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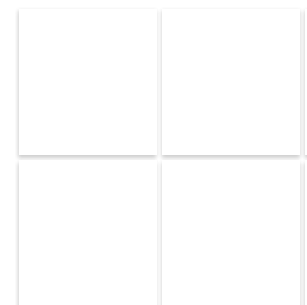


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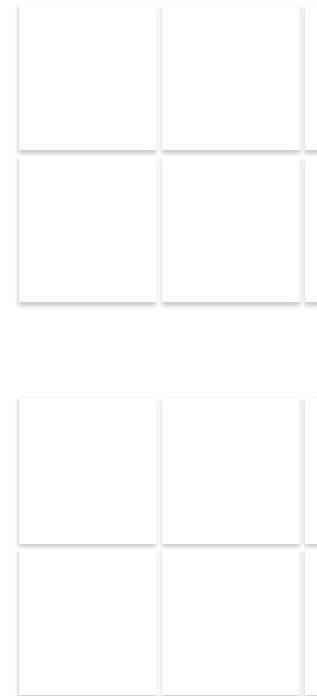
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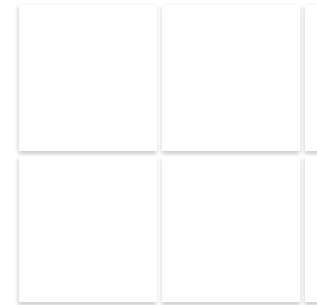


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Demikian kami sampaikan. Atas perhatiannya kami ucapkan terima kasih.

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## LEARNING DIFFICULTIES OF THE 5TH GRADE ELEMENTARY SCHOOL STUDENTS IN LEARNING HUMAN AND ANIMAL BODY ORGANS

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### ABSTRACT

Natural Science is an elementary school subject that requires students to organize ideas and concepts about the natural world gained from experiences through a series of scientific processes such as investigating, composing, and presenting ideas. The high complexity causes many cases of learning difficulties. This study aims to diagnose the learning difficulties that occur on 5th-grade elementary school students. The research was conducted in Muhammadiyah Pakem Elementary School, Sleman, Yogyakarta Special Regency. The subjects were 29 of 5th-grade elementary students. Data collection techniques were interviews, tests, and documentation. Data analysis techniques were descriptive statistic as a quantitative analysis and interactive model as a qualitative analysis. The learning difficulties were diagnosed by describing the students who were identified having learning difficulties; localizing the difficulties; and determining the factors that cause learning difficulties. The results showed that the difficulties experienced by students were in basic competence 1.1-1.5 (human blood circulation organs). The average percentage of students' learning difficulties in Basic Competence 1.1 was 48%; Basic Competence 1.2 was 51.1%; Basic Competence 1.3 was 57.6%; Basic Competence 1.4 is 64.7%; and Basic Competence 1.5 is 53.7%. The highest percentage of learning difficulties was in Basic Competence 1.4 (identifying human circulatory organs). It was caused by the students' low attention and motivation to learn natural science, the imprecise teaching methods, the parents' attention, and the negative influence of mass media.

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**Keywords:** natural science, blood circulation system.

### INTRODUCTION

Learning difficulties can hamper students in reaching the maximum achievement. It is one of the psychological disorders including hearing loss, thinking, speaking, reading, writing, spelling, or performing mathematical calculations (Cortiella & Horowitz, 2014). In Indonesia, learning

difficulties allegedly become the main reason for students' low achievement. PISA 2012 measured the understanding of 15-year-old students in the field of mathematics, reading, and science, which then ranked Indonesia to the low position of 65 participating countries. Indonesia was ranked to the 64th position on mathematics (score: 375), the 61st position on reading (score: 396), and the 64th position on science (score: 382).

NAEP (National Assessment of Educational Progress) (2013) stated that on reading and

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mathematics literacy in the United States, there is 69% of the 4th grade students and 60% of the 8th grade students who have trouble on reading. Learning difficulties of Mathematics on the 4th grade students is 45% and 65% on the 8th grade students. These data suggest that learning difficulties on the 4th to 8th grade students show relatively high numbers (Cortiella & Horowitz, 2014). Students' learning difficulties affect the learning process (Cavendish, 2013). Especially for elementary school students, learning success at this level will be the determinant of a successful learning in the next level (high school).

