

Research Article

Sustainable Development Goals (SDGs) Priorities of Senior High School Students and Global Public: Recommendations for Implementing Education for Sustainable Development (ESD)

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Education for Sustainable Development (ESD) contributes to the achievement of the Sustainable Development Goal (SDGs) when facing major global development issues. It includes formal, informal, and nonformal education, with an emphasis on a shift from “teaching” to “learning.” Using a data tracking approach and a questionnaire, this study aims to provide theoretical and practical suggestions for implementing ESD in senior high schools. Taking a Chinese senior high school as an example, the students in the school surveyed are compared with the global public in different language regions with respect to attention priorities for SDGs; students’ performance between the attention priorities and learning situation related to SDGs and subjects integrated into SDGs between learned and nominated are also analyzed. Gender equality and good health and well-being are the SDGs that students and the public both care most about. And the majority of SDGs receive less concern of the students and the public. By comparing the average amount of news about the SDGs in seven languages, the amount of news in English is far greater than other languages. Besides, different linguistic news has similarities and differences in their attention priorities to the SDGs. The students in the school surveyed only show greater learning performance in one SDGs, climate action. Only politics and economics, geography, and biology are the subjects with outstanding learning performance and high nominations by the students. The languages used to promote SDGs represent different populations and geographical distribution. The high school students’ attention to SDGs is affected by different linguistic media with the global public views, but it also has its particularities. Regarding the deficiency in SDGs awareness and learning performance, the implementation of ESD displays a nonideal status. It is also revealed that ESD should be strengthened. Additionally, during the process of ESD implementation, it is crucial to take full advantage of the combination of formal, informal, and nonformal education, advancing media campaigns for all 17 SDGs as well as fully mobilizing all course subjects to integrate SDGs. To achieve the curriculum reorientation of ESD, all subjects are recommended to connect to SDGs through unique characteristics. Considering the priorities of the students and the public, this research appeals to strengthening ESD through formal, informal, and nonformal channels under the influence from the global development and different linguistic regions’ media promotion. The recommendations can be used as an initiative and a reference for ESD implementation.

1. Introduction

The United Nations (UN) General Assembly adopted the 2030 Agenda for Sustainable Development in 2015, which is a global framework that leads humanity on the path to sustainable development [1]. The core of Agenda 2030 is the

17 Sustainable Development Goals (SDGs), which are critical to humans and the planet in addressing major global development challenges [2, 3]. Achieving these goals requires the contribution of all people worldwide from different geographic regions with different languages [4, 5], including China. As a community with a shared future, all

global citizens are responsible for understanding the development trend of SDGs and finding the connection between ourselves and sustainable development. To promote sustainable development and realize SDGs, everyone must contribute towards sustainable change and global challenges and issues [6]. People are required to acquire the necessary knowledge, skills, values, and attitudes to enhance their own sustainability awareness and competencies [7].

Education is an essential approach for achieving SDGs [8]. Education for Sustainable Development (ESD), as comprehensive and transformative education, involves learning content, outcomes, pedagogies, and the learning environment [9] and advocates lifelong and ubiquitous learning [10, 11]. The well-developed ESD enables learners to make informed decisions and take responsible action to promote environmental integrity, economic dynamism, and social justice to benefit present and future generations [2].

Multiple studies have shown that effective ESD can be achieved through dynamic integration of formal education, informal education, and nonformal education [12]. First of all, the education that students receive in organized educational institutions, such as primary, secondary, and higher education, is called formal education [13]. Formal education starting from the basics is essential for nations to achieve sustainable development [14]. Therefore, it is necessary for school stakeholders and educators to develop a systematic formal education to achieve ESD, such as in integrating the global challenges of the 17 SDGs into the curriculum. Nevertheless, formal education alone cannot meet everyone's needs for ESD, especially in developing countries where education resource is unevenly distributed. Therefore, it calls for the participation of various channels in addition to formal education in ESD to advance learners to be self-directed, such as media and extracurricular activities. This form of education is called informal and nonformal education [13]. Informal education does not necessarily include the objectives. It can be achieved from daily activities: watching TV programs, reading journals, etc. [15]. Non-formal education usually is realized outside the school and has flexible curriculum and approaches [16], for example, community service, trips, and conferences [17]. Since education both inside and outside the school plays a vital role in the development of high school students, SDGs should be promoted in all kinds of education. It means a shift from "teaching" to "learning" with a positive effect on people's lifelong learning process [18]. In short, all educational institutions, organizations, and schools can and should be responsible for addressing sustainable development issues and developing learners' sustainability capacities [19].

Despite the implementation of ESD for more than a decade, most of the fields of practice are in higher education, whereas there is limited involvement in upper secondary education [20, 21]. In China, SDGs are well known in higher education institutions. The sustainability issues are usually hot topics in the university, and the top priorities are mainly environmental oriented from the students' perceptions [22]. Besides, social aspects of sustainability development are gradually highlighted in the recent years, and ESD is one of the methods to realize the SDGs. It leads students to study

and live in a more sustainable way and is promoted in both formal and informal channels [23]. Senior high school shapes students' knowledge, abilities, attitudes, and values [24]. It is also a key period for achieving the effectiveness of ESD. Taking a Chinese high school as an example, the objective of this study is to investigate Chinese high school students' attention priorities and learning performance with respect to SDGs and to compare the media publicity of SDGs in different languages so as to understand the implementation of ESD and to give theoretical as well as practical recommendations on the implementation of ESD.

2. Theoretical Background

2.1. Sustainable Development Goals: Concerning Survival of Humankind and the Earth. In 2015, the SDGs were adopted in the UN General Assembly [25]. Containing 17 goals and 169 targets from several key aspects of poverty, hunger, economy, society, gender inequality, education, environment, and public health, the SDGs provided a new framework guiding both developed and developing countries to cope with unprecedented development challenges together in the next 15 years (2016–2030) [2].

The most prominent feature of the SDGs is its universality and indivisibility [2]; also, it has great capacity of strengthen inclusiveness [26], which means that every human being worldwide is responsible for taking actions to promote sustainable development [27]. As an important prerequisite for sustainable development, it is of great importance to examine the public's awareness, attitudes, and knowledge on SDGs [28].

2.2. Public's Understanding of SDGs: Strengthen Education for Leveraging Sustainability Awareness. Scholars have conducted large-scale investigations on people's understanding and attitudes towards SDGs worldwide. In Europe, for example, the statistics from GlobeScan demonstrated that, as of 2015, the proportion of people who have heard of SDGs is 28% [29]. In the same year, another survey concerning the public awareness of SDGs involving 28 European Union countries showed that 36% of the public know the specific targets of SDGs, and this number increased to 41% in 2016 [30]. In Latin America, according to empirical research, the university students in Mexico have an intermediate level in knowledge and attitudes toward sustainable development [31].

