Journal of Education, Teaching and Social Studies
ISSN 2642-2336 (Print) ISSN 2642-2328 (Online)
Vol. 7, No. 2, 2025
www.scholink.org/ojs/index.php/jetss

Original Paper

Difficulties and Coping Strategies for College Students to Participate in Community Bilingual Science Teaching —Take the "Summer Science Popularization Volunteer Team Project of HuBei University of Technology" as an Example

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Abstract

College students' participation in community bilingual science teaching is an innovative form that integrates volunteer service with educational practice, holding significant importance. However, challenges such as insufficient publicity, difficulties in standardizing curriculum difficulty, and the lack of experience among student volunteers persist in practice. This paper takes the 2024 Summer Science Popularization Volunteer Team Project of the School of Foreign Languages at Hubei University of Technology as a case study, analyzing the difficulties encountered in volunteer service and proposing corresponding solutions. With concerted efforts from all stakeholders, it is anticipated that bilingual science teaching activities led by college students will be further developed in the future, contributing to the advancement of education and social civilization.

Keywords

College Students' Volunteer Service, Bilingual Teaching, Community Volunteer Science Education

1. Introduction

1.1 Background

As an important symbol and means of strengthening social management and promoting civilization, volunteer service serves as an effective carrier for ideological and political education (Wang, 2022). It bridges the gap between theoretical learning and social practice, enabling college students to better adapt to the needs of future societal development. Communities, as fundamental units of society, are key platforms for disseminating scientific knowledge. Bilingual science teaching not only meets the diverse needs of different groups for scientific knowledge but also enhances the multicultural literacy and international perspectives of community residents in the context of globalization.

On one hand, college students can apply their knowledge to give back to society, fostering a sense of social responsibility and embodying the principle of "moral education." On the other hand, interactions with community residents help cultivate college students' communication skills, teamwork abilities, and cross-cultural competencies, achieving a harmonious integration of knowledge transfer and moral cultivation. However, challenges remain in the process of college students' community volunteering. Therefore, this paper examines the "2024 Summer Science Popularization Volunteer Team Project of Hubei University of Technology" to analyze the difficulties and propose countermeasures for bilingual science volunteer activities in communities.

1.2 Introduction to the 2024 Summer Science Popularization Volunteer Team Project

This project, based at the Nanhu Science and Technology Museum, targets teenagers in the Nanhu Street community. Led by English major students, it integrates English language skills with aerospace knowledge, using bilingual science popularization to help young people appreciate the charm of aerospace, improve their scientific literacy, and enhance their English proficiency and expression abilities.

2. Analysis of Difficulties in Bilingual Science Popularization Volunteer Service

2.1 Low Publicity for Bilingual Science Popularization Activities

The current outreach strategy for bilingual science activities in most communities suffers from over-reliance on singular digital platforms, particularly WeChat groups, while systematically neglecting a multi-channel communication approach. This myopic dissemination strategy creates significant barriers to inclusive participation, as evidenced in Wuhan's Fenghua Tiancheng community where the activity notification system exhibits three critical limitations: First, the exclusive dependence on WeChat groups establishes a technological barrier that automatically excludes digitally marginalized populations - particularly senior citizens and low-income families with limited smartphone access. Second, the registration mechanism requiring in-group form completion adds another layer of complexity, assuming universal digital literacy that doesn't reflect the community's actual technological landscape. Third, this approach fails to account for varied information consumption habits across generations, where older residents traditionally prefer physical information sources while younger parents favor digital platforms.

While the WeChat-based system capitalizes on the information age's conveniences through real-time updates and cost-effective dissemination, its implementation overlooks fundamental principles of inclusive science communication. Traditional but empirically effective channels - including community bulletin boards strategically placed near residential entrances and supermarkets, localized radio announcements during peak hours, printed flyers distributed through school networks, and face-to-face promotion at community events - remain dramatically underutilized despite their proven effectiveness in reaching non-digital natives. This oversight creates a participation paradox where the very communities that could benefit most from science education (families with limited educational

resources) are systematically excluded by the communication methods designed to serve them.

The consequences manifest most acutely in intergenerational educational access. Elderly caregivers, who often serve as primary childcare providers in multigenerational households, find themselves unable to navigate the purely digital registration process. This creates a vicious cycle where children from families with lower digital adaptability are repeatedly excluded from enrichment programs, inadvertently reinforcing educational inequalities through single-channel communication mechanism. The solution lies in developing an integrated communication ecosystem that synergizes digital efficiency with traditional reliability, ensuring no resident is left behind in the science education initiative.