At the elementary school level, learning difficulty problems often arise in both mathematical and rote subjects. One of such subjects is natural science, since it bears a characteristic which is definitely scientific. Natural science is a branch of knowledge that is originated from natural phenomena. Natural Science is defined as a collection of knowledge about the objects and natural phenomena which are gained from scientists' thought and investigation through experiments using scientific methods.

Experiments have been conducted to achieve the goals of science learning, including the enrichment of students' perception over the concepts in science and its products; scientific-practical competencies and problem solving skills; scientific 'habits of mind'; understanding of how science and scientists work; awareness and motivation (Duschl, 2008; Hofstein & Mamlok-Naaman, 2007). Teaching natural science in elementary schools should use fun methods and concrete media or media that are related to the students' daily life. Learning characteristic of elementary school students is that they learn through concrete things (Riggs & Enochs, 1990). Children can already be given the basic sciences such as reading, writing, and arithmetic. Elementary school children can also be given the basic knowledge related to human life, animal, natural environment, socio-cultural environment, and religion.

The characteristic of natural science learning in elementary school is emphasizing on the process of finding out, on the initial knowledge which later determines the knowledge construction that will be built. Therefore, teaching natural science to elementary school students needs high tenacity and patience. Natural science is a

very important lesson for students (Chiappetta & Koballa Jr, 2014). It is important because natural science is necessary for everyday life. However, students find difficulties in learning natural science. Learning difficulties in studying natural science in elementary school usually happen to the students of upper-level grade, especially the 5th grade students. Natural science lesson in the grade 5 elementary school already needs high logic of thinking since the material of it is difficult and discussing on the real phenomena that students cannot see and feel directly.

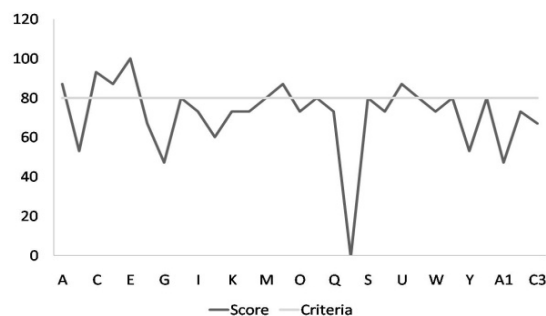
The difficulties in learning natural science in the 5th grade students also happen in Muhammadiyah Pakem Elementary School, Yogyakarta, Indonesia. Those difficulties were indicated from the results of teacher interviews conducted by the researchers. The findings showed that the 5th grade students got difficulties in understanding the natural science subjects taught by teachers, especially on the material of human and animal organs.

The results of learning natural science material which is focused only on the subject of human and animals' organs in the 5th grade students of Muhammadiyah Pakem elementary school, Sleman, Yogyakarta regency were measured by using several tests as the instrument. The researchers also explain the factors that cause learning difficulties in natural science learning. In this research, we used purposive sampling method involving 29 respondents of 5th grade students of Muhammadiyah Pakem Elementary School and a teacher. Data analysis techniques used were descriptive statistics for quantitative data and interactive models from Miles and Huberman for qualitative data.

## RESULTS AND DISCUSSION

### Identification of the students who have difficulties in learning natural science

Based on the test results that have been finished by 29 respondents of 5th grade students of Muhammadiyah Pakem Elementary School, the results obtained can be seen in figure 1. The value is obtained by using the parameter of a scale 0-100 and the passing grade is 80 in accordance with the minimum criteria of learning mastery in the school.



**Figure 1.** Criteria for Student Achievement.

Figure 1 shows that 55.1% of 5th grade students have learning difficulties for which it is later categorized as an incomplete criteria of learning outcomes. The percentage of the students who experience learning difficulties illustrates that most of the students in the 5th grade have difficulties in studying the subject of human and animal organs.

The difficulties of learning can also be seen from the analysis of the test results completed by students. The test questions used in the experiment have been mapped through the indicators, so it can be recognized which indicators are per-

ceived difficult by students and may cause difficulties in learning natural science, especially on the subject of human and animal organs.