In addition, scholars believe that the public's awareness and understanding of SDGs will be affected by different factors, such as age, education level, gender, region, and, more importantly, previous education on SDGs [27, 32]. Some studies have proved that young people have a better understanding of SDGs. For instance, young people tend to have a higher understanding of SDGs that exceeds the average of the general public [32]. Well-educated young males have a higher level of awareness of SDGs [27]. Additionally, college students with little understanding of SDGs do not participate in relevant educational activities, while students with a deeper understanding of SDGs behave in the opposite

manner [33, 34]. The Chinese senior high school students' knowledge and information sources related to the SDGs are also limited [35].

The above research reflected striking absence of public awareness of SDGs; also, people's awareness of SDGs does affect their behavior. In this case, education has become an indispensable means to leverage SDGs awareness [36]. ESD is considered as an effective educational approach to enable learners to understand SDGs more systematically and to take responsible actions to advance sustainable development [2].

2.3. What Is ESD?—Speed up SDGs Realization. To raise public awareness of sustainable development, education is an essential tool to encourage the society towards SDGs realization [37]. ESD aims to enlighten people's consciousness of sustainable development through future education, including natural resource protection, sustainable consumption, global citizenship education, and gender equality, thus making massive contributions to the achievement of the SDGs [38].

Education for Sustainable Development Tool Kit was published in 2001, aiming to help schools to establish a process to create education that suits local conditions [39]. With the continuous implementation and development of ESD, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has published ESD for 2030 Toolbox [25]. Based on the practical experience learned from the Global Action Programme (GAP) on ESD, the ESD for 2030 intends to use education to speed up the achievement of the SDGs due to the deterioration of our natural environment [25]. This program aims to build a more sustainable world through strengthening ESD and making contributions to achieve all 17 SDGs [25].

According to the UNESCO, there are four crucial approaches to implement SDGs through ESD [2]. Firstly, ESD should be integrated into policies, strategies, and programs [2]. Education systems including SDGs are eager to be supported by local policies to better prepare for climate change and global warming challenges [25]. Secondly, ESD should also be included in curricula and textbooks in K-12 and higher education [2]. From daily learning, people could pay attention to practical problems from an early age and cultivate the ability of problem-solving and innovation [25]. Thirdly, as an essential role in the implementation of education, teachers are required to have an in-depth understanding of ESD [40]. It is noted that related training is necessary for these educators [40]. Fourthly, the evaluation after the lecture should be divided into different levels based on the content of the lecture and the audience [25].

Except for formal ESD, which is always implemented in entities with a systematic and organized educational system, such as school [12], informal and nonformal ESD cannot be neglected. Not officially included in the objectives, informal education can be achieved from daily activities, e.g., watching TV programs and reading journals [15]. Non-formal education is usually realized outside the school and has a flexible curriculum and approaches [16], for example, extracurricular field trips and workshops. The SDGs should

be promoted in all kinds of formal, informal, and nonformal ESD [2].

2.4. ESD Implementation Worldwide—High Schools in Most Countries Are Still Underdeveloped. An increasing number of countries consider ESD as one of the key factors influencing their education policy and teacher training [25]. In most peer-reviewed articles as shown in Figure 1, university seems to be the main entity which offers various activities related to sustainable development [41]. Specifically, most programs have been conducted in Western countries, Europe (68%), and North America (14%), while only 9% have been conducted in Southeast Asia [41].

Most ESD projects have adopted a group exercise format to solve a real environmental issue [42]. Some programs are based on outdoor activities [43] or summer projects to collaborate with communities during ESD programs [44].

There are fewer ESD programs and activities in high schools compared to universities when consulting relevant information, seeing Figure 1. Two countries have outstanding performance in ESD at high schools: Japan and Sweden [21]. Some Japanese high schools have ESD-related subjects; for example, students choose one from the following subjects: environmental science, engineering science, human science, and communication [45]. Students are expected to develop core academic and personal skills, gain global perspectives, and enhance critical thinking ability through these subjects [45]. In Sweden, ESD is extremely emphasized in the national curriculum [21]. Some secondary schools offer preparation courses for higher education, such as economic, administration, and natural science [21]. The students are aware of the global sustainable development agenda and try to contribute to their schools and communities [21]. These two countries provide examples of practical experience and inspiration for other countries worldwide. Meanwhile, it also indicates the urgent need for high school students to understand and practice SDGs through formal, nonformal, and informal ESD.

2.5. Formal, Informal, and Nonformal Education: Dynamic Integration to Facilitate Effective ESD. Studies have shown that only dynamic integration of formal, informal, and nonformal education can better achieve ESD [12]. Based on this, countries around the world implemented the three types of education in ESD actively: a Spanish middle school integrated the citizen science project into the school curriculum to encourage students to become active participants of the sustainable development [46]. The results show that participants' scientific literacy and attitudes towards science and technology have significantly improved, which in turn promotes the ESD [46]. In a Russian university, the functional block model of the project approach was created and applied to environmental education for sustainable development [47]. In the formal approach, students submit analytical materials (notes), coursework, research report, and final qualification paper through the project integrated into the curriculum [47]. As for the informal and nonformal

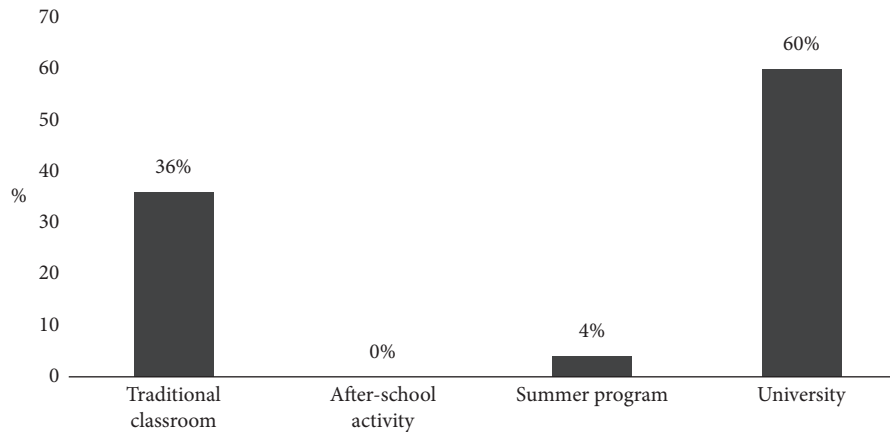


FIGURE 1: Places where ESD was implemented. Source: Achieving and Monitoring Education for Sustainable Development and Global Citizenship: A Systematic Review of the Literature, p.6 [41].

approaches, students carry out their own projects in student clubs, media groups, and communities, where there are no evident signs of training, but the results show that they have also significantly enhanced their problem-solving capacity to sustainable development issues [47]. In Tanzania, community learning centres were established as an important form of nonformal education for SDGs [48]. In Malaysia, geotourism is adopted as a tool of informal education, aiming to improve citizens' concept of protecting the ecological environment through geotourism and reap the economy benefits to protect the heritage, thereby resolving the conflict between environmental and cultural protection and economic growth [49].