2.2 Non-Uniform Difficulty Levels in Bilingual Science Courses

The bilingual science courses face significant pedagogical challenges due to the wide age range of participants (5–12 years old), which results in varying levels of cognitive development, language proficiency, and prior scientific knowledge. Younger learners (5–8 years old) typically require simplified explanations, visual aids, and interactive activities to maintain engagement, whereas older students (9–12 years old) often seek more in-depth content, critical thinking exercises, and opportunities for discussion. In Wuhan's Bao'an community, the absence of age-differentiated teaching materials creates a dual challenge: younger learners often become disengaged when confronted with overly advanced content, such as complex aerospace terminology lacking supporting visual aids or hands-on demonstrations, which leads to frustration and diminished interest, while older students simultaneously experience insufficient intellectual stimulation when presented with oversimplified lessons, causing them to view the activities as repetitive and unchallenging, ultimately reducing their motivation for continued participation. This pedagogical mismatch highlights the critical need for tailored educational approaches that accommodate varying developmental stages within the same learning environment.

2.3 Lack of Practical Experience of Student Volunteers

In the bilingual science popularization volunteer activities, college student volunteers usually focus on learning and lack practical experience, which brings multiple challenges to the smooth development of these activities. For instance, consider the Didong community in Wuhan. The children are highly energetic and enthusiastic, which can be challenging for new volunteers to channel during science activities. When it comes to maintaining classroom discipline, these volunteers, due to their inexperience, are highly prone to encountering chaos.

During a class where the volunteers were explaining knowledge related to cars, it was evident how quickly the situation could spiral out of control. The children who had little initial interest in the topic gradually lost their patience. First, one or two started to fidget in their seats, and soon, they began to whisper to each other. As the whispering spread, more and more children joined in, completely disrupting the classroom discipline. The once - orderly class quickly devolved into a disorderly scene, with the class order on the verge of collapse. At this critical moment, the volunteers, lacking the skills

and experience to handle such situations, were at a loss. They simply did not know how to use subtle means, such as changing the teaching method, adding an interesting anecdote, or using interactive elements, to draw the children's attention back to the class.

In addition, student volunteers often find themselves in a state of being overwhelmed when communicating with parents. Parents, understandably, have high expectations for their children's learning outcomes. When parents inquire about their children's performance and gains in the bilingual science activities, the volunteers, who are often inexperienced in such communication scenarios, may lack the necessary communication skills. They might stutter through their responses, unable to clearly articulate the children's progress, or fail to provide comprehensive feedback that includes not only academic achievements but also the children's behavioral and attitudinal changes during the activities. This lack of effective communication causes parents to have doubts about the effectiveness of the activities, which in turn can undermine the long - term sustainability and success of the entire bilingual science popularization initiative.

3. Solutions to difficulties

3.1 Building a Multifaceted Community Information Platform

One of the main reasons for the low participation in bilingual science popularization volunteer activities is the lack of organization and publicity. Communities can combine emerging and traditional ways of disseminating information to build a diverse network of communication that is suitable for all ages. For example, digital communication such as WeChat groups and community official websites, as well as traditional publicity methods such as community billboards, community publications, and community radio. It is convenient for people who do not know how to use smartphones, and improves the breadth of publicity. At the same time, school volunteers can also produce bilingual popular science videos, which should include the class process, student performance, after-class feedback, experience harvest, etc., and the videos can be put on the community official account, the school's official official account and other platforms, so that more students' parents and college students can see and actively participate in the ranks of bilingual science popularization.

3.2 Curriculum Research and Tiered Teaching

There are distinct differences in learning ability between students. Recognizing these variances is crucial for the successful implementation of bilingual science popularization activities. The organizer of the activity should take a proactive approach by carefully dividing the students in the community according to their age groups. Each age - group typically corresponds to a different learning stage, with unique cognitive capabilities and interests. For younger children, perhaps in the elementary school age range, the curriculum should be designed to be highly engaging and interactive. It could incorporate some colorful visual aids, simple experiments that are easy to understand and perform, and storytelling elements related to scientific concepts. For example, when teaching about plants, instead of delving deep into complex botanical terminologies, the curriculum could focus on basic plant life cycles

through fun stories about a little seed growing into a big plant. The teaching content could involve hands - on activities like planting small seeds in pots and observing their growth over time. For older students, such as those in middle school, the curriculum can be more in - depth. It can introduce more complex scientific theories, encourage critical thinking, and include group discussion topics. For example, when explaining rocket propulsion principles, the instructor could first show a video demonstration of an actual rocket launch, then distribute simple spacecraft model kits for students to assemble in groups. During the construction process, students should test how weight distribution impacts launch altitude and record flight data from each group's model. Finally, students would analyze and discuss their findings, addressing questions such as: How building methodologies affect rocket flight dynamics? How should payload weight and thrust be balanced? What are the key differences between space conditions and ground-based experiments? This "theory + hands-on practice + data analysis" teaching model not only deepens students' understanding of aerospace technology but also cultivates their scientific inquiry skills. The model-building segment is particularly effective at engaging young learners, while the data analysis component strengthens their logical reasoning abilities. Instructors can adjust the difficulty level based on students' ages—focusing on fun assembly for younger students while incorporating deeper theoretical exploration for older ones.

