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**"Prospects for the
Development of Modern Science"
Materials of the II International
Student Scientific Conference**

**March 20-22, 2019
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Submissions cover a wide range of issues, primarily the problem of improving management, sustainable economic development and introduction of innovative technologies, improved training and enhancement of the development of "human capital", interaction between the individual and society, psychological and pedagogical foundations of innovative education.

Materials addressed to all those interested in the actual problems of management, economy and ecology, social sciences and humanities.

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Compilation of the materials of the international scientific-practical conference **"Quality Management: Search and Solutions"** (edited by S. Midelski) was awarded the **Honorary Diploma** and the **Gold Medal** of the **XXXVI International Paris Book Fair** (17-20 March 2016, Paris).

XXXVI International Paris Book Fair was held under the motto "Book in the Spotlight". It was opened by solemn speech of French President Francois Hollande. Among the visitors of the Fair were many French and foreign politicians, scientists and cultural figures, such as France Prime Minister Manuel Valls, the Minister of Culture and Communications Audrey Azoulay, Minister of Higher Education and Scientific Research Najat Vallaud-Belkacem.

Over the 4 days of the Exhibition organized more than 800 meetings devoted to issues of book publishing, distribution and availability of books, copyright issues related to, including educational and scientific publications.

Fair participants were representatives of 45 countries; the number of visitors exceeded 230,000 people.



Сборник материалов международной научно-практической конференции **«Менеджмент качества: поиск и решения»** (под редакцией С.Л. Мидельского) был отмечен Почетным Дипломом и Золотой медалью XXXVI Международного Парижского книжного Салона (17-20 марта 2016, Париж).

XXXVI Международный Парижский книжный Салон прошел под девизом «Книга в центре внимания». Его открыл торжественной речью президент Французской Республики Франсуа Оланд (François Hollande). Среди посетителей Салона были многие французские и иностранные политики, деятели науки и культуры, такие как премьер-министр Франции Мануэль Вальс (Manuel Valls), министр культуры и связи Одри Азулай (Audrey Azoulay), министр высшего образования и научных исследований Наят Валло-Белкасем (Najat Vallaud-Belkacem).

За 4 дня проведения Салона организовано более 800 встреч, посвящённых вопросам книгоиздания, распространения и доступности книжной продукции, вопросам авторских прав, касающихся, в том числе, учебных и научных изданий.

Участниками Салона стали представители 45 стран, число гостей превысило 230 000 человек.



The collection of materials of the III International Scientific and Practical Conference "Innovation Management and Technology in the Era of Globalization" (Sharjah, UAE, January 12-14, 2016, edited by S. Midelski) was presented at the XXIX International Exhibition of Teaching and Scientific Publications.

The exhibition was held from 30 May to 1 June 2016 in the main building of Russian Academy of Sciences (RAS, Moscow, Russia).

The collection was awarded by the Diploma "The Best Teaching Publications in Its Field" and by the Certificate "Golden Fund of National Science".

Regional Academy of Management sincerely thanks our partners and co-organizers of the conference, members of the editorial board and all the authors of articles, which was published in the collection.

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Сборник материалов III международной научно-практической конференции «Инновационный менеджмент и технологии в эпоху глобализации» (Шарджа, ОАЭ, 12-14 января 2016 года, редактор С.Л. Мидельский) был представлен на XXIX международной выставке-презентации учебно-методических и научных изданий.

Выставка проходила с 30 мая по 1 июня 2016 г. в главном здании Российской Академии Наук (РАН, Москва, Россия).

Сборник был награжден Дипломом «Лучшее учебно-методическое издание в отрасли» и Сертификатом «Золотой фонд отечественной науки».

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The collection of materials of the International scientific-practical conference «Prospects for the Development of Modern Science» (edited by S. Midelski) was awarded the Gold Medal of the XXXVI International Book Exhibition *Liber Barcelona - 2018*.

The exhibition was held from 3 to 5 October 2018 in one of the largest exhibition centers in Europe *Fira Barcelona Grand Via* (Barcelona, Spain). The event was held with the official support of the Government of Spain, the Ministry of Education and Training of Spain, the Ministry of Culture and Sports of Spain, the Department of Culture of Catalonia, the City Council of Barcelona.



Сборник материалов международной научно-практической конференции «Перспективы развития современной науки» (под редакцией С.Л. Мидельского) был награжден Золотой медалью XXXVI Международной книжной выставки *Liber Barcelona - 2018*.

Выставка прошла с 3 по 5 октября 2018 года в одном из крупнейших выставочных центров Европы *Fira Barcelona Grand Via* (г. Барселона, Испания). Мероприятие проведено при официальной поддержке Правительства Испании, Министерства образования и профессиональной подготовки Испании, Министерства культуры и спорта Испании, Департамента культуры Каталонии, Городского совета г. Барселона.

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REPORTS AT THE PLENARY SESSION / ДОКЛАДЫ ПЛЕНАРНОГО ЗАСЕДАНИЯ

01. Factors Associated with Obesity Among Korean Adolescents

Gyu Jin Heo, So Young Nam, Soo-Kyung Lee
Department of Food and Nutrition, Inha University
(Incheon, Korea)

Abstract

Obesity has been a great interest of public health. Studies simultaneously examining various factors associated with obesity among adolescents have been limited. Therefore, this study aimed to examine how various factors (socioeconomic status, sex, age, diet, and physical activity) were simultaneously associated with obesity among Korean adolescents. This study analyzed two nationally representative datasets: 2008 Korea National Health and Nutrition Examination and Survey (KNHANES) and 2008 Korea Youth Risk Behavior Web-based Survey (KYRBWS). A total of 900 adolescents (12-18-year-old) in KNHANES and 74,451 adolescents in KYRBWS were included in statistical analyses with SPSS 19.0. Overweight (5.7%) and obesity (13.9%) rates were determined in KNHANES, and KYRBWS showed somewhat lower rates. No significant associations between the various factors and obesity were found in KNHANES. However, the analysis of KYRBWS confirmed higher obesity risk for boys, lower economic status, infrequent high-energy/low-nutrient type food consumption, practicing moderate-intensity physical activity less than five days per week, spending more than 2 hours sitting per day, and having tried exercise or diet for weight control ($p < 0.05$). The results from the two national datasets seemed to generally agree that many of the various obesity risk factors were important among Korean adolescents, although the associations were mostly not significant in KNHANES. It seemed that obese adolescents tried to practice good dietary behaviors, but not necessarily physical activity, known to reduce obesity risk. Obesity policies should continue to help adolescents achieve an active lifestyle and healthy eating behaviors.

Keywords: Obesity; Risk Factors; Korea; Adolescent

1. Introduction

Recent modernization and globalization have led to lower physical activity and higher energy consumption, resulting in increased obesity rates around the world [1]. Children and adolescents are not exceptions. Child and adolescent obesity rates have almost doubled from 5.8% in 1997 to 9.7% in 2005 in Korea [2]. Many factors, including socioeconomic status (SES), sex, age, dietary habits, physical activity, and other lifestyle factors, have been studied in relation to child and adolescent obesity. SES appears to have a positive relationship with obesity in developing countries, whereas a negative relationship in developed countries [3-6]. Further, boys and older age people are positively associated with obesity [7, 8]. The relationships between sex, age, and obesity may differ by country. Dietary habits providing higher level and easily usable form of energy have been studied. For example, consumption of high-energy/low-nutrient foods, beverages, and fast food and habits of overeating have been previously researched [7-12]. Physical

activity has been studied in the context of physical activity for leisure and physical activity for daily activities [10, 13-15]. These various factors have been simultaneously examined in a comprehensive manner in only a few studies. In addition, adolescents have received less attention relative to children, despite adolescence constituting an important life stage connecting childhood to adulthood [16].