### The assessment results of the subject on human and animal organs

Based on the assessment results that have been completed by the 5th grade elementary students of Muhammadiyah Pakem Elementary School, with 29 students as the respondents, researchers classify the question into low, moderate, and high level of difficulty. The results of the assessment can be seen in table 1.

**Table 1.** Level Difficulties of Question

Question Number	Percentage of True answer	Percentage of False answer	Difficulty Level
1	51.1%	48.9%	Moderate
2	62.2%	37.8%	Moderate
3	48.9%	51.1%	Moderate
4	48.9%	51.1%	Moderate
5	48.9%	51.1%	Moderate
6	62.2%	37.8%	Moderate
7	41.8%	58.2%	Moderate
8	48.9%	51.1%	Moderate
9	41.8%	58.2%	Moderate
10	44.9%	55.1%	Moderate
11	62.2%	37.8%	Moderate
12	27.6%	72.4%	<b>High</b>
13	41.8%	58.2%	Moderate
14	34.7%	65.3%	Moderate
15	37.8%	62.2%	Moderate
16	37.8%	62.2%	Moderate
17	41.8%	58.2%	Moderate
18	37.8%	62.2%	Moderate
19	24.5%	75.5%	<b>High</b>
20	44.9%	55.1%	Moderate
21	34.7%	65.3%	Moderate

22	48.9%	51.1%	Moderate
23	58.2%	41.8%	Moderate
24	65.3%	34.7%	Moderate
25	41.8%	58.2%	Moderate

From table 1, it can be seen that some 5th grade students of Muhammadiyah Pakem Elementary School have difficulties on the certain basic competencies while studying natural science, especially on the subject of human and animal organs. It can be seen from the percentage of the students' failure in answering the test questions that have been mapped according to the basic competencies and learning indicators. From the percentage of Table 1, it can also be seen that students that have learning difficulties in the easy category were 0%, in the moderate category were 92%, and in the high category were 8%.

### The Difficulties in Learning Natural Science

From the analysis of the students' failure in answering the test questions, it seems that most students have learning difficulties on the certain basic competencies.

#### a. *The difficulties in learning basic competency 1.1: Identifying the function of the human respiratory organs*

The learning difficulties on the indicator 1.1 include the number of the students' failures in answering the questions related to the mechanisms of the human respiratory system, and the completeness of the human respirators which are presented in table 2.

**Table 2.** The Learning Difficulties of Basic Competency 1.1

Question Item	Percentage of True answer	Percentage of False answer
1. The branch of the throat is called....	51.1%	48.9%
2. When we take a breath, air will enter through the nose, then go to....	62.2%	37.8%
3. When the air exchanges in the respiratory process, there occurs....	48.9%	51.1%
4. The inspiration for human respiration occurs because the diaphragm....	48.9%	51.1%
5. Completeness of the respiratory system in humans are....	48.9%	51.1%
Average	52%	48%

From table 2, it can be inferred that 48% of 5th grade students have difficulty in studying basic competency 1.1 for that requires them to identify the respiratory organs in human body. Based on the analysis of the question items, students' learning difficulties on the basic competency 1.1 are caused by the following factors: (1) The answer choices of the test had a good deceiver power so that the students' good comprehension towards the material was required here; (2) The teacher needs to use media in explaining concepts to avoid multiple interpretations and misconceptions, so that the students can truly comprehend the learning material rather than simply memorize it; (3) The students'

comprehension towards the abstract concept was so low that it took teachers' skill in using appropriate media and methods based on the characteristics of the learning material.

#### b. *The difficulties in learning basic competency 1.2: Identifying the functions of the respiratory organs*

The assessment aspect of the learning difficulties on "identifying the function of the respiratory organs" is the students' failure in answering the questions related to the respiratory mechanism in animals and the functions of animals respiratory organs is presented table 3.



