Environmental action

Research question: How do teenagers of Aktobe schools reduce amount of a litter in the streets?

Nazarbayev Intellectual School of Physics and Mathematics in Aktobe

Global Perspectives and Project Work

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Throughout the course of research there were people who helped with research work and now I want to send my best regards for their help and guidance

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My deepest thank to my family members for being active in my research. They were giving ideas and provided me with valuable time and invited many more relatives to participate in survey.

It is essential to mention my deer classmates who were assessing and fulfilling my project. I will never forget you guys.

**Abstract(English)**

The paper investigates an issue with waste in Aktobe.  2 billion tons of waste is generated every year and third of that isn’t managed in environmentally friendly way. Data is collected by survey. According to the findings, Aktobe is suffering from waste pollution.  The paper answers a question: What teenagers of Aktobe schools can do in order to clean the streets of Aktobe.

**Abstract(Russian)**

Статья исследует проблему с отходами в Актобе. Ежегодно образуется 2 миллиарда тонн отходов, треть из которых не обрабатывается экологически безопасным способом. Данные были собраны путем опроса. Согласно заключениям, Актобе страдает от загрязнения отходами. Статья отвечает вопрос: что могут сделать подростки школ Актобе, чтобы убрать улицы Актобе.

**Abstract(Kazakh)**

Мақалада Ақтөбедегі қалдықтар мәселесі қарастырылған. Жылына 2 миллиард тонна қалдықтар пайда болады, оның үштен бір бөлігі экологиялық таза түрде өңделмейді. Деректер сауалнама арқылы жиналды. Табылған мәліметтерге сәйкес, Ақтөбе қоқыстың ластануынан зардап шегеді. Мақала Ақтөбе қаласының көшелерін тазарту үшін Ақтөбе мектептерінің жасөспірімдері не істей алады деген сұраққа жауап береді.

**Key Words**

Waste pollution, Aktobe city, lung diseases, allergies, waste management, hydrogen sulfide, students, garbage.

**Introduction**

Garbage is the leftovers of human activity. For example: when people eat, they throw away food that they cannot eat anymore. It is very important to manage waste correctly and get rid of them. In the modern-day cities, there is a complex system of waste management. To begin with, garbage must be transported to landfill or incineration centers. This task mainly done by garbage trucks, and citizens must pay for this service to private companies. After that garbage can be sent to landfill where it will stay, or it can be combusted in incineration centers. As stated by Ellis (2020), world generates 2 billion tons of municipal waste every year and at least one third of waste is not managed in environmentally safe manner ant it is projected that this number will grow to 3.4 billion tones in 2050. Waste is not going anywhere soon, but what consequences occur if waste was not managed properly. To begin with, waste can harm environment very severe. For instance, it can cause acid rain and pollution of natural habitat of species. Likewise, garbage can directly cause diseases, such as asthma and can result in mutation of bacteria, which can be immune to drugs. There were number of sources that proves that waste can harm health of people. Research by Bai and Bai (2019), proves that hydrogen sulfide can cause respiratory diseases.

Aktobe city has problem with waste. A lot of litter lies on the streets and many people do not throw away their garbage in trash bins. Because of that you can find litter in grass, on pedestrian part. It makes city very polluted and smell very bad. Therefore, many people do not like to walk on streets when day is windy. These statements have reasonable evidence behind. As stated by Makenko (2019), 2 out of 3 waste collection companies are closing in Aktobe. From this citation follows that waste overwhelms the streets of the city.

I am motivated to study this issue because I think that garbage indirectly worthened my health. I have an allergic reaction to pollen. It first appeared in 2013, when I was outside of the city. It was very painful for me and because of allergy I could not go out from home for whole summer. I suffered a lot, and I was passing several treatment courses. I think that by reducing litter in the streets I can prevent allergic reactions of children from happening.

The purpose of the research project was to discover how waste is affecting population of Aktobe city and search for solution of this issue. The aim was to find out methods of reducing waste and how teenagers that study in school can be motivated for acting.

Therefore, the main aim research questions were:

* What health problems may occur because of waste?
* In what ways students can reduce litter on the streets?
* Why teenagers would be interested in cleaning streets of Aktobe?

The result of the research was to decrease the number of wastes on streets and make people more interested in a keeping city clean.

**Context**

Waste pollution is one of the most common problems in many countries. Waste can be divided into several groups: organic, paper, plastic, glass, metal, electronic, mixed.  Each of these types harms the environment, and it needs a lot of time to recover from waste pollution. For instance, the ocean is filled with garbage, and even in the Mariana Trench, which is the deepest point of the world, ocean plastic litter was found by scuba divers. “Every year, about 8 million tons of plastic waste escapes into the oceans from coastal nations. That is the equivalent of setting five garbage bags full of trash on every foot of coastline around the world” (Parker, 2019).