This study aimed to examine association patterns between various factors (SES, sex, age, diet, and physical activity) and obesity among Korean adolescents using Korea National Health and Nutrition Examination Survey (KNHANES) and Korea Youth Risk Behavior Webbased Survey (KYRBWS). These datasets are two major nationally representative data sources in Korea, each with its own strengths and weaknesses. Therefore, utilizing the two datasets simultaneously would provide a comprehensive breakdown of the current status of obesity-related factors among Korean adolescents.

2. Methods

2.1. Subjects

This study used 2008 KNHANES [17] and KYRBWS [18]. KNHANES is a national survey of health behaviors and medical status of Koreans of all ages. Variables are directly measured or obtained by personal interviews. KYRBWS is an online survey focused on health behaviors among students in middle-high and high schools. All variables are self-reported, but the number of participants is very large, affording higher statistical power.

Analyses were conducted with a total of 900 adolescents (472 boys and 428 girls) aged between 12 and 18 in 2008 KNHANES and 74,451 adolescents (38,795 boys and 35,656 girls) in 2008 KYRBWS. Age was dichotomized: 12 - 15 (middle-high school) and 16 - 18 (high school) years old.

2.2. Study Variables

1) Body weight status. Body Mass Index (BMI) in KNHANES was calculated from directly measured height and weight, while BMI in KYRBWS was calculated from self-reported ones. Adolescents with a BMI over 95th percentile or over 25 were determined to be obese; adolescents with a BMI between 85th and 95th percentile was determined to be overweight. Adolescents with a BMI below 5th percentile was categorized as underweight and others as normal weight [19].

2) Obesity-related factors. a) Socioeconomic status SES were determined based on monthly household income adjusted for the number of family members, parents' occupation, and parents' education in KNHANES, while parents' education and economic status in KYRBWS were used to determine SES. Monthly household income in KNHANES was re-categorized into two groups: individuals with incomes below 120% of the Korea poverty level [20] or those with incomes above the level. KYRBWS provided parents' economic status as: 1) low, 2) middle-low, 3) middle, 4) middle-high, or 5) high. Parents' education was dichotomized into 1) lower than high school graduation, or 2) high school graduation and higher.

Parents' occupation, available only in KNHA NES, was dichotomized into 1) currently working, or 2) currently not working.

b) Dietary factors. Dietary factors included: 1) high-energy/low-nutrient (HELN) food consumption, and 2) energy consumption level. High-energy/low-nutrient foods are energy-dense foods with a minimal level of nutrients, and a list of such foods are monthly published by the Korea Food and Drug Administration [21]. In KNHANES, consumption of high-energy/low-nutrient foods such as instant noodles, bread, cookies, ice cream, carbonated drinks, hamburgers, pizza, and fried foods was dichotomized into infrequent or frequent users. Adolescents who consumed five or more HELN food items once a week or more were grouped as frequent users; adolescents who consumed-four or less food items once a week or more were grouped as infrequent users. KYRBWS asked the consumption frequency of carbonated drinks, instant noodles, fast food, and cookies. Adolescents in KYRBWS were also re-categorized as 1) infrequent users (those who answered the "do not eat" category), or 2) frequent users (those who answered any of the other categories).

Energy consumption level was determined by comparing energy intake from 24-hr recalls with individually estimated energy requirement, calculated using the formulas in the 2010 Dietary Reference Intakes for Koreans [22]. Energy consumption level was examined only in KNHANES, as KYRBWS did not conduct 24-hr recalls.

c) Physical activity factors. Physical activity factors included: 1) vigorous-intensity activity, 2) moderate-intensity activity, 3) walking, 4) sedentary hours, and 5) sleeping hours.

Vigorous-intensity activity for 20 minutes or more per session is recommended three days or more per week. Moderate-intensity activity for 30 minutes or more per session is recommended five days or more per week. Walking for 30 minutes or more per session is recommended five days or more per week [17,23]. Subjects were categorized as those who met or those who did not meet the recommendation for each physical activity factors.

Sedentary hours were provided only in KYRBWS. Following the Dietary Guidelines for Korean Adolescents [24], individuals were grouped into two categories: 1) 2 hours per day or more or 2) less than 2 hours. "Sleeping hours" was also dichotomized into 1) less than 7 hours per day or 2) 7 hours or more per day.

d) Controlling factors. Whether or not adolescents attempted exercise or dietary means (e.g. eating less, fast, etc.) for weight control was asked in KNHANES and KYRBWS. Subjects were categorized as 1) those who attempted or 2) those who did not.

2.3. Statistical Analysis

This study used statistical analysis methods reflecting the complex sample survey design of KNHANES and KYRBWS, using SPSS 19.0 (IBM SPSS, Armonk, NY, USA).

Basic descriptive methods were used to determine the status of the study variables, whereas logistic regression analyses were used to examine relationships among the variables. The relationships between obesity and risk factors were examined in a series of multiple logistic regression models: Model I (SES variables), Model II (sex, age, dietary variables, and the controlling variable), Model III (sex, age, physical activity variables, and the controlling variable), and Model IV. When significant relationships were found in previous models, model IV was established including all study variables.

3. Results

3.1. Obesity Status

Overweight or obesity rate among 12-18-year-old adolescents in KNHANES was 19.6%, whereas KYRBWS showed a lower rate of 11.8%. Boys showed a higher overweight or obesity rate (22.3% in KNHANES, 13.3 in KYRBWS) than girls (16.5% in KNHANES, 10.2 in KYRBWS). While more boys were obese than overweight, more girls were overweight than obese ($p < 0.05$). The two datasets indicated that older (16-18-year-old) adolescents tended to be more obese than younger (12-15-year-old) ones ([Table 1](#)).

Table 1. Prevalence of overweight and obesity among Korean adolescents by sex and age. % (SE)¹⁾.

		Sex				Age			
		Male	Female	Total	p	12-15	16-18	Total	p
Weight status ²⁾	Underweight	KNHANES ³⁾	8.0(1.8)	7.3(1.5)	7.7(1.2)		6.4(1.3)	9.3(2.2)	7.7(1.2)
		KYRBWS ⁴⁾	6.6(0.2)	7.4(0.2)	7.0(0.1)		6.0(0.2)	8.4(0.2)	7.0(0.1)
	Normal	KNHANES	69.7(2.7)	76.3(2.4)	72.8(1.9)		75.4(2.2)	69.2(3.1)	72.8(1.9)
		KYRBWS	80.1(0.3)	82.4(0.3)	81.2(0.2)	0.000 ⁵⁾⁶⁾	82.4(0.3)	79.5(0.3)	81.2(0.2)
	overweight	KNHANES	2.7(0.8)	9.0(1.6)	5.7(0.9)		7.1(1.3)	3.7(1.2)	5.7(0.9)
		KYRBWS	2.0(0.1)	5.6(0.2)	3.7(0.1)		4.8(0.1)	2.1(0.2)	3.7(0.1)
	obesity	KNHANES	19.6(2.1)	7.4(1.5)	13.9(1.4)		11.0(1.5)	17.7(2.4)	13.9(1.4)
		KYRBWS	11.3(0.2)	4.6(0.1)	8.1(0.2)		6.8(0.2)	10.0(0.3)	8.1(0.2)
Group ⁷⁾	Not obese	KNHANES	77.7(2.1)	83.5(2.0)	80.4(1.5)		81.9(1.9)	78.5(2.6)	80.4(1.5)
		KYRBWS	86.7(0.2)	89.8(0.2)	88.2(0.2)	0.041 ⁵⁾ 0.000 ⁶⁾	88.3(0.2)	87.9(0.3)	88.2(0.2)
	obese	KNHANES	22.3(2.1)	16.5(2.0)	19.6(1.5)		18.1(1.9)	21.5(2.6)	19.6(1.5)
		KYRBWS	13.3(0.2)	10.2(0.2)	11.8(0.2)		11.7(0.2)	12.1(0.3)	11.8(0.2)