**Table 3.** The Learning Difficulties of Basic Competency 1.2

Question Item	Percentage of True answer	Percentage of False answer
6. The bird breathing apparatus at flight is called...	62.2%	37.8%
7. Gas exchange on the respiration process of a fish is located on...	41.8%	58.2%
8. On the fish respiration, water enters the mouth when....	48.9%	51.1%
9. In the bird's respiratory system, there are two airsacs. When the bird breathes, the air will flow through the....	41.8%	58.2%
Average	48.5%	51.5%

From table 3, it can be concluded that 51.5% of 5th grade students have difficulties in studying basic competency 1.2 which requires them to identify the function of respiratory organs. Based on the item analysis, students' learning difficulties on the basic competency 1.2 are caused by the following factors: (1) The students' comprehension over the function of the respiratory organs was still low. This is due to the lack of students' participation in learning; (2) The answer choices of test had a good deceiver power so that the students' good comprehension towards the learning material was required; (3) The teacher needs to use media in explaining concepts to avoid multiple interpretations and misconceptions so that students can truly comprehend the learning material rather than simply memorize

it; (4) The students' comprehension towards the abstract concept was so low that it took teachers' skill in using appropriate media and methods based on the characteristics of the learning material.

*c. Difficulties in learning basic competencies 1.3: Identifying the function of human digestive organs and the relation to food and health*

The assessment aspect of learning difficulties on "identifying the function of human digestive organs" includes the students' failure in answering the questions related to human digestive mechanisms, the functions of digestive organs in the human body, the obstruction in the digestive system, and the nutritional content in food.

**Table 4.** The Learning Difficulties of Basic Competency 1.3

Question Item	Percentage of True answer	Percentage of False answer
10. A deficiency of vitamin B6 can cause....	44.9%	55.1%
11. Appendicitis is inflammation of the appendix which is caused by...	62.2%	37.8%
12. The sprouts of mung bean contain high nutrition if it is eaten by...	27.6%	72.4%
13. The combination of foods containing balanced nutrition consists of...	41.8%	58.2%
14. Food from the stomach will be absorbed and channeled to all parts of the body. The absorption of food is occurred in...	34.7%	65.3%
Average	42.4%	57.6%

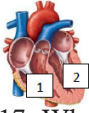
From table 4, it can be inferred that 57.6% of 5th grade students have difficulties in studying basic competency 1.3 which requires them to identify the function of human digestive organs and its relation to food and health. Based on the item analysis, students' learning difficulties on basic competency 1.3 are caused by the following factors: (1) The uninteresting method of the teacher in delivering the lesson materials, or the lack of media usage which later led to the students' feeling of bore and unmotivated to learn natural science; (2) The answer choices of the test had a good deceiver power so that the students' good comprehension towards the learning material was required; (3) The inadequate comprehension of the previous material caused disruption

on the process of understanding the next material; (4) The teacher needs to use media in explaining concepts, especially an abstract concept. It is necessary to avoid the multiple interpretations and misconceptions, so that students can truly comprehend the material rather than simply memorize it.

*d. Difficulties in learning basic competency 1.4: Identifying human blood circulatory organs*

Assessment aspect of learning difficulties on "identifying human blood circulatory organs" is the students' failure in answering the questions related to the mechanisms of human blood vessel system and the function of human blood vessels.

**Table 5.** The Learning Difficulties of Basic Competency 1.4

Question Item	Percentage of True answer	Percentage of False answer
15. Blood vessels that stream the blood outside the heart are called...	37.8%	62.2%
16. The blood vessels that stream the blood from the heart to the entire body are called....	37.8%	62.2%
 17. When the heart part 1 and 2 are contracting, what happens is....	41.8%	58.2%
18. One function of capillary vessels is....	37.8%	62.2%
19. The blood vessels that are in charge of carrying oxygenated blood from the lungs to the left atrium of the heart is called...	24.5%	75.5%
Average	35,4%	64,6%

From table 5, it can be seen that 64.6% of 5th grade students have difficulties in studying basic competency 1.4 which is related to the identification of the human blood circulatory organs. Based on the items analysis, students' learning difficulties on basic competency 1.4 are due to these following factors: (1) The answer choices of the test had a good deceiver power so that require the students' good comprehension over the learning material; (2) In delivering the lesson material, the teacher needed to use media so that the students would not get bored and got their motivation back to learn natural science; (3) Inadequate comprehension of the previous material caused disruption on the process of understanding the next material; (4) The teacher needs to use media or visual properties in explaining

concepts, especially an abstract concept. This is necessary to avoid multiple interpretations and misconceptions of the students, so that they can truly comprehend the learning material; (5) The students' motivation was still low which then affects the process of absorbing the learning material.