In a word, by combining formal, informal, and non-formal education and applying it to ESD, on the one hand, students are able to acquire SDGs-related knowledge and concepts and develop their own skills and attitudes through school courses [50]. On the other hand, informal and nonformal education, such as student club activities, community learning centres, and field trips, give students opportunities to participate in sustainable development activities and consciously take actions to achieve the purpose of lifelong learning [51].

3. Research Design

Taking one Chinese senior high school as an example, this study used data tracking to acquire the SDGs attention priorities of the global public and a questionnaire survey based on previous studies [35] to acquire the SDGs attention priorities and learning performance of high school students.

For global public attention data with respect to SDGs, the number of news articles about SDGs worldwide was recorded, including the amount of news in six official languages of the UN as well as German via the website RELX Sustainable Development Goals Resource Center (SDG Resource Center, <https://sdgresources.relx.com/news>). SDG Resource Center showcases the latest information on SDGs science, law, business, activities, and more in order to expand the knowledge and understanding of SDGs. The center's SDG News Tracker displays the latest global SDGs

news over the past 30 days while searching millions of articles published in six UN languages (Arabic, Chinese, English, French, Spanish, and Russian) and German on a daily basis. The search on global news sources is carried out for SDGs target differential counts. A global SDGs focus database is established by regularly tracking weekly SDGs news over the month and the number in 7 languages, respectively.

During the same period, a questionnaire survey (see Table S1) was conducted in Beijing No. 35 High School in Beijing, China, in April 2021, to measure students' priorities and learning performance regarding the SDGs [35]. Students completed the questionnaires anonymously online through Wenjuanxing (<https://www.wjx.cn/index.aspx>). A total of 328 valid questionnaires were collected, with a response rate of 92%. In a Chinese three-year high school, with 50.91% boys and 49.09% girls, students aged 15 accounted for 10.67%; students aged 16 were 33.23%; students aged 17 took up 29.57%; students aged 18 and 19 occupied 25.30% and 1.22%, respectively. Grade 10 accounted for 31.10%; grade 11 was 36.28%; grade 12 occupied 32.62%. Besides, there were 14 course subjects in Beijing No. 35 High School International Department. The students were informed of the purpose of the research and signed informed consent forms.

The research questions in this study include the following: (1) Which SDGs are more concerned by the students and general public in different languages around the world? (2) What are the influencing factors of SDGs priorities of the students regarding different language media? (3) How do students' SDGs priorities affect their SDGs learning performance? (4) With respect to the integration of SDGs in the curriculum, what is the correlation between the subjects learned and the subjects nominated by the students?

These questions are linked to the research objectives, which are as follows: (1) Understand the students' priorities of SDGs, and understand what people in different language regions around the world know about SDGs. (2) Analyze the factors affecting the priorities of students with respect to SDGs. (3) Verify that ESD is affected by formal, informal, and nonformal learning among students through exemplifying curricular integration and media publicity. (4) Taking a

Chinese high school as an example, learn about ESD implementation, and give corresponding recommendations.

The limitation of this research method is that the sample students from the International Department of Beijing No. 35 High School come from different provinces and cities in China and will study abroad rather than domestic universities. They have different backgrounds, so they can represent the students of the whole country to a certain extent. However, due to the limitations of quantity and source, the representativeness of samples is still limited. In order to improve the representativeness, the follow-up research objects will be more extensive and diversified. Students from other schools in different regions and backgrounds in China will be investigated.

Nowadays, ESD programs are almost carried out in universities rather than in secondary schools [41]. The results from this high school cannot represent all Chinese high schools; however, as a key high school in Beijing, the capital of China, the questionnaires collected from here are able to reflect the current level of ESD in Chinese high schools to some extent and could draw lessons for other secondary schools.

4. Findings

4.1. Comparison of SDGs Attention Priorities between the Global Public and the Students. This research adopted Kendall rank correlation and Spearman rank correlation tests to analyze the amount of global news concerning SDGs during April and May. The Kendall rank correlation test was used to measure the level of consistency, and the Spearman rank correlation test was used to study the relationship between the collected data. In Tables 1 and 2, both Kendall rank correlation and Spearman rank correlation tests show statistical significance. The global public attention to SDGs was consistent in April and May, which means their focus on SDGs is stable and not affected by emergencies. Therefore, it can be set as a standard and compared with the attention to SDGs from the students in the school surveyed during the same period.

To understand global public and the students' attention to SDGs and to conduct a comparative analysis, the weight conversion of global news data and student data was carried out for comparison in the same frame of reference, as shown in Figure 2. According to the global statistics, the goals with the highest global attention are SDG 13: climate action; SDG 5: gender equality; SDG 3: good health and well-being; and SDG 8: decent work and economic growth. In the Chinese high school surveyed, the goals that the students are most concerned about are SDG 5: gender equality; SDG 4: quality education; SDG 10: reduced inequalities; SDG 1: no poverty; SDG 2: zero hunger; and SDG 3: good health and well-being, indicating that these aspects are currently the hotspots that the students care most about and are most relevant to their vital interests. The three goals of the global public with the least concern are SDG 15: life on land; SDG 14: life below water; and SDG 17: partnerships for the goals, and the remaining goals are all below the average value. For students, the last three goals

TABLE 1: Kendall tau rank correlation of people's worldwide preference for SDGs between April and May.

	April	May
April	1.00	
May	0.72**	1.00

* $p < 0.05$ and ** $p < 0.01$.

TABLE 2: Spearman rank correlation of people's worldwide preference for SDGs between April and May.

	April	May
April	1.00	
May	0.87**	1.00

* $p < 0.05$ and ** $p < 0.01$.

with the least concern are SDG 12: responsible consumption and production; SDG 15: life on land; and SDG 17: partnerships for the goals, and the rest are all below average. It reflected that these goals may be close to the solution or far away from real life, or people do not realize their importance, thus needed to be strengthened in ESD in the future. Besides, the data showed that high school students' attention to SDGs is influenced by the world but also has its own unique characteristics.