1) Estimated percentage of population (standard error);

2) 2007 Korean National Growth Charts. Underweight: <5th percentile, Normal: 5th - 85th percentile, Overweight: 85th - 95th percentile, Obesity: ≥95th percentile or ≥BMI 25;

3) Korea National Health and Nutrition Examination Survey;

4) Korea Youth Risk Behavior Web-based Survey;

5) Sex or age difference of KNHANES;

6) Sex or age difference of KYRBWS;

7) Not obese (underweight + normal), Obese (overweight + obese).

3.2. Obesity-Related Factors in KNHANES

No significant associations were found in Model I and II ([Table 2](#)). Model III found that girls (OR = 0.36) were less likely to be overweight or obese ($p < 0.05$). Since separate analyses did not show consistent statistically significant relationships, Model IV was not established.

Table 2. Relationships between risk factors and overweight and obesity in 2008 Korea National Health and Nutrition Examination Survey. OR (95% CI)¹.

		Model I (N = 505)	Model II (N = 335)	Model III (N = 404)
Sex	Male	1.00	1.00	1.00
	Female	0.93 (0.56, 1.56)	0.34 (0.20, 0.58)	0.36 (0.22, 0.59)
Age	12 - 15 years	1.00	1.00	1.00
	16 - 18 years	1.50 (0.89, 2.52)	1.11 (0.59, 2.08)	0.92 (0.52, 1.60)
Socioeconomic factors				
Income compared with the minimum cost of living	<120%	1.00		
	≥120%	0.90 (0.41, 1.96)		
Father's education	≤high school	1.00		
	≥high school	1.32 (0.62, 2.82)		
Mother's education	≤high school	1.00		
	≥high school	0.98 (0.44, 2.16)		
Father's occupation	Not	1.00		
	Working	0.96 (0.31, 2.97)		
Mother's occupation	Not	1.00		
	Working	1.29 (0.71, 2.34)		
Dietary factors				
The proportion of energy by EER ²⁾	<100%		1.00	
	≥100%		0.57 (0.29, 1.15)	
Intake of High energy/ Low nutrient food types	Infrequent ⁶⁾		1.00	
	Frequent		0.96 (0.56, 1.63)	
Weight control by fast, diet, and others	Not attempt		1.00	
	Attempt		1.39 (0.86, 2.25)	
Physical activity				
Vigorous-intensity activities ³⁾	<3 days			1.00
	≥3 days			1.08 (0.50, 2.36)
Moderate-intensity activities ⁴⁾	<5 days			1.00
	≥5 days			1.01 (0.43, 2.36)
Walking ⁵⁾	<30 min			1.00
	≥30 min			1.10 (0.68, 1.78)
Sleeping time	<7 hours			1.00
	≥7 hours			0.72 (0.40, 1.30)
Weight control by exercise	Not attempt			1.00
	Attempt			1.22 (0.63, 2.35)

Dependent variable: Obese (overweight + obese), Not obese (underweight + normal): Reference

1) Odds ratio (95% confidence interval);

2) EER: Estimated Energy Requirement;

- 3) Vigorous-intensity activities: having exercised with vigorous-intensity 20 minutes or more per session, three days per week or more, last week;
- 4) Moderate-intensity activities: having exercised with moderate-intensity 30 minutes or more per session, three days per week or more, last week;
- 5) Walking: walked 30 minutes or more per session, five days per week or more, last week;
- 6) High-energy/low-nutrient food types: Infrequent users - consumed fewer than five items from ramen, bread, cookies, ice cream, soft drink, hamburger, pizza, and fried food more often than once per week; Frequent user – consumed five items or more.

3.3. Obesity-Related Factors in KYRBWS

According to Model I in [Table 3](#), economic level was negatively related to obesity. Compared to adolescents who reported a low SES level, those who reported a higher SES level were less likely to be obese. Model II indicated that obesity probability was higher for less frequently consuming fast food (OR = 0.78), ramen (OR = 0.90), or snacks (OR = 0.74), and having dieted for weight control (OR = 4.25). Model III showed that moderate-intensity active adolescents (OR = 0.88) were less likely to be obese, whereas adolescents who were more sedentary during weekdays (OR = 1.11) or weekends (OR = 1.23) and exercised for weight control (OR = 1.13) were more likely to be obese.

Most of the significant factors in the previous models remained significant in the full model, Model IV. Higher obesity probability was found for lower economic status, infrequent high-energy/low-nutrient food consumption, vigorous-intensity active, moderate-intensity inactive, spending more than 2 hours a day sitting, and having tried exercise or diet for weight control ($p < 0.05$).

Overall, analyses of KNHANES and KYRBWS resulted in similar trends, although the results from KNHANES were not significant.

3.4. Discussion

This study attempted a comprehensive and simultaneous analysis on the relationships of socioeconomic, dietary, and physical activity factors with obesity in Korean adolescents using 2008 KNHANES and KYRBWS.

Overweight (5.7%) and obesity (13.9%) rates among 12-18-year-old adolescents in 2008 KNHANES were similar to those from 2007 KNHANES, but slightly higher than those from 2005 KNHANES [8, 17]. Overweight (3.7%) and obesity (8.1%) rates from 2008 KYRBWS were also similar to those from 2007 KYRBWS [19, 25]. Therefore, recent overweight and obesity rates among Korean adolescents have appeared to plateau in general.

Girls were less likely to be obese than boys. Girls showed higher overweight rates, whereas boys displayed higher obesity rates. This trend was also observed in 2007 KNHANES, the National Youth Policy Institute report on child/adolescent obesity, and the 2009 student health check by the Ministry of Education, Science, and Technology [8, 15, 26]. Therefore, obesity prevention policies and programs should provide more care for boys.

Table 3. Relationship between risk factors and overweight and obesity in 2008 Korea Youth Risk Behavior Web-based Survey. OR (95% CI)¹⁾.