*e. Difficulties in learning basic competency 1.5: Identifying the disorders of human blood circulatory organs*

The assessment aspect of learning difficulties on "identifying the disorders of human blood circulatory organs" includes the students' failure in answering the diseases which are caused by abnormalities in the human circulatory system.

**Table 6.** The Learning Difficulties of Basic Competency 1.5

Question Item	Percentage of True answer	Percentage of False answer
20. The disease of the circulatory system that is associated with blood pressure is...	44.9%	55.1%
21. The disease of the circulatory system that increases the number of leukocytes cells uncontrollably then eating erythrocyte cells and blood preservation is....	34.7%	65.3%
22. The best way to maintain the health of blood circulation system is....	48.9%	51.1%
23. The fat that attaches to the walls of blood vessels can cause ...	58.2%	41.8%
24. The veins on Mr. Herlambang's right calf are prominent. It is very different from the left one. It is possible that Mr. Herlambang may have....	65.3%	34.7%
25. Stroke can occur due to....	41.8%	58.2%
Average	48.7%	51.3%

From table 6, it can be inferred that 51.3% of the 5th grade students have difficulties in studying basic competency 1.5 which requires them to identify the disorders of human blood circulatory organs. Based on the item analysis, the students' learning difficulties on basic competency 1.5 are caused by of these following factors: (1) The answer choices of the test had a good deceiver power so that the students' good comprehension of the learning material was required here; (2) The uninteresting method applied by the teacher in delivering the lesson material, or the lack of media usage in learning natural science led to the students' boredom which then affects their motivation to learn natural science; (3) The teacher needs to use media or visual properties in explaining concepts, especially an abstract concept. This is necessary to avoid multiple interpretations and misconceptions of the students, so that the students can truly comprehend the learning material.

Based on the research data, it is found that 55.1% of elementary school students of Muhammadiyah Pakem have difficulties in studying natural science on human and animal organs subject. Learning difficulties is the difficulties experienced by students so that they cannot achieve a certain level of learning qualifications (Hale, J., et al, 2010; McLeskey & Waldron., 2011; Cavendish, 2013). The results of the test analysis show that the students have difficulties in solving the problems of certain basic competencies. Moreover, the level of learning difficulties experienced

by students in each basic competency is different one and another.

The results obtained in this research are later analyzed thoroughly and showing up that the students have difficulty on the basic competencies; which are 48% in basic competency 1.1, 51.5% in basic competency 1.2, 57.6% in basic competency 1.3, 64.6% in basic competency 1.4, and 53.7% in basic competency 1.5.

The most significant difficulty experienced by the students is in the basic competency 1.4 which requires them to identify the human blood circulatory organs. It can be seen from the percentage of difficulty gained in this basic competency which reached the highest percentage. The learning difficulties of the basic competency 1.4 lie on the lack of the students' ability to comprehend the indicators in identifying the functions of the human blood circulatory organs, explaining the human blood circulatory process, analyzing the works of human blood circulatory organs.

Learning difficulties experienced by students can also be seen from the percentage level of the students' failure in answering the questions. The students' errors in answering the questions can be interpreted that the deceiver power of the answer choices is effective. Students can easily distracted by the answer choices if they do not master the concepts of learning materials, especially the abstract concepts. The students were still unable to distinguish between bronchus (throat branch) and bronchioles (bronchus branch), throat (digestion organ) and esophagus (respiratory



organ). The students assumed that those organs are the same, but actually they have different functions even though located in the same place.

Referring to some relevant studies conducted by (Geary, 2013; Kaldenberg, et al, 2015; Schoenfeld, 2016), the research results showed that the students usually have learning difficulties due to the lack of learning material concept mastery. Learning material concept is the base or foundation of science learned by students which means, when students do not understand the concept, there will be misconceptions that later impact on learning difficulties experienced by students (Cakir, 2008). Lack of the learning material concept mastery can be caused by several factors.