By formulating such corresponding curricula and teaching content for students at different learning stages, the “one - size - fits - all” large - class teaching approach can be effectively avoided. When publishing course news, the community should be detailed and informative. In addition to stating the popular science theme of the bilingual popular science activity, such as “Exploring the Mysteries of Space” or “The Wonders of the Microbial World,” it should clearly specify the age group suitable for the participating students. This helps parents and students quickly identify whether the course is appropriate for them. Also, providing information about the teaching teachers, such as their educational background in relevant scientific fields and their experience in teaching or volunteering, can build trust and attract more community students who are genuinely interested in the popular science content. This, in turn, significantly improves student participation. Apart from that, community workers play a vital role in the continuous improvement of these activities. They need to systematically collect feedback after each class. This feedback can come from both the students and the parents. They can use questionnaires, face - to - face interviews, or online surveys to gather opinions. Based on this feedback, corresponding adjustments should be made to the teaching content. If students find a particular scientific concept too difficult to understand, the content can be simplified or presented in a different way. Regarding teaching methods, if the current method of lecture - style teaching is not engaging enough, more interactive methods like group work or hands - on demonstrations can be adopted. The teaching mode of volunteers can also be adjusted. For instance, if the volunteers are not effectively managing the classroom, training can be provided to improve their classroom management skills. This cycle of feedback and adjustment ensures that the bilingual science popularization activities remain relevant, engaging, and beneficial for all participating students in the community.

3.3 Enhancing College Student Volunteer Services

3.3.1 Implement Volunteer Training of "Bringing the Old with the New"

Due to the lack of sufficient practice of college students, some difficulties often arise due to lack of experience in the process of popular science teaching. To improve the situation, the academy can guide novice volunteers through each step of the process by conducting systematic training, inviting experienced volunteers to share teaching methods, classroom management skills, and key points of communication with parents. At the same time, the college should also organize simulated teaching activities, so that student volunteers can practice and accumulate experience in practice, so that they can work more calmly and effectively in the actual bilingual science popularization volunteer activities. It is also necessary to invite professional teachers to serve as judges to point out the inappropriateness of the students' teaching so that the students can correct them in the future.

3.3.2 Strengthen University-Community Collaboration

At present, most of the youth volunteer activities in colleges and universities are organized and carried out by volunteer organizations at various college levels under the guidance of school volunteer associations. However, due to a series of factors such as the relative lack of funds and the difference in information transmission, the form of activities organized by university clubs is relatively simple. When students participate in activities, the range of choices is very limited, and it is difficult for their own abilities to be fully exercised and improved.

In the information age, the speed of information circulation is very fast, and when college students understand the rapid development of society, their hearts are full of yearning for a broader development platform, and they expect to devote themselves to social activities with a more proactive attitude and contribute to the progress of society. Therefore, in the long run, the future development direction of volunteer activities in colleges and universities will be that universities and social organizations will work together to carry out activities. Entrust specific volunteer projects to professional social organizations for operation and management, so as to promote the sustainable development of volunteer activities.

4. Conclusion

As an innovative form that combines volunteer service with educational practice, college students' participation in community bilingual science popularization teaching is not only a practice of "fostering virtue and cultivating people", but also an important way to promote the development of community science popularization education and improve the quality of residents. In the future, with the continuous efforts and collaborative cooperation of all parties, the bilingual science popularization teaching activities carried out by college students in communities are expected to become more in-depth and extensive. It is believed that with the joint attention and support of all sectors of society, the bilingual science popularization teaching activities of college students will play a greater role in the new era. They will not only contribute to improving individuals' scientific literacy and language skills,

but also help build a strong educational country and promote the progress of social civilization. By cultivating a love for science and language learning at the community level, we are laying the foundation for a more informed, globally aware, and culturally rich society. This initiative has the potential to trigger a chain reaction, inspiring more young people to participate in educational volunteer services and promoting the overall development of society in the long run.

In conclusion, college students' participation in community bilingual science popularization teaching is a win-win situation for both students and communities. By further strengthening the cooperation between universities and communities, we can ensure the sustainable development of this initiative and maximize its positive impact. This will not only enrich the educational experience of college students, but also make significant contributions to the educational and cultural development of communities across the country, ultimately leading to the realization of a more prosperous and civilized society.

Fund Project

This paper is a phased achievement of the 2024 Hubei University of Technology Provincial College Students' Innovation and Entrepreneurship Training Program project titled "Strengthening National Security, Empowering Space Dreams: A Practical Study on Bilingual Science Outreach Activities for Community Youth" (Project No. S202410500094).

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