		Model I (N = 55,099)	Model II (N = 33,327)	Model III (N = 33,327)	Model IV (N = 25,409)
Sex	Male	1.00	1.00	1.00	1.00
	Female	0.72 (0.67, 0.77)	0.42 (0.39, 0.46)	0.67 (0.61, 0.72)	0.41 (0.37, 0.45)
Age	12 - 15 years	1.00	1.00	1.00	1.00
	16 - 18 years	1.02 (0.95, 1.01)	0.92 (0.85, 0.99)	0.98 (0.90, 1.06)	0.95 (0.86, 1.05)
Socioeconomic factors					
Father's education	≤high school	1.00			1.00
	≥high school	1.06 (0.94, 1.21)			1.19 (1.00, 1.42)
Mother's education	≤high school	1.00			1.00
	≥high school	0.95 (0.81, 1.11)			0.89 (0.73, 1.08)
Economic level	Low	1.00			1.00
	Middle low	0.88 (0.75, 1.02)			0.81 (0.66, 1.00)
	Middle	0.69 (0.59, 0.80)			0.73 (0.60, 0.88)
	High middle	0.72 (0.62, 0.84)			0.77 (0.63, 0.93)
	High	0.74 (0.61, 0.89)			0.74 (0.57, 0.95)
Dietary factors					
Frequency of fast food intake	Infrequent ⁶⁾		1.00		1.00
	Frequent		0.78 (0.72, 0.84)		0.79 (0.72, 0.86)
Frequency of carbonated drink intake	Infrequent		1.00		1.00
	Frequent		0.93 (0.87, 1.00)		0.92 (0.84, 1.00)
Frequency of ramen intake	Infrequent		1.00		1.00
	Frequent		0.90 (0.84, 0.98)		0.89 (0.81, 0.97)
Frequency of snacks intake	Infrequent		1.00		1.00
	Frequent		0.73 (0.67, 0.81)		0.74 (0.66, 0.82)
Weight control by fast, diet, and others	Not attempt		1.00		1.00
	Attempt		4.25 (3.86, 4.69)		4.31 (3.85, 4.82)
Physical activity					
Vigorous-intensity activities ²⁾	<3 days			1.00	1.00
	≥3 days			1.08 (1.00, 1.18)	1.15 (1.05, 1.26)
Moderate-intensity activities ³⁾	<5 days			1.00	1.00
	≥5 days			0.88 (0.79, 0.99)	0.84 (0.74, 0.96)
Walking ⁴⁾ (weekday, per day)	<30 min			1.00	1.00
	≥30 min			1.03 (0.93, 1.14)	1.06 (0.94, 1.20)
Walking (weekend, per day)	<30 min			1.00	1.00
	≥30 min			1.00 (0.91, 1.10)	1.04 (0.93, 1.15)
Sedentary hours ⁵⁾ (weekday, per day)	<2 hours			1.00	1.00
	≥2 hours			1.11 (1.03, 1.19)	1.12 (1.03, 1.22)
Sedentary hours (weekend, per day)	<2 hours			1.00	1.00
	≥2 hours			1.23 (1.12, 1.34)	1.22 (1.10, 1.36)
Sleeping time	<7 hours			1.00	1.00
	≥7 hours			1.02 (0.94, 1.11)	1.11 (1.00, 1.24)
Weight control by exercise	Not attempt			1.00	1.00
	Attempt			1.13 (1.05, 1.22)	1.11 (1.01, 1.21)

Dependent variable: Obese (overweight + obese), Not obese (underweight + normal): Reference

1) Odds ratio (95% confidence interval);

2) Vigorous-intensity activities: 20 minutes per session or more, last week;

3) Moderate-intensity activities: 30 minutes per session or more, last week;

4) Walking: walked 30 minutes or more per session, five days per week or more, last week;

5) Spending time watching TV, playing games, Internet, etc. (exception of watching during school hours, watching of education broadcast, etc.);

6) Infrequent (original response category: rarely); Frequent (original response category: Once 6 - 7 days, Once 4 - 5 days, Once 2 - 3 days, ≥ Once a day).

This study found that overweight and obesity prevalence was lower in KYRBWS compared to KNHANES. This discrepancy seems largely due to different data collection methods. KNHANES used direct measurement methods, whereas KYRBWS used self-reported data. If statistical methods to adjust for this discrepancy can be devised, national data on obesity could be better managed and utilized.

The KYRBWS results showed that adolescents at lower quintiles of economic level were at higher risk for overweight and obesity. No significant relationships between SES and obesity were found in KNHANES, possibly because of the low statistical power. Perhaps, subjectively measured economic status could influence body weight status more than objectively measured economic status [27]. The nature of relationships between SES and obesity in Korea would be of great interest to the international community as Korea has been and still is transitioning from a developing to developed economy in such a dynamic fashion.

Examination of dietary factors showed that high-energy/low-nutrient foods were less likely to be consumed by obese children. This finding could be attributed to the cross-sectional nature of the datasets used in this study. That is, obese adolescents tend to stay away from snacks [10, 14]. Adolescents seem to know which foods are better for weight control, and obese adolescents seem to put the knowledge into practice. Although this is an encouraging sign, public health efforts should be continued to lower consumption of such high-energy/low-nutrient foods [28, 29].

This study showed that adolescents who spent more than 2 hours sitting per day were more likely to be obese. However, relationships between exercise and obesity differ by intensity. These results seemed to indicate that although obese adolescents had a more sedentary lifestyle, they tried vigorous-intensity activities more often, but not moderate-intensity activities. Therefore, obesity prevention for adolescents should include policy and environments supporting both an active lifestyle (i.e. spending less time watching TV or internet) and more exercise (i.e. increasing physical education class hours, promoting group sports for fun) [28, 29].

This study was limited by being unable to statistically compare the two datasets, as different sampling strategies and measurement methods were used. Making causal inferences was also difficult because of the cross-sectional nature of the datasets. Further, KNHANES may lack sufficient statistical power because of the low number of participants. Large-scale cohort studies on obesity among children and adolescents would be able to provide much of the needed missing information for obesity related research and policy-making.

This study is one of a few that has simultaneously examined various factors associated with obesity utilizing two nationally representative datasets collected through different sampling and measurement methods. The results from the two national datasets seemed to generally indicate that obese adolescents tried to actively practice good dietary behaviors, but not

necessarily physical activity, known to reduce obesity risk. Therefore, obesity prevention policies should continue to help adolescents achieve an active lifestyle and healthy eating habits.

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02. International Comparative Case Study of High School Students about Empathy

Heesun Yang¹, Jung-Eun Park², Ji Hye Kim², Seong-Joo Kang²

¹Department of Elementary Science Education,
Korea National University of Education
(Cheongju, South Korea)

²Department of Chemistry Education,
Korea National University of Education
(Cheongju, South Korea)

Abstract

In this study, we attempted to investigate the empathy ability of Korean adolescents. Davis' Interpersonal Reactivity Index was applied to 1155 high school students in Korea, and the results were compared with those obtained from the survey of the American and Dutch students with similar ages. As a result, high school students in Korea had higher cognitive empathy than other countries. But, in cognitive empathy, Fantasy (FN) was lower than Perspective Taking (PT), unlike other countries. The mean score of women in all empathy subscales was higher than that of men. And there is significant difference between humanities and natural science high school students in PT, Empathic Concern (EC) and Personal Distress (PD). However, in the comparison of mean score's effect size and correlation in the subscales of the empathetic scale, it was confirmed as an unstable structure in PD. Therefore, there is a need to educationally discuss how to improve this limitation of measuring empathy in the further research.

Keywords: Interpersonal Reactivity Index, Cognitive Empathy, Empathy for High School Student in Korea, Gender Comparison, Interdisciplinary Comparisons

1. Introduction

With the advent of the Fourth Industrial Revolution, there have been widespread perspectives that all things will change completely due to technological convergence ([Schwab, 2016](#)). In this regard, [Schwab \(2016\)](#) said that empathy, which is one of the most important parts of human nature, could be a solution to the problems caused by the loss of humanity. Empathy is a key element of human relations ([Krzmaric, 2014](#)). and when we are confronted with problems, it helps us to solve the problems in a multidimensional way ([Davis, 1980](#); [Hoffman, 1982](#)). Moreover recent, Programme for International Student Assessment (PISA) 2015 started to

measure collaborative problem-solving abilities. This means that collaborative problem-solving abilities, which refers to the importance of interpersonal abilities such as empathy, are educationally needed ([OECD, 2017](#)). Empathy can be an important factor as a way to creatively and collaboratively solve the integrated and complex problems in modern society ([Howe, 2012](#); [Sawyer, 2007](#); [Taggar, 2002](#)). Therefore, we need to investigate educational approaches to empathy in response to these social demands.