4.2. SDGs Attention Priorities of People from Different Language Regions. The news about SDGs tracked in this research covers six official languages of the UN and German. Different languages represent different regions of the world. Through the histogram shown in Figure 3, the concerns of different regions of the world on SDGs can be reflected by the amount of news related to SDGs in different languages. By comparing the average amount of news in seven languages, it is concluded that the amount of news in English is far greater than other languages, and the order of other languages is Spanish, Chinese, German, Arabic, French, and Russian.

By analyzing the media promotion of SDGs in different linguistic areas, it was observed that different linguistic areas have similarities and differences in their attention priorities to SDGs.

As for the similarities, it was found that some of the goals exceed the average with respect to news frequency, and these goals are SDG 5: gender equality; SDG 13: climate action; and SDG 4: quality education, demonstrating that these goals are what people in all linguistic areas are the most concerned with. At the same time, SDG 14: life below water; SDG 15: life on land; SDG 16: peace, justice and strong institutions; and SDG 17: partnerships for the goals are all below the average of news frequency. This means that the public may not have realized the importance of these goals. These are also the aspects that we should strengthen in ESD in the future.

Nevertheless, there also exists a uniqueness in the focus on SDGs in different linguistic areas. Take SDG 3: good health and well-being as an example; it is observed that the news frequency of this goal in Russian is far beyond the

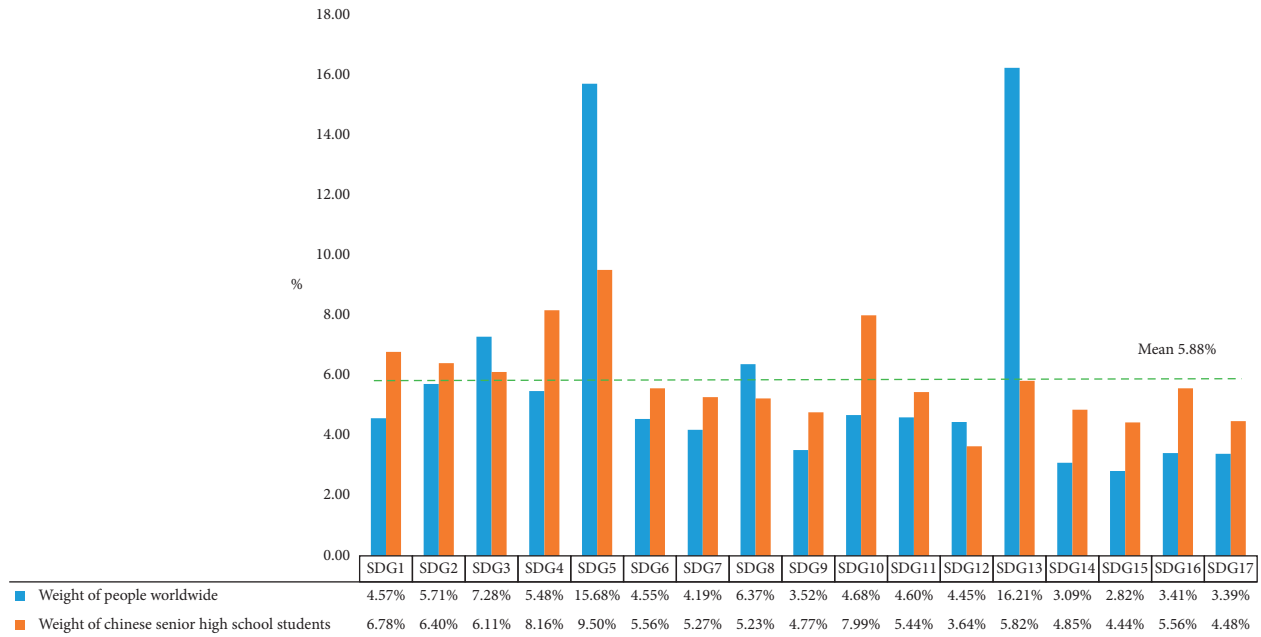


FIGURE 2: Histograms of SDGs attention priorities between people worldwide and students from a Chinese senior high school.

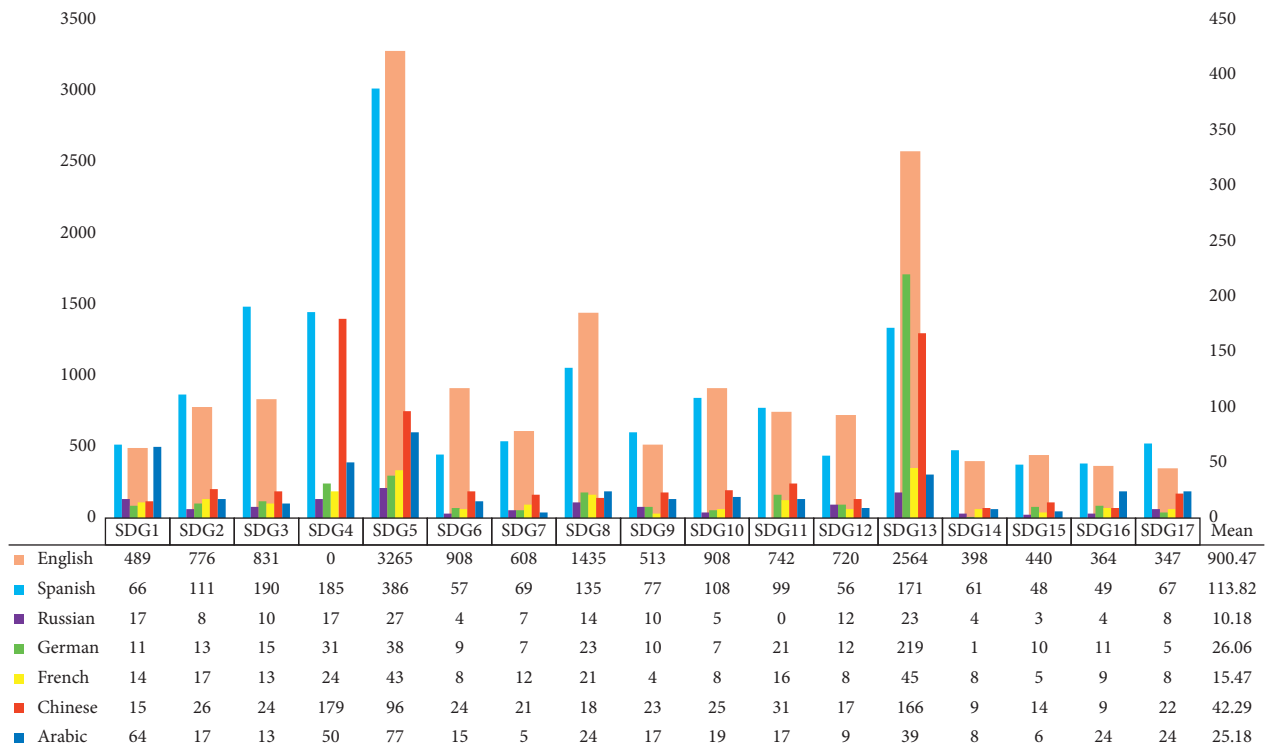


FIGURE 3: Histograms of people’s attention priorities for SDGs according to language.

average. This is in sharp contrast with other countries, indicating that the public’s attention to SDGs might be affected by multiple factors, such as time, space, regional development, population needs, and awareness. This will also provide us with good clues for in-depth discussion in combination with the theoretical and practical backgrounds of ecology, sociology, and psychology in the future.

