Enterprise——the Garden of Middle School Students receiving Science Education

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Abstract:
As a part of the education for all-round development, science education is widely concerned by educators in China. In this article we analyze the problems of current science education for middle school students and the solutions should be taken correspondingly. As a modernized steel company determined to carry out the strategy of "being highly respected by the society", Baosteel explores into the possibility of providing middle school students with science education and access to practices. This action reflects enterprise's strong sense of social responsibility and commitment to achieve an all-round coordinative development with the society.

Keywords : Enterprise, middle school students, education for all-round development, technique education

I. Current problems in science education for middle school students, and the corresponding solutions

1. Survey on middle school students' science literacy

Science education, as a part of education for all-round development, aims to promote the science literacy of students. Science literacy consists of scientific knowledge, technique, and aspiration for science.

In order to understand to what extent science literacy will be required in the future, which probably indicates the potential requirements for this generation of youth, Shanghai has conducted a survey in a variety of enterprises that engaged in 12 different industries. The survey reveals an almost equal demand for technical knowledge to scientific awareness.

A corresponding survey has been carried out among 629 middle school students in 29 middle schools in order to find out to what extent the students have been installed with scientific knowledge and techniques. Looking at the three aspects of science literacy, students perform relatively well in knowledge (over 50% answers are correct), but poor at technique and aspiration. Focusing on the technical respect, the students are not too bad at cooperation and learning, but weaker in observation, expression and creativeness.

Comparing the results to the requirements, science literacy is badly lacking by these generations of students; and it should be re-addressed in the systematic education for all-round development.

2. Analysis on middle school's ability to develop science education
Poor science education in middle school hinders the development of students' techniques.

Technique is used to meet people's demand; it features practical value and addresses hands-on practice and creation. Technique consists of various process, operation methods and skills that developed upon production practice and scientific principles, and it also includes production tools, equipments and programs. Technique can be regarded as a course towards science and technology enhancement. Consequently, from an education perspective, it's necessary to provide students with enough chance to meet techniques as well as their application in the reality, or even try to use and create techniques, however, these requirements can't be satisfied just by limited resources in schools; we need to outsource the resources outside school for support, otherwise, students will have less access to technique education.

3. Solutions for promoting science literacy of middle school students'

In April 2004, the State Council approved the "Action Plan to Promote Science Literacy for all Citizens" proposed by China Association for Science and Technology. The reform carried out in school aims to shift education orientation from teaching knowledge to encouraging practice and creativeness; education will approach to all-round development of students by developing their interests and tapping their potentials.

Shanghai is one of the cities that firstly carry out the trial reform which clarifies the guideline as to "invite scientists to give lessons" and "combine the science community with the education community". Under the direction of the guideline, social resources need to be found to supplement school education, and give the students accesses to techniques in the real life that can't be learned in classes. On the other hand, inviting scientists and technical experts to the classes is another effective way to open students' mind for science and technology, and stimulate their creative thinking as well as improve their hands-on capability. Interactive discussion and practice will also close the distance between students and experts, as to let the young peoples sense the charming personality of the technical people.

Promoting the science literacy of middle school students should not be solely shouldered by school, it requires common efforts from all parts of the community and people in all works of life. What's important is the community outside school should recognize the responsibility of working with school, providing practice opportunities proactively to broaden the platform of science education for the younger generation.

II. Baosteel's consideration on "being highly respected by the society"

As the largest modernized steel complexity in China, Baosteel has been through 27 years of development. With its advanced technology and equipment, Baosteel is able to apply manufacturing process with less pollution and produce environment-friendly products with premium quality. Baosteel commits to seeking a developing roadmap that in harmony with the social development, and at the same time, supporting the development of Chinese steel industry in a sustainable way.

Along with years of evolution, Baosteel set up a strategic target of "being highly respected by the society", which reflects Baosteel's developing philosophy, i.e. creating a better public image, realizing an all-round coordinative development with the society.

Nevertheless, Baosteel has a prudent perspective on this target: a "highly respected" enterprise

should be much rather commonly agreed by the community than appraised by itself. So that Baosteel takes initiatives to establish company's "Hope Project", set up funds for high-art and scholarships.

In the course of promoting science and technology, Baosteel deeply realizes that science education for middle school students is of great benefit as to have them understand the value of more disciplines and aspire their emotions for science and technology. All these should be done before they make any choice of what's major they are going to take in the future, because it will directly influence their decision on whether to be an engineer or not. From a long-term management point of view, it's very important to guarantee the human resources supply in the future, that's why Baosteel is more than willing to share the responsibility with schools, trying to broaden the education platform of science and technology for the youth.

III. Baosteel's exploration into different approaches on providing middle school students with science education for iron & steel industry

Baosteel is owned by the Chinese people, it is the company's obligation to payback the society. Baosteel takes advantage of its facility resources and seek for various ways to improve steel education for middle school students.

1. Setting up guarantee organization and organize a variety of activities

15 years have passed by glimpse since the establishment of Baosteel Association for Caring Next Generation, which is composed by executives and experts retired from Baosteel. Aiming at education for all-round development, the association's continuous efforts will benefit not only the moment but also the long-run. It involves into main stream education in primary school and middle school, plays technical expertise in serving education, organizes patriotism education activities and engineering technology lessons, arrange Baosteel plant tours for more than 13,000 pupils and students. The members of the association have made over 38 speeches in science education activities organized by schools and communities. Their performance in the past 15 years creates value for education and wins Baosteel a good reputation in the community.

2. Compiling teaching materials, giving students access to the specialized world of iron **&** steel

To increase understanding and develop interest in steel production, Baosteel's technical experts compiled a package of education material named "*Enter the World of Iron & Steel*" for middle school class education. This package introduces Baosteel's production process and top quality products with diversified contents such as description, question, webpage and multi-media reference, practice instruction, engineer workshop, reference list, and website, etc. It stimulates students' interest and curiosity in steel as well as their ambition to be an engineer. Additionally, Baosteel sent senior technical experts to train middle school teachers, helping them to find connections between the specialized knowledge and the general knowledge that already perceived by the students. The intention of this education package emphasize s more on techniques and aspirations in the three dimensional science literacy. The interactive package is welcomed by middle school students.

3. As a State industrial tourist spot, Baosteel welcomes students from all over the world

As the only State industrial tourist spot in Shanghai, Baosteel receives middle school students in its plant for technical knowledge distribution. High school students can have chances to exchange ideas with engineering technicians, which will encourage their dream of being engineers. A tour in the research labs can popularize science and technology, at the same time, motivate learning and utilization of science. Baosteel have received over 500 undergraduates from UBC, Canada, the Chinese University of Hong Kong, as well as more than 20,000 students from primary and middle school. This kind of educative tour creates a great lot of benefits towards the society.

IV. Look into the future, here goes the coordinative development

The hot splashing liquid steel, the running steel plate, the neat plant, the real application of steel products, all what can be seen in Baosteel will largely promote students' understanding and emotion for steel industry ——the column of the national economy.

As the largest modernized steel enterprise in China, Baosteel will realize environment-friendly production, and build itself as a highly respected enterprise to provide science education platform and resources consistently for students.

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