The needs for empathy, which is a cognitive and affective response that perceives the meaning as if it is one's own, were mentioned even in the late 18th century when traditional scientific methodologies were in the mainstream ([Rifkin, 2009](#)). The study of empathy began in 1873, starting with aesthetics, and continued to grow until it exploded after [Rogers \(1957\)](#) in the 1950s. As a result of these interests, researchers have provided various opinions on the definitions and components of empathy ([Eisenberg & Strayer, 1987](#)). And, most researchers agree that this is not a single concept but a compound concept that includes various characteristics and elements ([Davis, 1980](#); [Hoffman, 1982](#)). Because of the complex nature of empathy, effects also do not appear as just one aspect, but as two or more aspects in multidimensional processes, thereby making the scale for it very important. In order to measure empathy, many criteria have been developed. In particular, the representative scales to measure empathy in terms of the general public include Davis' Interpersonal Reactivity Index (IRI), the Hogan Empathy Scale, Mehrabian and Epstein's affective Empathy Scale ([Hojat et al., 2002](#)).

The most commonly used measure to date is the IRI ([Albiero et al., 2009](#)). The IRI can measure empathic ability in terms of Perspective Taking (PT) and Fantasy (FN) in cognitive empathy, and Empathetic Concern (EC) and Personal Distress (PD) in affective empathy from the perspective of Davis ([Davis, 1980](#)). As a result of confirming previous researches applying IRI to adolescent students, this study found that, in many studies, the empathy ability was measured and analyzed according to gender and age ([Davis, 1980, 1983](#); [Davis & Franzoi, 1991](#); [De Corte et al., 2007](#); [Cliffordson, 2001, 2002](#); [Pulos, Elison, & Lennon, 2004](#)). In addition, the researches on empathy in elementary and middle school education have been mainly limited to the researches on school counseling ([Clark, 2014](#)). researches on educational effect according to the empathic ability of teachers and students ([Boyer, 2010](#)). researches on developing empathic ability ([Hoffman, 2000](#)) and the effect of empathy on learning ([Budin, 2001](#)). However, there has never been a case to confirm the relation between empathic ability and academic achievement through the comparison of empathic ability and there is no try to derive of the educational meaning about appropriateness empathic scale through its evaluation results.

In this regard, this study aims to identify the empathetic characteristics of Korean high school students with the use of Davis' IRI. Many previous

studies were conducted regarding the necessity of empathy and scales of it. But there were few studies to compare empathy ability in IRI of Korean high school students with those of other countries ([Woo et al., 2017](#)). Therefore, this study seeks to analyze the realities of empathy abilities and confirms the possibility of using them in the field of education as there still remain many challenges in this regard.

- How does the IRI show the characteristics of high school students' empathy in Korea when compared with overseas cases?
- How do empathy abilities appear according to academic characteristics (humanities, natural science) in Korea?

2. Methods

2.1. Participants

In order to analyze the empathy ability of high school students, Davis' IRI was applied to 1155 students attending general high schools located in Korea in July 2017 ([Table 1](#)).

Table 1. Research subjects.

Region	Gender		Grade			Academic characteristics			Total
	Male	Female	1	2	3	Common	Humanities	Natural science	
K	230	243	156	177	140	151	205	116	473
D	682	-	307	210	165	307	72	304	682

Note: Total n = 1155.

We selected two high schools with a middle level of learning ability. One school was a mixed-gender school with 473 students and the other was a boys' school with 682 students. This survey was conducted on high school students during class under the supervision of teachers. Only the questionnaires of the parents and the participants agreed with the research were used as research data. The results were compared with those cases where the IRI was applied to American and Dutch high school students. The data collected for comparison are taken from the results of the research in which the IRI was applied to 417 Americans aged 18 to 38 ([Chrysikou & Thompson, 2016](#)), and 232 Dutch high school students with an average age of 17.77 ([Hawk et al., 2013](#)). Since there were few cases in which all four IRI scales were applied to multiple student samples in the same time period and even the gender difference was presented, the characteristics of countries were compared and analyzed as the most similar research data.

2.2. Materials

The IRI, which is the most popular empathy scale, grasps that empathy is a multi-dimensional entity and divided it into four subscales ([Davis, 1980](#)). The subscales are, namely, PT, FN, EC and PD ([Table 2](#)).

Table 2. The Components of Davis' IRI.

Dimension		Contents
Cognitive empathy	Perspective-Taking (PT)	It measures the tendency to adopt viewpoints of others
	Fantasy (FN)	It measures the tendency to engage in novels or movies
Affective empathy	Empathetic Concern (EC)	It measures the tendency of interest, compassion, and warmth for others experiencing negative experiences
	Personal Distress (PD)	It measures the tendency of inconvenience and anxiety when seeing negative experiences of others

These four subscales of the IRI consist of 28 items in a 5-point Likert scale ranging from 0 to 4 points. The IRI used in this study, which is a translated version of Davis' IRI, is very similar to the items of the overseas cases used as the comparative research data. However, the reliability of these items was confirmed in order to supplement the limitations of interpretation. In this scale, the KMO value for item was .904, χ^2 in the Bartlett sphere formation validation was 12,449.878, and the degree of freedom (p) was 378 (.000). In addition, in terms of the reliability by subscale, the value of Cronbach' α for PT was .753, FN was .769 EC was .799, and PD was .805. These results confirmed that the measurement tools used in this study were reliable.

2.3. Analytical Procedure

In order to examine whether the learner characteristics appear on the scale, gender difference in various aspects was investigated through T-test, and T-test results were analyzed according to the academic disciplines (humanities and natural science) in order to identify cognitive and affective elements in empathy abilities of high school students. The relationship between the subscales of the empathy scale was analyzed using the correlation analysis method, and the statistical analysis results presented above were compared with the results of the application of American and Dutch high school students.

3. Results

In order to measure the empathy ability of high school students in Korea, Davis' IRI was applied, and the results were compared with those of the United States and the Netherlands. We were focused on analysis of cognitive and affective aspects of empathy and rediscovering the meaning of IRI by analyzing the correlation between the subscales.

The cognitive empathy ability was higher than the affective empathy ability among high school students in Korea in [Table 2](#). The mean score of cognitive empathy was 2.59 and that of affective empathy was 2.32. However, EC was showing the highest score, and PD was found to be the lowest empathy ability among four subscales. Both of them are affective empathy factors which has large gap. This is related to the previous study that EC continue to increase in puberty and adulthood ([Romer et al., 1986](#)). but its tendency affected to reduce PD ([Davis, 1983; Davis & Franzoi, 1991](#)). In this study, we wanted to directly compare the data with the US ([Chrysikou](#)

& Thompson, 2016). and the Dutch (Hawk et al., 2013). However, since the data about the US and the Dutch are presented only mean scores of the subscales, the overall mean were roughly calculated and compared as in Table 3.

Table 3. Comparison of the IRI subscales of Korean, American and Dutch high school students.