4.3. Consistency between Students and Global Public Concerns regarding SDGs. The variance of a group of data is the average of the square of the deviation of each data relative to its average. The significance of variance is that it reflects the deviation degree between a group of data and its average. To compare the SDGs attention priorities of students with people in distinct linguistic regions, the variance of the SDGs

attention priorities of above groups was calculated first, which was used to analyze fluctuation and dispersion in the attention priorities of different groups. It is observed from Table 3 that the students' variance value is the smallest, which indicates that the students' attention to different SDGs is close to the average, and the degree of dispersion is low. The variance value of the Chinese group ranked second, which is higher than that of other language groups, indicating that Chinese people have different concerns about each goal.

To understand the consistency of SDGs concerns between students and the global public in different linguistic areas, Kendall rank correlation and Spearman rank correlation analyses were adopted. The Kendall rank correlation test was used to measure the degree of consistency, and the Spearman rank correlation was used to study the relationship between quantitative data, including the existence of the relationship and the degree of closeness. Tables 4 and 5 show a significant positive correlation between students and Spanish, French, Chinese, and Arabic. Spanish has a significant positive correlation with all languages except Arabic. In addition, Russian has a significant positive correlation with German, French, and Arabic. German has a significant positive correlation with French, Chinese, and Arabic, and French has a significant positive correlation with Chinese and Arabic.

4.4. SDGs Preference and Learning Level of the Students in a Chinese Senior High School. To investigate the preference-action gap between what students prefer to learn and what their actual study outcomes are, a comparison between students' attention priorities and learning levels with respect to SDGs is shown in Figure 4. As for the SDGs preference, SDG 1: no poverty; SDG 2: zero hunger; SDG 3: good health and well-being; SDG 4: quality education; SDG 5: gender equality; and SDG 10: reduced inequalities are the goals above the average of 140.59, which means that these goals are paid much attention by the students in a Chinese high school. Additionally, the mean for the learning level of SDGs is 2.80, lower than the median, which is 3, in the questionnaire scale ranging from 1 to 5 (from the low learning level to the high learning level). It can be concluded that the overall SDGs learning level of students in the school surveyed is defective. Only the learning performance of SDG 13: climate action is greater than the questionnaire median, which means that students in the school surveyed have excellent learning performance in one theme of sustainable development.

More specifically, no goals are highly preferred and learned by students in the school surveyed at present. There are goals with high preference and poor learning levels, which are SDG 1: no poverty; SDG 2: zero hunger; SDG 3: good health and well-being; SDG 4: quality education; SDG 5: gender equality; and SDG 10: reduced inequalities, and the goal with low preference and good learning level is SDG 13: climate action. Among all of the goals, SDG 6: clean water and sanitation; SDG 7: affordable and clean energy; SDG 8: decent work and economic growth; SDG 9: industry, innovation and infrastructure; SDG 11: sustainable cities and

TABLE 3: Variance of SDGs attention priorities for global public in different languages and Chinese senior high school students.

Group	Variance
Students	0.0002
Spanish	0.0019
Russian	0.0018
German	0.0130
French	0.0021
English	0.0029
Chinese	0.0054
Arabic	0.0023

communities; SDG 12: responsible consumption and production; SDG 14: life below water; SDG 15: life on land; SDG 16: peace, justice and strong institutions; and SDG 17: partnerships for the goals are goals neither preferred nor learned, which means action must be taken to raise the awareness of these marginalized goals.

4.5. Subjects Integrated into SDGs between Learned and Nominated. This study also collected the course subjects which are integrated with SDGs in a Chinese high school. There is a difference between the current learning subjects and the nominated subjects, seeing Figure 5. The aim of collecting these data was to understand the SDGs integration degree with respect to course subjects and the current situation of ESD in the school surveyed, laying the foundation for further analysis and suggestions to improve it in upper secondary education. The mean of learning performance of subjects integrated into SDGs is 77.93. From Figure 5, politics and economics, geography, biology, and foreign languages are above the average, which indicates that students have a better learning performance in these subjects, while math, technology and laboratory courses, physics, physical education, computer science, and arts do not score as high. For subjects nominated by students as shown in Figure 5, physics, chemistry, biology, geography, politics and economics, and technology and laboratory courses are above the average (137.36), and the remaining eight subjects are below the average.

Politics and economics, geography, and biology are subjects with outstanding learning performance and high nominations. Foreign languages have great learning performance but low nomination; in contrast, technology and laboratory courses, physics, and chemistry have poor learning performance, but are highly nominated. Math, physical education, computer science, arts, career and psychology, Chinese and native culture, and history have poor results in both aspects.

5. Discussion

5.1. The Students' Priorities for SDGs Are Influenced by Commonness and Individuality. The SDGs with the most attention of global public are climate action, gender equality, good health and well-being, and decent work and economic growth. It indicates that people tend to pay much attention to goals that are closely related to their interests [52]. On the

TABLE 4: Kendall tau rank correlations of attention priorities for SDGs between students and different languages.

	Students	Spanish	Russian	German	French	English	Chinese	Arabic
Students	1.00							
Spanish	0.48**	1.00						
Russian	0.29	0.48**	1.00					
German	0.28	0.47*	0.45*	1.00				
French	0.48**	0.57**	0.48*	0.67**	1.00			
English	0.24	0.44*	0.20	0.36	0.31*	1.00		
Chinese	0.45*	0.61**	0.22	0.44*	0.43*	0.38*	1.00	
Arabic	0.46*	0.38*	0.48*	0.40*	0.47*	0.14	0.30	1.00

* $p < 0.05$ and ** $p < 0.01$.

TABLE 5: Spearman rank correlations of attention priorities for SDGs between students and different languages.