This greatly affects the animal world because its inhabitant is polluted. Many animals are getting caught by plastic, which makes them die of injuries; for example, according to Daly (2018), 700 species of marine animals have eaten or got caught in plastic. Another issue is that humans start many wildfires that destroy inhabitants of animals and burn houses of residents. Debris fires discarded cigarettes are one of the many reasons why wildfires are igniting in the world. Wildfires are problematic and cause severe damage to nearby residential areas and live thousands of people without shelter.  Reid (2020) stated that devastating bushfires had taken 23 lives and destroyed approximately 2000 homes in Australia.

Moreover, human waste can create conditions for bacterial growth and mutation. This mutation can provide bacteria immunity to drugs and antibiotics. As Waturu, Mutai, Kiiru, Musyoki, and Ochieng (2017) claimed, antimicrobial resistance was found in garbage collection areas in Nairobi, Kenya. If bacteria become immune to drugs, it will eventually cause another disease and threaten the lives of a lot of people.

Another issue that is coming along with trash is that it decays it produces gases such as hydrogen sulfide. It is invisible, and its mass is less than the mass of air, so it is hard to track it. Research by Bai and Bai (2019) supports that this gas can harm people in certain ways. For instance, this gas can cause raspatory diseases. Raspatory diseases are affecting your organs, especially lungs, which makes you feel problems with a breath. Likewise, landfill gasses are harming the environment. As stated by Ritzkowsky and Stegmann. (2018), this type of gasses is hazardous and explosive. It might become a serious threat for residential areas and cause severe injury for people.

However, there are different perspectives on this problem. Waste can be something to make a profit from. To begin with, recycling centers can take advantage of what you throw away. Boxes, bottles, glasses can be recycled to become goods that can be sold. China is the most recyclable nation on Earth. According to Clark (2018), China is buying more trash than any other country in the world. Government buys 3.1 billion dollars’ worth of trash annually. Also, recycling is one of the most prospective businesses in the world. Their annual share in the market is increasing dramatically.

Another way of using litter as a source of profit is to convert the trash into energy. Sweden is known for its government policies about recycling. They implemented reforms to encourage citizens to recycle even more. Nowadays, Sweden even transports waste from neighboring countries: Norway, Finland, Denmark, because their demand increases every year. They use waste as energy carriers, and currently, 50% of all trash is gathered in power plants. Currently, there are 34 power plants opened, and even more will be opened in the future.

However, still, trash is received only for a small amount of all energy generated in a country. According to Yee (2018), 80 % of the total energy generated by Sweden was produced on nuclear and hydropower plants. Likewise, burning trash is still producing emissions. But still, trash in landfills will be eventually burned, but with waste to energy program, this can be renovated to energy.

Overall, this issue affects the world in many ways, so many people started projects for conservation purposes. There are a lot of methods. One of them is by transforming trash into something useful for the house, and students can perform this. For example, many families want to buy a piece of art for their houses. They cost a lot of money that can be spared for other things such as paying taxes or products. So, you can create artwork from bottles which can be collected from across the neighborhood. Furthermore, many people wish for their favorite character's statue, but they can practice and create a full-size figure of their character using papier mache. Moreover, many kids like interesting toys with eye-catching designs to craft a toy from details extracted from other toys. Also, people can take their trash to utilize the center and get paid for their work. For many workers, this activity became their livelihood and vital for supporting their families. Additionally, students can become volunteers and clean streets by themselves. This will greatly reduce the litter's number on the streets and make Aktobe city a better place for walking.

**Methods:**

In this research work several methods were used in order to collect data about the issue of waste in Aktobe. Survey and the Internet were chosen as a primary and secondary research methods, respectively. By doing this, quality of research improved. Overall, for collecting information two weeks were spent. Firstly, one week was spent to gather information from the Internet in December and second week was spent for conducting survey in January.

To begin with, the Internet was used for gathering general information about the problem with waste, which is prevalent in many countries and many people are writing their solutions. However, many of them do not have special knowledge about this problem, so it was difficult to choose appropriate sources. In order to check credibility of information 6 steps of credibility (origin, author, purpose, perspective, academic, relevance) method was used. So, websites that were chosen were credible. For example, National Geography website was incredibly huge source of data about effects of waste on environment.

Additionally, websites that were used for research were governmental or scientific. For instance, website epa.gov (U.S Environmental Protection Agency) provided a lot of real-life cases of people who collected and recycled waste by different methods.  To get data about how waste effect health of population an article that was written by Yong Bai and Qianq Bai. Both have PhD in medicine and currently they are professors in Hainan University.