Dimension		Mean score (standard deviation)		
		Korean ^a	American ^b	Dutch ^c
Cognitive empathy	PT	2.65 (.55)	2.57 (.71)	2.36
	FN	2.53 (.64)	2.63 (.80)	2.52
Affective empathy	EC	2.70 (.63)	2.84 (.74)	2.37
	PD	1.94 (.63)	1.69 (.78)	1.62

Note: Perspective Taking = PT; Fantasy = FN; Empathetic Concern = EC; Personal Distress = PD. n^a = 1155, M age^a = 17. n^b = 417, M age^b = 33.17. n^c = 232, M age^c = 17.77. ^cIn the Dutch data, the empathy ability of the IRI is presented separately for men and women.

Based on the data in Table 3, the average cognitive empathy of American students is 2.6 and 2.44 for Dutch students. And the average affective empathy of American students is 2.27, while Dutch students are 2.00. These results confirm that the cognitive empathy ability in Korean high school students (2.59) is little lower than that of American students, and the affective empathy ability in Korean (2.32) is little higher than that in US, but both dimensions of empathy are much higher than that of Dutch students. So, it can be said that empathy ability of Korean students is similar to that of students in US, but higher than that of students in Dutch. These results are different from that of research on the comparison about the empathy ability of elementary school students among Korean, American, and Dutch (Woo et al., 2017). It showed that the cognitive empathy ability of Korean elementary school students was higher than that of American or Dutch elementary school students, whereas the affective empathy ability of Korean elementary school students is lower than that of Americans or Dutch students.

In terms of cognitive empathy, Korean high school students exhibited that PT was much higher than FN, even though high school students in other countries had a higher FN than PT. FN has been supported by educators as a useful learning tool, learning with creative properties (Egan, 1992). However, in Korea's high school curriculum, students' intelligence is assessed on the basis of having a lot of knowledge. And these students' abilities are determined based on scores. Ultimately, because this result has a major impact on university admission (Cheong, 2005), it will be difficult for students to have a variety of learning opportunities in a permissive atmosphere that will stimulate FN of high school students. And in all subscales, Korean adolescents' PT and PD were the highest in all three countries. In Korean data, a comparison of the mean scores between the subscales reveals that EC was the highest, followed by PT, FN and PD. In

the case of the United States, that of EC was also the highest, followed by FN, PT and PD. However, In the case of the Netherland, FN was highest followed by EC, PT, PD. In other words, the common thing that can be seen in the three countries is that PD appears as the lowest level of empathy. However, there is a peculiarity point is that the highest empathic ability of Korea and the US are EC and the Netherlands is FN.

After comparing the country's empathy for each subscale, we used Hedges'g to identify the effect sizes of the values for the four subscales of Korean and American students. This is because the only way that we can confirm means and standard deviations of four subscales is the research for US data ([Chrysikou & Thompson, 2016](#)). As a result, there was a small difference ($g_s = .145 - .211$) between two countries' empathy subscales except PD (Hedges' $g = .371$, 95% CI: $-.356 - 1.089$). This means that PD is unstable as an empathy scale to measure empathy ability between groups.

3.1. Comparison of Mean Score Correlation between IRI Subscales

The correlation between subscales was investigated to confirm the suitability of Davis' IRI. First, the results of the application to high school students in Korea showed higher correlation between cognitive empathy and affective empathy, and it can be confirmed that each scale has a positive influence on each other. In addition, the structure of the scale was confirmed through the correlation between the subscales, which was compared with the results of the American and Dutch high school students ([Table 4](#)).

Table 4. Comparison of the IRI correlation among Korean, American and Dutch high school students.

Division	Correlation		
	Korea ^a	American ^b	Dutch ^c
Cognitive empathy vs. affective empathy	.545**	-	-
PT vs. FN	.437**	.25***	.302***
PT vs. EC	.683**	.66***	.515***
PT vs. PD	-.088**	-.20***	.180**
FN vs. EC	.545**	.31***	.471***
FN vs. PD	.167**	.13**	.324***
EC vs. PD	.009	-.09	.394***

Note: Perspective Taking = PT; Fantasy = FN; Empathetic Concern = EC; Personal Distress = PD. $n^a = 1155$, $M_{age}^a = 17$. $n^b = 417$, $M_{age}^b = 33.17$. $n^c = 232$, $M_{age}^c = 17.77$. * $p < .05$. ** $p < .01$. *** $p < .001$.

The correlation between subscales of empathy factors among high school students in Korea showed that the correlation between PT and EC was the highest, and it showed a positive relationship. On the other hand, there was a negative correlation between PT and PD. Overall, PT and EC were highly correlated with other subscales, but the correlation with PD showed a negative relationship, or the correlation value became lower. Even though PD and EC are empathy abilities in terms of affective empathy, their correlation was the lowest of all.

The analysis of data from the three countries found that the correlation between EC and PT was the highest. And correlations of PT and EC, PT and FN, FN and EC, and FN and PD showed positive in common. Therefore, it can be confirmed that the correlation including the cognitive empathy ability exhibits a positive relationship to empathy. However, the difference is that the correlation between PT and PD was negative in Korea and the United States, but the data of the Netherlands was slightly positive. In addition, the relationship between PD and EC was an insufficiently positive correlation in Korea, whereas it was an insufficiently negative correlation in the United States, and its coefficients were insignificant. However, in the Netherlands, the correlation had a slight positive relationship, showing significant coefficients. Accordingly, it seemed that PD does not mean a significant relationship in the correlation with other subscales, which is similar to the results of the previous studies. Also, we found that there are some problems in the consistency of the scale. In order to compare correlations across countries, we used z tests. As result, most of subscale-comparisons were significant (ps from .000 - .045), suggesting inconsistency between three countries according to our research.

3.2. Differences in Empathy Abilities according to Learner's Gender

It examined how learner characteristics are reflected in empathy abilities through the IRI. First, the results of analysis on the differences of empathy abilities according to gender are summarized in [Table 5](#). For high school students in Korea, the mean of empathy ability of female was higher than that of male in the overall empathy ability and each subscale. In the case of male students, EC was most excellent among subscales, followed by PT, FN and PD. This tendency agreed with that of female.

Table 5. Table type styles.

Dimension		Mean score (standard deviation)					
		Korea ^a		American ^b		Dutch ^c	
		Men ^{a1}	Women ^{a2}	Men ^{b1}	Women ^{b2}	Men ^{c1}	Women ^{c2}
Cognitive empathy	PT	2.64 (.54)	2.70 (.58)	2.46	2.65	2.20 (.61)	2.51 (.60)
	FN	2.50 (.62)	2.65 (.68)	2.61	3.00	2.28 (.52)	2.76 (.50)
Affective empathy	EC	2.68 (.61)	2.78 (.68)	2.45	2.75	2.07 (.87)	2.67 (.75)
	PD	1.91 (.64)	2.03 (.58)	1.56	1.78	1.33 (.57)	1.90 (.68)

Note. Perspective Taking = PT; Fantasy = FN; Empathetic Concern = EC; Personal Distress = PD. ^a $n^a = 1155$ ($n^{a1} = 912$, $n^{a2} = 243$), $M\ age^a = 17$. ^b $n^b = 417$ ($n^{b1} = 171$, $n^{b2} = 246$), $M\ age^b = 33.17$. ^c $n^c = 232$ ($n^{c1} = 107$, $n^{c2} = 125$), $M\ age^c = 17.77$. ^aIn Korean data, there is a significant difference according to gender except PD. ^bNo standard deviation is presented in the US data, but there is a significant difference according to gender. ^cThe Dutch data do not provide significant values according to gender.