	Students	Spanish	Russian	German	French	English	Chinese	Arabic
Students	1.00							
Spanish	0.64**	1.00						
Russian	0.40	0.61**	1.00					
German	0.45	0.64**	0.60*	1.00				
French	0.64**	0.72**	0.59*	0.82**	1.00			
English	0.33	0.51*	0.30	0.45	0.41	1.00		
Chinese	0.61*	0.78**	0.38	0.58*	0.58*	0.45	1.00	
Arabic	0.61**	0.47	0.64**	0.53*	0.61**	0.13	0.41	1.00

* $p < 0.05$ and ** $p < 0.01$.

contrast, SDGs that require specialized subject knowledge, such as life on land and life below water, have received less attention from the public. Hence, it is suggested that people need to be concerned with all the SDGs with more consideration for the future [36].

Taking one Chinese high school as an example, the students are most concerned about gender equality, quality education, reduced inequalities, no poverty, zero hunger, and good health and well-being, while responsible consumption and production, life on land, and partnerships for the goals are the most overlooked goals for students. Compared with global priorities, the high school students also pay much more attention to gender equality and health [36, 53, 54]. Thus, it can be seen that these two are the goals that people are generally concerned about and need to be improved. Correspondingly, it is easy for the high school students to ignore the existence of other species and the partnerships for the goals as a common vision in achieving sustainable development [36]. In addition to the aforementioned similarities, the high school students also focus on SDGs compared with the global concern. No poverty, zero hunger, quality education, and reduced inequalities are the goals that the high school students pay much attention to compared with the global citizens, while global citizens are more concerned with decent work and economic growth. This is consistent with student characteristics, age, and developmental stage [36]. In sum, taking one Chinese high school as an example, the high school students' attention to SDGs is affected by global public views, but it also has its particularities.

5.2. The Languages Used to Promote SDGs Represent Different Populations and Geographical Distribution. English, Spanish, and Chinese are the three most-spoken native languages

worldwide [55]. English is the leading language of international discourse in different kinds of printed and electronic media [56], with 1.5 billion of speakers [57]. As an official language in 67 countries and 27 nonsovereign entities [58], English has become the majority native language in the United States, the United Kingdom, Canada, Australia, New Zealand, and Ireland, an official and the main language of Singapore, and it is widely spoken in the Caribbean, Africa, South Asia, Southeast Asia, and Oceania [59]. Spanish is a global language with nearly 597 million speakers [60]. Its geographical distribution includes Europe, mainly in Spain, as well as America, Africa, Asia, and Oceania. It is the second most-spoken native language globally after Chinese [55]. Chinese has a wide geographic distribution [61, 62]. The estimated number of native speakers is approximately 1.3 billion [55]. Based on the substantial number of speakers and wide geographical distribution, English, Spanish, and Chinese are at the top of the list spreading and popularizing SDGs.

German is the most-spoken native language within the European Union [63] and the third most-taught foreign language after English and French. Ethnologue estimated the total number of Standard German speakers at 132 million in 2020 [55]. German geographical distribution encompasses Europe, Africa, North America, South America, and Oceania [64]. Although German is not the official language of the UN, its status in the media to disseminate SDGs cannot be underestimated.

Arabic is native to countries of the Arab League, which is located in Northern Africa, Western Africa, Eastern Africa, and Western Asia [65]. Modern Standard Arabic is an official language of 26 states, such as Egypt and Iraq [66]. There are 422 million speakers of Arabic of all varieties [67], making it the fifth most-spoken language in the world.

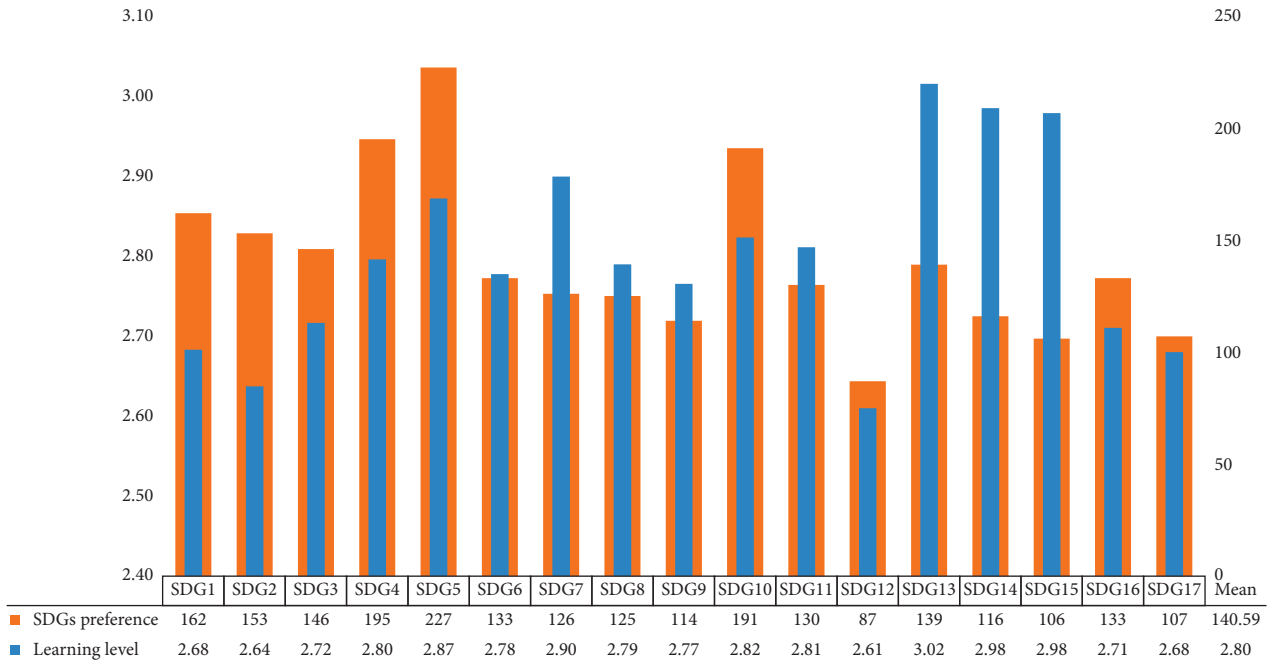


FIGURE 4: Histograms of SDGs priorities and learning performance of students.