Despite the credibility of websites and information that was collected, it still not enough. Only by using primary research methods it is available to prove or disprove the findings from the Internet. Quantitative research method in the form of survey was used. It was impossible to use interview methods. There are some reasons for that:

* Coronavirus pandemic is the most limiting factor for research. Due to quarantine measures, the movement of people is limited, and meeting people is impossible. However, it is extremely important to meet people who works on landfill, because they explain situation with litter better than anyone else.
* Another issue is that in order to get better knowledge of medical side of waste problem it is essential to talk with doctors, but currently they are very busy, and they do not have time for this.
* According to Wilkinson (2020), interviews are time consuming. Due to busy school schedule and homework, it was necessary to conduct primary research fast. Therefore, interviews were not held.

That is why it was decided that survey is more suitable than interview. Survey was chosen as a primary research because it is easy to get multiple answers in the shortest time possible.

Main participants of survey were students of Aktobe schools in age 10-19. They have spare time and will clean Aktobe up from waste, likewise, students are very active in social media and therefore, they are the most accessible people. The platform for survey was Google Forms. It was convenient platform to work in. Overall, 58 students had taken survey.

It was necessary that people who will take part in survey will have different points of view on this topic. Therefore, questions are close-ended, and variants of answer are distinct. By doing this, research can cover different sides of one problem. Many people can agree with two variants for answer at once, so most of the question have an option for more than one pick of variant. Likewise, many people maybe want to add something more or maybe they disagree with all of variants, so half of the questions have an option for adding your own variant as “other”. Overall time for survey was 3 minutes and it had 9 questions in total.

However, the most difficult part of conducting survey is to draw attention of people. In order to fix this, it is vital to write invitation to take survey personally and in social media. Also, it is important to make survey short, but packed with different questions. Most of the students respond to invitation and took survey.

**A Kazakhstan Public Opinion Investigation on Changing the Way of Energy Production**

**Results**

Information that was obtained from the internet research was important for entire research. The main ideas were already presented in Context section.

To sum up, the main points were that world produces a lot of trash annually, but only 2/3 of the whole amount of waste is managed in environmentally friendly way. Therefore, wildlife is in danger. Likewise, people are also suffering from this issue, waste can cause wildfires and many people lose their homes. Trash also negatively affects nations health, because of the products of deterioration.

The results of survey were helpful. Data analysis is presented in Appendix. The key information from questionnaire can be summarized in the following points below.

* Information from Table 2 represents that vast majority of people think that growing waste issue in Aktobe is relevant for today, because only 18% of people think that situation with litter in Aktobe is stable, while the rest 81% are not satisfied with current situation.
* According to the Table 3, most people do not know what diseases can occur because of waste, however, 22 and 17 percent of participants wrote that lung diseases and allergies may occur, respectively. Only 1% of people mentioned psychological problems because of waste.
* With regards to the Table 4, 35% of the respondents think that trash can make sanitation of Aktobe inappropriate.34 and 35 percent of the participants think that trash makes city less comfortable for walking and waste can cause severe health problems, respectively.
* According to Table 5, Overwhelmingly majority at 52 % are interested in cleaning litter, because a smell of a litter is annoying to them, 30% believe that collecting trash will help them to apply to university, while 15% consider that trash can be useful for project work.
* From Table 6, Around 39 percent of the respondents think that the best way to solve this issue is taking this problem in your own hands and clean streets of Aktobe. Likewise,34% decided that recycling litter is the most suitable solution. 27% of respondents think that waste management must be more effective and 1% of people wrote that garbage chant must be constructed.
* According to Table 7,73% of respondents agreed that good and appropriate management is a way to make Aktobe clean from trash, however, 27% of participants disagree with this opinion.
* Referring to Table 8, bulk of the people at around 39% agreed that if nothing is done, ecosystem will be damaged harshly. 34% of participants believe that health of population will be in danger due to waste issue, while 27% of individuals agree that enonomic of Aktobe will fail because no one will be intersected in polluted city.
* With regards to Table 9,56 percent of people showed that they are interested in trying to combat the spread of waste,on the other hand,44% of respondents showed that they arent interested in stopping waste.