The commonalities among the adolescent in the above three countries include that empathy of women is superior to that of men in all respects. This is similar to the result of a study that analyzed the IRI's subscales and masculinity and femininity ([Ingoglia et al., 2016](#)), which showed that all four

subscales were negatively correlated with male performance and positively correlated with female performance. Through [Table 5](#), we tried to confirm that there are statistically significant differences in empathy abilities between male and female depending on the country. The data showed that, in the case of the United States, the statistic differences between men and women in all empathy dimensions were significant, while that of Korea showed significant difference in PT, FN and EC. As a result of analyzing the differences between men and women by subscale, in the cases of the United States and the Netherlands, the ability of FN was the best in both men and women. In the case of males in both countries, the second highest empathy was PT in the cognitive empathy factor followed by EC in affective empathy. But in the case of female students, the next best ability was EC followed by PT. This suggests that boys are, compared to girls, more likely to develop cognitive empathy than affective empathy. However, this was not found in Korean high school students. Through comparing the effect sizes of four subscales of male and female students between Korea and Dutch, it was found that there was a very large effect size difference in the comparison of the male students' group of the two countries ($g_s = .796 - .923$). In the comparison of female students, the magnitude of the effect was intermediate between PT and PD ($g_s = .217 - .325$). This also indicates that there is a difference in scales when using IRI to compare countries.

As shown by the IRI results, which have compared by gender and countries, PD is not sufficient to utilize as a consistent empathy subscale. For this reason, it seems that PD is not used for the measurement of empathy ability among four empathy subscales in other previous studies ([Eberly-Lewis & Coetzee, 2015](#); [Hawk et al., 2013](#); [Mcwhirter et al., 2002](#)). However, a fundamental analysis of PD weaknesses is needed rather than this way.

3.3. Differences in Empathy Abilities According to Learner's Discipline

The results of the study on the differences in empathic abilities according to academic aptitude of high school students are shown in [Table 6](#). There were many cases where Davis' IRI was analyzed according to age or gender. However, there were cases neither in the United States nor the Netherlands, in which the results of the analysis of this scale were presented according to academic aptitude. Therefore, this study intended to analyze IRI only in terms of the data from Korean high school students. According to the Korean high school curriculum system, Korean high students are supposed to choose one of the two courses for the purpose of their career advancement in the second year of high school. One of the two choices is the humanities and the other is the natural science. In this context, humanities students refer to the students who want to enter the careers in the humanities and social sciences, and natural science students refer to the students who want to enter careers in mathematics, science and engineering.

Table 6. Difference in disciplines of empathy abilities among high school students in Korea.

Dimension		Mean (standard deviation)		T-test result (p)
		Humanities ^a	Natural science ^b	
Overall empathy ability		2.42 (.45)	2.45 (.40)	-.978 (.329)
Cognitive empathy	total	2.54 (.54)	2.60 (.47)	-1.539 (.124)
	PT	2.56 (.57)	2.67 (.52)	-2.629 (.009)**
	FN	2.52 (.61)	2.53 (.61)	-.209 (.834)
Affective empathy	total	2.30 (.57)	2.67 (.52)	-.115 (.908)
	EC	2.58 (.67)	2.70 (.57)	-2.548 (.011)*
	PD	2.02 (.55)	1.90 (.64)	2.469 (.014)*

Note. Perspective Taking = PT; Fantasy = FN; Empathetic Concern = EC; Personal Distress = PD. $n^a = 277$, $n^b = 420$. * $p < .05$, ** $p < .01$.

Among affective empathy abilities, natural science students are superior in all aspects except PD. Based on previous studies ([NGSS Lead States, 2013](#); [Cheryan et al., 2013](#)), we hypothesized that the cognitive empathy abilities are high in natural science high school students and affective empathy abilities are high in humanities students, but the results were different from our expectations. The mean of the two groups was similar and it did not make any significant difference in overall empathy. There was no statistical difference in cognitive and affective aspects when separating the overall empathy into two aspects. However, the differences in the two groups can be identified by separating empathy into four subscales. A significant difference between groups was seen in PT, EC and PD factors, but FN was not. In the case of natural science students, EC was highest among subscales, followed by PT, FN and PD. This tendency agreed with that of humanities students. This is similar to the results of a comparison of Korean high school students' empathy by gender which we refer before in previous section ([Table 5](#)).

4. Discussion

There has been some concern about dehumanization centered on computers and robots by artificial intelligence with the advent of the Fourth Industrial Revolution ([Schwab, 2016](#)). Therefore, as scientific technology and industry develop, education for human beings should be strengthened to increase emotional abilities such as empathy and care ([Cooper, 2004](#); [Krzmaric, 2014](#); [Hatcher et al., 1994](#)). However, it is doubtful about the educational effects of empathy education in modern society because there was no investigation into the actual realities of empathy levels among students in Korea for educational applications. Therefore, in this study, the empathy ability of Korean high school students was measured using Davis' IRI in terms of cognitive and affective aspects, and the results were compared with the results from overseas cases.

For this study, the questionnaire survey was conducted by applying Davis' IRI to 1155 students in general high school in Korea, and the results were compared with those of the American and Dutch high school students

with similar ages. In order to compare the results with the same measurement tool, a set of items adapted from Davis' IRI were used, and the items were found to be very reliable (.753 -.805). We present our findings in three parts, corresponding to the research questions driving our study, such as the cognitive and affective empathy abilities of learners, gender differences, and interdisciplinary comparisons.

First, we confirmed whether Davis' IRI reflected the learner's cognitive and affective characteristics. Korean students were superior to students in other countries in their affective empathy abilities, but Korean students were little lower than US in terms of cognitive empathy. In the results of analysis in elementary school students in Korea ([Woo et al., 2017](#)), their cognitive empathy ability was higher than their affective empathy ability. But in the high school case, the situation was different. In our participants' cognitive empathy ability, PT showed a higher mean score than that of high school students in other countries, but the mean value of the FN scale was lower in Korea than in the United States. Based on the results of the previous studies which showed that cognitive empathy has a significant positive correlation with academic achievement ([Austin et al., 2005](#)). We could draw conclusions that especially PT is related to cognitive abilities such as reasoning ([Eisenberg & Strayer, 1987](#)), intelligence quotient (IQ) ([Davis, 1983](#)) and, another intelligence ([Jolliffe & Farrington, 2004](#)). The fact that PT ability of Korean students is higher than that of American and Dutch students seems to be associated with the fact that Korean high school students show the higher average than the OECD in the Program for International Student Assessment (PISA, 2017). However, it is necessary to consider that FN of Korean students is lower than that of students in the United States. This phenomenon is no surprise in the Korean high school curriculum, which is oriented toward logical thinking regarding ([Cheong, 2005](#)). High school curriculum should be able to stimulate imagination based on knowledge ([Egan, 1992](#)). However, the results of this study show that the curriculum of Korea high school has a limitation. Since university admissions are the ultimate goal of high school education in Korea, it is impossible to apply the curriculum beyond this. However, current college admission is determined by the score about students' knowledge. Due to these effects, although high school students' PT is high, their FN seems to have low results in cognitive empathy. Since FN is a deeper cognitive empathy process that scientifically reasons the other's inner state ([Barak et al., 1987](#); [Erera, 1997](#)), further research is required to improve this part of empathy ability.

