitations of the Journal club teaching method are limited by the research direction of the facilitators, their own academic level and the seriousness of the participants in the exchange, so it is necessary to guide scholars who are really interested in scientific research to participate in the Journal club teaching in a targeted way. In conclusion, the Journal club teaching model is aimed at improving the research literacy of graduate students in forest fire protection, which meets the current needs of Chinese society for improving the quality of forest fire personnel.

## Acknowledgments

This work was financially supported by Agriculture and Forestry Working Committee of China Academic Degree and Postgraduate Education Society Fund(2021-NLZX-YB77), Southwest Forestry University Education Fund (YB202104, 202018).

## References

- [1] Thangasamy Isaac A,Loeb Stacy,Sathianathen Niranjan J,Leveridge Michael,Stork Brian,Davies Benjamin J,Woo Henry H. Evaluating the Effectiveness of an Online Journal Club: Experience from the International Urology Journal Club.[J]. European urology focus,2019,7(prepublish).
- [2] Deenadayalan Y,Grimmer-Somers K,Prior M,Kumar S. How to run an effective journal club: a systematic review.[J]. Journal of evaluation in clinical practice,2008,14(5).
- [3] The journal club in postgraduate medical education: a systematic review.[J].Medical Teacher Volume,2001,23(5).
- [4] KHALID S. KHAN HARRY GEE. A new approach to teaching and learning in journal club[J]. Medical Teacher,2009,21(3).
- [5] Chen Zhaolin,Tang Liqin,Fang Yan,Du Decai,Zhang Lei,Ni Weijian,Shen Aizong.Application and practice of Journal Club combined with PBL teaching method in the cultivation of research ability of pharmacy undergraduate interns[J]. Educational Teaching Forum,2020(19):237-239.
- [6] Zhang Y, Xia Zhixuan, Liu Qiang, Liu Qibing, Zhang Xiaopo. Exploring the mode of cultivating literature reading habit and ability of medical undergraduates--Practice and reflection on the teaching method of "Journal Club"[J]. Educational Teaching Forum,2021(42):169-172.
- [7] Wang Juping,Gao Jie,Peng Hui.Study on the application of Journal Club teaching method in teaching advanced pathophysiology to postgraduate students[J]. Chongqing Medicine,2021,50(03):535-537.
- [8] Li X, Wu Zuwei W, Yin Last Night. The application of literature presentation teaching method in the training of research ability of postgraduate clinical medicine students in a university in Wuhan[J]. Medicine and Society,2021,34(10):108-111.DOI:10.13723/j.yxysh.2021.10.021.
- [9] Han Yongmei, Wei Aiwu. The application of literature presentation teaching method in postgraduate research ability training[J]. Modern distance education of Chinese medicine in China, 2021, 19(18):34-37.
- [10] Jian Wei, Chen Yu, Yu Tingting. Discussion on the teaching reform of forest fire prevention courses in colleges and universities in the new era[J]. Green Technology, 2020(15):222-223 . DOI:10.16663/j.cnki.lskj.2020.15.088.