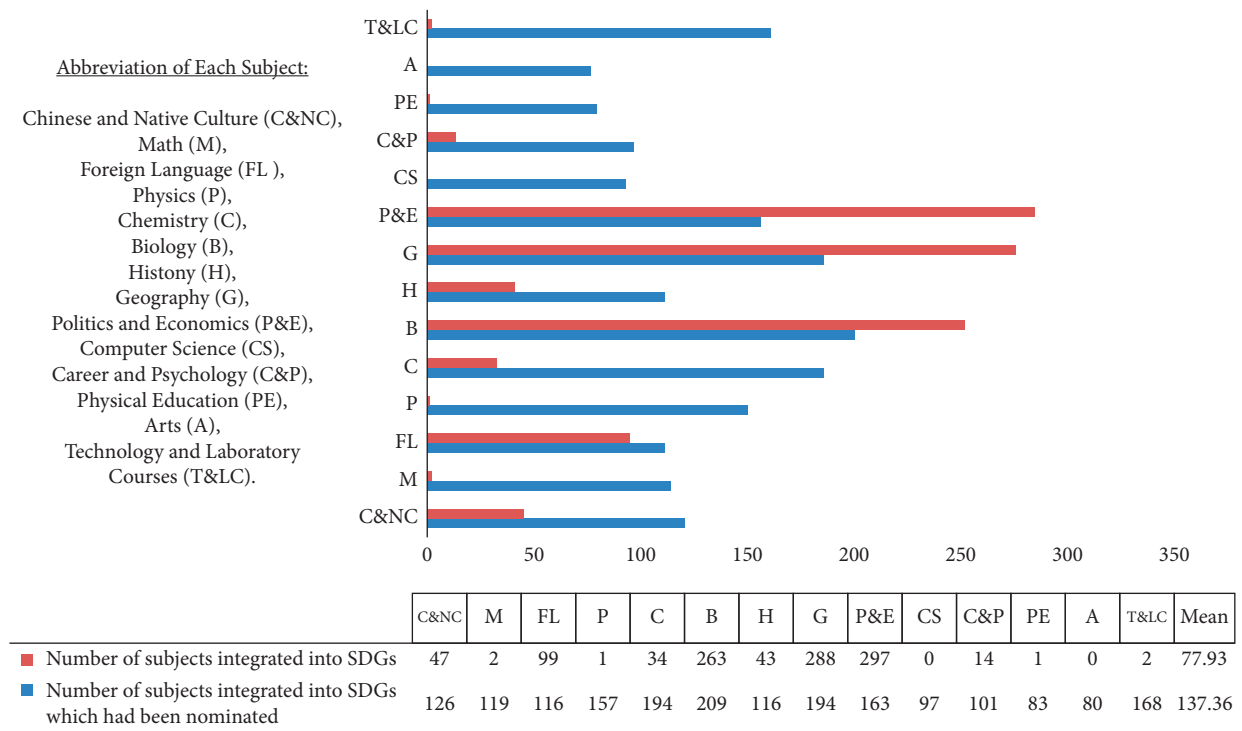


FIGURE 5: Bar charts of subjects integrated into SDGs between learned and nominated.

French originated in France and is now worldwide, especially in France, Canada, Belgium, Switzerland, North Africa, and West Africa. There are 76.8 million native French speakers and an estimated 274 million speakers with a combined second language [55, 68]. As an official language in Russia, Belarus, Kazakhstan, and Kyrgyzstan [69, 70], the geographic distribution of Russian includes Europe, Asia, and North America, with over 258 million speakers

worldwide [71]. Due to the limited corresponding regions and populations, Arabic, French, and Russian maintain a consistent status in propaganda of SDGs.

Through the analysis of language media, it is demonstrated that some linguistic regions of the world are consistent with respect to priorities of SDGs, such as Spanish, with all languages except Arabic illustrating the common concerns and needs of people from different areas, which

reflects the consciousness of a community with a shared future for humankind [72]. In addition, inconsistency of SDGs attention also exists among some languages, which reflects the uniqueness of different geographical regions and populations and their particular needs [73].

It should be noted that there were two goals not promoted in April 2021, SDG 4: quality education by English news and SDG 11: sustainable cities and communities by Russian news. After verification with the data on the website RELX SDG Resource Center, it was found that SDG 4 has not been reported in English since 2018, and SDG 11 was not reported during the research in April 2021. News data may have problems, such as zero English news related to SDG 4. At the same time, such problem of data quality will also affect the follow-up analysis.

5.3. Senior High School Students Have Limited Awareness of SDGs. The SDGs that generally evoke the most concern worldwide are gender equality, climate change, and quality education, which may be closely related to current issues [74]. On the contrary, the goals that are generally neglected are SDGs 14–17, i.e., life below water, life on land, peace, justice and strong institutions, and partnerships for the goals, and some goals are not a concern of the public in some languages at all. The reason for this might be that these goals are close to being solved or far away from real life. It is also possible that these goals are areas where people do not realize their role and importance [74], which must be strengthened in the future and requires global attention.

By comparing different language media for the promotion of different SDGs, the variance of Chinese media was found to be higher than that of other languages, which shows that Chinese media pays much attention to some categories of SDGs [27, 75]. However, the variance of the students' attention is the lowest, indicating that the students' attention is more balanced, and there tends to be no specific focus. This indicates that students have limited awareness of SDGs, which is possibly due to their scarce contact with real social issues and lower focus on current developmental challenges [76, 77]. This also reveals the demand to strengthen education on real social issues and ESD in the future [78].

Taking one Chinese high school as an example, it was found that the attention on SDGs of the students and Spanish, French, Chinese, and Arabic is consistent, indicating that students are influenced by the media in these languages, thus calling for increased publicity of the above media [79]. In addition, it was also observed that the students in the school surveyed have a different focus on SDGs to Russian, German, and English, perhaps due to the fact that students have less exposure to the media in these languages. At the same time, this shows that the student group is unique due to age, media preferences, and cognition.

5.4. ESD through Formal, Informal, and Nonformal Channels. As mentioned above in the findings, students have a better learning of SDG 13: climate action compared to other goals, which indicates the popularizing and learning levels of the

rest of the goals need to be enhanced in the future. Nevertheless, students have low cognition of SDG 13, which implies that increased connection of the SDG with students' actual study and lives is required. In addition, students pay much attention to no poverty, zero hunger, good health and well-being, quality education, gender equality, and reduced inequalities, but at a low level of learning. This demonstrated that the school surveyed should strengthen the penetration of these goals into course subject teaching. Students' lack of attention and underperformance in learning on clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; sustainable cities and communities; responsible consumption and production; life below water; life on land; peace, justice and strong institutions; and partnerships for the goals, indicates that the above goals have failed in ESD implementation. In a word, the student in the school surveyed overall SDGs learning performance is deficient since no goal is highly preferred and learned. Although students have a good understanding of a few SDGs, such as SDG 13: climate action, they still have low learning level and cognition regarding to it, let alone other goals which were lack of attention and underperformance in learning. Therefore, taking one Chinese senior high school as an example, China should make an urgent call on ESD progressing in high schools by combining formal, informal, and nonformal education.