Moreover, according to (Cooper, S. A. et al., 2009) "Factors that can emerge learning difficulties can be classified into two groups namely internal factors (physical, psychological, fatigue) and external factors (family, school, community)". Having been revealed, there are several factors that cause students experience learning difficulties in accordance with the results of interviews and documentation conducted on the students and a teacher. The internal factors include both the students' low attention and low motivation to learn natural science. Meanwhile, the external factors are the teachers' teaching methods, parental attention, and mass media.

The students' low comprehension in learning material concepts is caused by internal factors such as student' lack of attention and boredom which then lead to their low participation in the lesson. Furthermore, they even prefer to chat and play with their classmates during the learning process. The students' low motivation in the learning process can be indicated from the students' inactiveness while studying natural science and the students' low spirit in learning natural science. Those indicators are reflected on the students' study time at home, especially on the natural science subject which is still low.

The students' low attention, low learning motivation and low comprehension of the learning material concept which then emerge misconceptions may occur due to the teacher's uninteresting methods of teaching. Based on the interviews on the students and a teacher, teaching method is one of the factors that lead to the students' difficulties in learning natural science. The teacher's teaching method used previously was only lecturing without using media that can support the explanation of the learning materials. The teacher only used the textbook, yet the facilities provided by the school are complete.

In teaching human and animals' organs materials, teachers cannot use only textbooks to teach. It is because the students need to have a visualization of the human body organs, human blood circulatory system, human respiratory system, and human digestive system which are processing inside the human body, so that the students cannot see the processes directly. The characteristics of children at elementary school level who are in the phase of concrete operation think based on the concrete or real experience. They are not able yet to think abstractly, such as imagining how the process of blood circulation occurs (Fedewa, et al., 2017).

If the teacher is already aware of the students' thinking development, he or she can choose the appropriate teaching methods for the students, so that the learning difficulties can be minimized. The teacher can apply various learning methods in teaching if only he or she already masters the pedagogic and professional capability. It will later trigger the development of the students' comprehension towards the learning materials. The teacher must understand the basic concepts of the learning material so that the mistakes in teaching the materials will be minimized along with the learning difficulties experienced by the students in comprehending the concepts.

The teacher's performance, the experience of teaching pupils with special needs, the behavior of disable people, and the teachers' role which influence the creation of the rapports between teacher and students in learning the lessons was identified. The effects of teachers' training and development for pupil's success and pupil self-perception have been identified as well (Brady & Woolfson, 2008). In addition, students become more interested in learning so that their motivation will be getting higher (Maryani & Martaningsih, 2015).

Parents of the students with special needs have extra barriers to the parental attention than parents of the common students. Their attention is also a contributing factor in creating learning difficulties experienced by some students (Fishman & Nickerson, 2015). It can be detected from the interview results with some students whose parents are entrepreneurs who usually work out of the town. The students' time to meet their parents is also very limited. Because their parents are busy with their own work, their children's learning achievements are then relied on the schools and tutoring institutions only.

Mass media and internet usage are also the factors that cause learning difficulties experien-

ced by students (Chu, 2014; Takahashi & Tandoc, 2016). This can be indicated from the students' activities. They prefer to play games, use mobile phones, and watch television rather than doing activities that support their learning process such as having an additional course or studying together with friends. Based on the interview results on the students, interaction with friends does not belong to the factors that cause the difficulties in learning natural science experienced by students.

### CONCLUSION

The learning difficulties experienced by the 5<sup>th</sup> grade students of the elementary school on the human and animal organs subject are based on the following basic competencies: 1.1 on identifying the functions of human respiratory organs include the number of students' failure in answering the questions related to the mechanisms of the human respiratory system, and the completeness of the human respirator (48%), 1.2 on identifying the functions of the respiratory organs (51.1%), 1.3 on identifying the functions of human digestive organs and their relation to food and health (57.6%), 1.4 on identifying the human blood circulatory organs (64.7%), and 1.5 on identifying the disturbances in human circulatory organs (53.7%).

The discussion results of qualitative data indicated that the factors causing difficulties in learning natural science experienced by the 5<sup>th</sup> grade students of elementary school are the students' low attention to the natural science lesson, the low motivation to learn natural science, the teacher teaching methods, the parents' attention, and mass media.

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