Table 1:

Question: What do you think about a situation with litter in Aktobe?

|  |  |
| --- | --- |
| Answers | Percentage |
| Situation with litter is stable | 18% |
| Private companies are not capable to collect all litter in Aktobe | 35% |
| Aktobe is fulfilled with litter | 46% |
| I was not here | 1% |

Table 2:

Question: What health problems might occur because of litter?

|  |  |
| --- | --- |
| Answers | Percentage |
| I don’t know | 60% |
| Lung diseases | 22% |
| Allergies | 17% |
| Psychological problems | 1% |

Table 3:

Question: Why the issue with litter is important in your opinion?

|  |  |
| --- | --- |
| Answers | Percentage |
| Sanitation of Aktobe will be inappropriate | 35% |
| It makes city uncomfortable for walking | 34% |
| It can cause severe health problems | 31% |

Table 4:

Question: Why can you be interested in reducing litter in Aktobe?

|  |  |
| --- | --- |
| Answers |  |
| I feel bad because of smell  from litter… | 52% |
| Volunteering for cleaning works is great for applying to university | 30% |
| I want my country to be clean | 1% |
| My school project can be related to this problem | 15% |
| I want my hometown not to be buried in trash | 1% |
| Large amounts of garbage worsen the overall situation | 1% |

Table 5:

Question:  What solutions can you propose for reducing litter?

|  |  |
| --- | --- |
| Answers | Percentage |
| Cleaning streets by yourself | 28% |
| Recycling litter | 37% |
| Waste management must be more effective | 34% |
| Build a garbage chute by  model of Sweden | 1% |

Table 6:

Question: To what extent do you agree with this statement “Good waste management is a key to a cleaner Aktobe”?

|  |  |
| --- | --- |
| Answers | Percentage |
| I totally agree | 46% |
| I partially agree | 27% |
| I partially disagree | 3% |
| I totally disagree | 24% |

Table 7:

Question:  What consequences can appear because of inappropriate situation with litter, if nothing will be done by your opinion?

|  |  |
| --- | --- |
| Answers | Percentage |
| Ecosystem will be harmed very harsh | 39% |
| Economics of Aktobe will fall because no one will be interested in polluted city | 27% |
| Health of population will be damaged | 34% |

Table 8:

Question: How do you feel about taking action for yourself to stop the spread of litter in Aktobe?

|  |  |
| --- | --- |
| Answers | Percentage |
| I interested in it | 44% |
| I am looking forward to begin cleaning litter | 12% |
| I am already cleaning litter for myself | 20% |
| I am not interested | 24% |

To sum up, the analysis of data shown that students had shown them persuade to change situation with litter, however most of them do not know what important consequences to health might occur. By means of social advertising and spreading news this issue and its consequences will become more widespread

**Conclusion**

With regards to data obtained from survey it is time to conclude an entire research and answer to research questions.

* What health problems may occur because of waste?

It is commonly believed that waste is an issue for Aktobe city residents, however, a vast majority of the students do not know what health problems can appear because of waste.  Most prevalent from these illnesses was lung diseases group. Many argued that litter is a reason of allergies and can cause psychological problems. Therefore, waste pollution is a problem for Aktobe region because nations well-being is in danger. If this problem will be solved, people will participate in more economical processes and economics will be greatly improved.

* Why teenagers would be interested in cleaning streets of Aktobe?

Many people found their own reasons for cleaning litter on the streets. First, the smell of waste is annoying and uncomfortable. Second, for volunteering to clean waste because it is useful for applying to university. Additionally, some people came up with idea to use trash for the school project. Finally, some feel themselves as part of large community of citizens of Aktobe and Kazakhstan, therefore, they cannot lay their hands down on this issue. If the population will be encouraged to keep Aktobe city clear, it will dramatically shift a situation with waste pollution.

* In what ways students can reduce litter on the streets?

There are a lot of possible solutions that were proposed during survey. Many argued that recycling is the most effective solution to this problem. One such example is using plastic bottles as bricks. Firstly, empty plastic bottles must be fulfilled with little soft plastic and then closed. Next, plastic bottles are combined with silicone, adobe so the block of 60x150 is obtained.  One devised an idea to build a garbage chute like in Sweden. By promoting and realizing this idea, Aktobe will become less dirty and more innovational.

To sum up, waste pollution is not negligible, and many people fear for their own mental and physical health. Therefore, students want to get rid of waste and find the profit out of this issue such as applying to university, creating a project work with trash. Many ideas were presented for getting rid of waste, such as: recycling, volunteering work and new projects like a garbage chute. Lots of data that was obtained from survey were useful, still there is missed opportunity to ask opinions of adults for this issue. Therefore, further investigations are required to cover all aspects of question.

**Appendix**

Diagram 1

Question: What is your age?

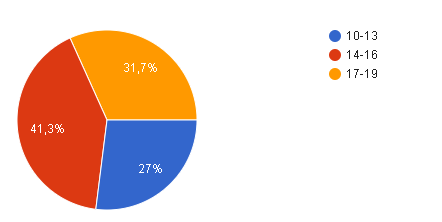


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