In formal education, embedding ESD in the curriculum is an important tool for achieving sustainable development [80]. Among various course subjects which integrate SDGs, foreign languages are highly mastered via learning, but there is a lack of recognition. It is recommended to raise students' awareness of SDGs in this subject. For technology and laboratory courses, physics, and chemistry, students have low learning acceptance but high recognition. These disciplines are blind spots for ESD implementation, indicating that ESD in these disciplines needs to be enhanced. Considering politics and economics, geography, and biology, students have both high learning acceptance and recognition. It is recommended to maintain ESD in these course subjects; meanwhile, they can be used as pilot disciplines to support ESD in other fields. Students have both low acceptance and recognition in math, physical education, computer science, arts, career and psychology, history, and Chinese and native culture. Schools and educators are required to fully mobilize students' learning motivation in these subjects and raise the sustainability awareness of students [81].

In terms of informal and nonformal education, schools should probably set up student clubs related to sustainable development and encourage students to consciously learn SDGs through lectures or club activities, thus continuously improving their awareness of SDGs. In addition, driving the communities to develop a community learning center can also be one of the ways of nonformal education, where students can enhance their awareness of SDGs by participating in learning or community service [48]. In addition, with the development of information technology, mass media has become an important channel for citizens,

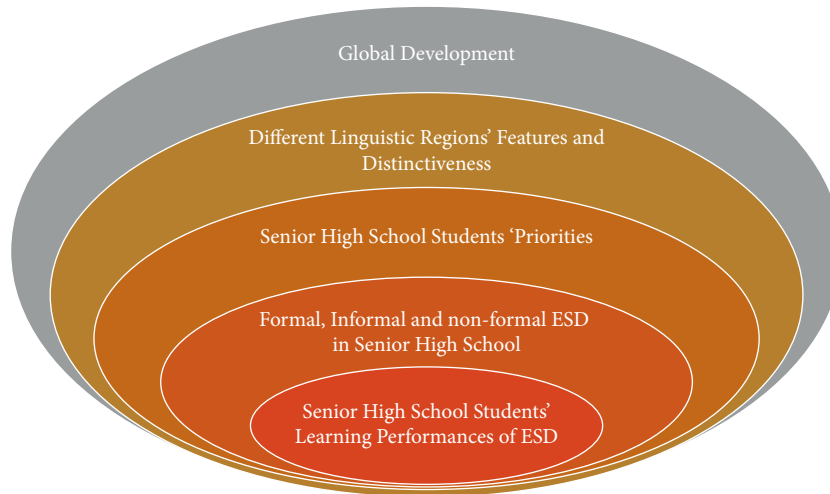


FIGURE 6: The proposal framework of this study.

especially young people, to acquire knowledge. Therefore, governments and related organizations could seize the opportunity to make more reasonable use of the media platform to promote ESD, so as to improve young people's awareness of SDGs in a subtle way. Of course, the quality of informal and nonformal education, such as online videos, readings, news, and other materials, should also be strictly monitored to ensure that these educational resources really benefit learners [82]. As a result, formal education in integrating academic disciplines in schools, informal in relation to mass media advertisement, and nonformal education are the three main approaches to influence the learning level of SDGs of students. The proposal framework of this research is shown in Figure 6. This comprehensively affects the concerns about SDGs of Chinese high school students from personal, schooling, and even global perspectives. Compared to traditional education, the curriculum integrated with ESD advocates action-oriented learning and problem-solving, encouraging students to pay attention to real social issues and sustainable development in the future [83, 84]. In addition, opening up various informal and nonformal platforms to publicize SDGs and strengthening the publicity of the marginalized goals by high school students should be implemented [85].

6. Conclusion

By comparing the trend of attention to SDGs in various linguistic regions, it can be found that people's attention to SDGs is affected by a specific area, regional development, public demand, and cognition. Therefore, follow-up research could combine the theoretical and practical backgrounds of ecology, sociology, psychology, etc., for a more in-depth analysis.

SDGs that are closely related to people's interests have become those with the most concern. However, the so-called irrelevance does not exist; therefore, people should pay attention to all goals with more consideration for the future. Taking one Chinese high school as an example, the attention of high school students to SDGs is affected by global trends,

but the impact is relatively small as high school students are unique. Therefore, it is proposed to dialectically observe students' attention priorities to SDGs under the influence of the media. In addition, high school students' awareness of SDGs needs to be improved, and it is necessary to strengthen their attention to international affairs and real problems in the society.

Taking one Chinese high school as an example, by exploring the priorities of SDGs of high school students in the school surveyed and the learning performance of ESD through course subject integration, it is necessary to popularize the SDGs through multiple media platforms and penetrate all SDGs into ESD in the future. To achieve the curriculum reorientation of ESD, all subjects are recommended to connect to SDGs through unique characteristics. It should be noted that subject penetration is not the only part of the whole-institution approach. ESD should be reflected in all aspects of schools in the future, such as updating the curriculum, school culture, community relationship, and orienting all processes towards principles of sustainability.

Overall, this research discovered the Chinese high school students' priorities of SDGs comparing with global public under different language media as well as learning performance with respect to SDGs and provided the key findings and suggestions for ESD implementation as follows.

Gender equality and good health and well-being are the SDGs that students and the public both care most about. And the majority of the SDGs receive less concern of the students and the public. By comparing the average amount of news about the SDGs in seven languages, the amount of news in English is far greater than other languages. Besides, different linguistic news has similarities and differences in their attention priorities to the SDGs. The students in the school surveyed only show greater learning performance in one SDG, climate action. Only politics and economics, geography, and biology are the subjects with outstanding learning performance and high nominations by the students.

The languages used to promote SDGs represent different populations and geographical distribution. The high school

students' attention to SDGs is affected by different linguistic media with the global public views, but it also has its particularities. Regarding the deficiency in SDGs awareness and learning performance, the implementation of ESD displays a nonideal status. It is also revealed that ESD should be strengthened. Additionally, during the process of ESD implementation, it is crucial to take full advantage of the combination of formal, informal, and nonformal education, advancing media campaigns for all 17 SDGs as well as fully mobilizing all course subjects to integrate SDGs. To achieve the curriculum reorientation of ESD, all subjects are recommended to connect to SDGs through unique characteristics.

Considering the priorities of the students and the public, this research appeals to strengthening ESD through formal, informal, and nonformal channels under the influence from the global development and different linguistic regions' media promotion. The recommendations can be used as an initiative and a reference for ESD implementation.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Supplementary Materials

Table S1: questionnaire on the awareness of the SDGs of senior high school students (Yuan et al., 2021). (*Supplementary Materials*)

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