Second, we examined whether gender differences exist in empathy ability. Female students in Korea were superior to male students in all areas of the empathy scale. This is a global trend commonly found and suggests that gender is related to the development of empathy in adolescence and young adulthood. Empirical evidence that female adolescents begin to be more empathetic than male adolescents is found in junior high school ([Eisenberg et al., 1991](#)), high school ([Davis & Franzoi, 1991](#)), and college

students ([Davis, 1980](#)). However, what has been found in this study is that the PD of Korean adolescents do not show significant differences depending on their gender, unlike other countries ([Chrysikou & Thompson, 2016](#); [Hawk et al., 2013](#)). This means that gender differences in PD may or may not be significant from country to country. In addition, we could also confirm this PD's instability in the result of the correlation and comparisons of means in subcomponents among countries. After all, this means that PD scale needs to be revised to reflect the empathy characteristics of personal pain as the threshold for this scale.

Third, the relationship between academic aptitude and empathy ability of humanities and natural science high school students was investigated in terms of empathy ability. The natural science high school students showed higher empathy ability in the overall empathy area except PD. The Next Generation Science Standards ([NGSS Lead States, 2013](#)) highlighted the social co-operation ability of scientists and engineers, because it is required for STEM-related students who have relatively limited interpersonal skills and this ability ([Cheryan et al., 2013](#)). Therefore, it would be meaningful that Korean students of natural high school have excellent PT, EC and PD. However, especially FN was the only area that showed insignificant differences between the two groups, although it was expected that the biggest difference should be FN according to differential academic disciplines ([Egan, 1992](#)). This indicates that there is a limit to this scale because it fails to identify differences between groups according to academic characteristics in terms of FN. There were some previous studies conducted by regarding subject using empathy. A previous study on school science using empathy only talked about the importance of empathy in classroom situations ([Arghode et al., 2013](#)). In this context, the other researchers used IRI to demonstrate the effectiveness of education in science class ([Guney & Seker, 2012](#)). However, based on our findings, it is doubtful whether the outcome has emerged as an appropriate empathy for the subject.

Lastly, the suitability of this scale was confirmed by analyzing the correlation between the IRI's subscales. As in the case of overseas cases, cognitive empathy factors (PT and FN) were positively related to EC with high correlation coefficients. Thus, it can be said that cognitive elements play an important role in empathy. In the case of the correlation between subscales, PT and EC showed the highest correlation, followed by EC and FN. This means that EC has a great influence in empathy factors. For this reason, there were many cases where only EC was used to measure empathy ability in previous studies ([Hatcher et al., 1994](#); [Mcwhirter et al., 2002](#)). However, PD and EC, which are empathy abilities of the same affective area, showed a low correlation. This suggests that there are problems with both elements. Also, it was confirmed that FN maintains a positive relationship with PT, EC and PD in the results of this study and those of previous research. This is because although FN is cognitive empathy ability, it has an emotional element according to Hawk (2013). However, it

can be said that the FN of the cognitive aspect plays an important bridge in cognitive and affective elements in terms of empathy. However, since there were many cases in which the above subscales were excluded from the evaluation in the previous studies ([Eberly-Lewis & Coetzee, 2015](#); [Mcwhirter et al., 2002](#)) more detailed research needs to be conducted in this respect.

It is important to analyze empathy ability through all the elements of IRI to identify the multidimensional nature of empathy. In this regard, this study has its significance in that empathy ability was classified into cognitive and affective aspects and analyzed according to learner characteristics, and the suitability of the scale was confirmed through the analysis of the correlation between the subscales using four factors in IRI. There were many previous studies to investigate differences in empathy abilities according to age or gender ([Davis & Franzoi, 1991](#); [Eisenberg et al., 1991](#)) or analyze the correlation between subscales ([Davis, 1980, 1983](#); [Davis & Franzoi, 1991](#); [De Corte et al., 2007](#); [Cliffordson, 2001, 2002](#)), but there was no research to analyze empathy factors according to variables such as learners' academic aptitude. In addition, this study is meaningful in that the suitability of the scale was confirmed through the correlation between subscales of empathy and the characteristics of variables, and the Korean cases were compared with the US and the Dutch cases with similar ages. Finally, the results of this study confirmed that high school students in Korea have a lack of FN among cognitive empathy abilities compared to the American students, and the IRI scale has its limitations as an empathy scale that reflects PD and academic characteristics through actual data analysis results.

However, this study has the following limitations: First, empathy is a complex and diverse disposition that varies depending on personal characteristics, surrounding environment and individual circumstances ([Hoffman, 2000](#)), and therefore, the results presented in this study cannot provide the definite cause. In this regard, this study attempted to analyze the cause from various variables and empathy aspects and present the results through a comparison with the American and Dutch cases as well as the previous studies. Second, the range of participants was limited. Multiple samples of 1155 high school students were utilized in this study. However, since some of the subjects of this study were extracted from male high school, the results may be analyzed with one-sided bias in terms of academic aptitude and gender. Finally, in cases where the four subscales of the IRI were applied when the data from the US and the Netherlands were extracted, the age group of the data from the US was different from that of the data from that of the research data of this study. However, in order to complement this, we tried to generalize the findings by comparing the data with the data of the Netherlands and analyzing the results of the previous studies.

In order to complement the results derived from this study and reflect them in future work, the IRI should be designed by extracting samples from different age groups and reflecting regional differences, and the results

should be used to develop an empathy scale that reflects the gender differences and academic characteristics of Korean students through academic research and a mutual agreement among experts. In addition, the developed scale needs to overcome the limitations of Davis' IRI, and thus more clearly present the affective empathy abilities of subjects. Finally, it is necessary to extract empathy factors that are most necessary for students through the research results and develop them into educational methods so that this study will become the cornerstone of empathy-based educational activities.

5. Conclusion

This is the first study to analyze the empathy ability of high school students according to gender, country and academic aptitude by applying all the scales of Davis' IRI. According to the results of this analysis, IRI showed similar pattern depending on gender, but it was confirmed that there is a difference according to countries. In the comparison of empathic ability according to academic aptitude, the natural sciences students of Korea showed high empathy ability. Also, it is confirmed once again that the PD scale is incomplete, suggesting that it needs to be supplemented. However, based on the analysis of empathy scale except for the PD, we were able to infer the problems of Korean students' high school curriculum and to seek a complementary measure for the development of empathy scale.

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03. The Impact of Atmospheric Phenomena on South Korean Students' Engagement at School through the Mediating Effect of the Students' Health

Shelley Choi

Yongsan International School of Seoul (Seoul, South Korea)

Abstract

This study examined how South Korea's regular significant atmospheric phenomena, the yellow dust and the monsoon, affected students' health and academic engagement at school. Five hundred middle and high school students were surveyed to figure out the atmospheric impacts on the students' lives. The results of this study found that the severity of yellow dust and monsoon conditions experienced by the students negatively influenced their academic engagement. However, the variable of students' concerns about their health was shown to have a mediating effect between the intensity of yellow dust and the level of academic engagement. These results indicated the need to alleviate the yellow dust and monsoon atmospheric phenomena and their effects at both the school and national levels in order to improve the academic engagement of students in South Korea.

Keywords: Atmospheric Conditions, Yellow Dust, Monsoon, Students' Health, Academic Engagement, South Korea

1. Introduction

Over the last few decades, climate change has significantly increased average global temperatures, damaged forests and marine life, and reduced air quality. The main types of air pollution, namely smog, acid rain, and ozone depletion, have hindered people's ability to conduct their daily lives and been a source of increased mortality. Air pollution was named as the fourth leading risk factor for premature death around the world. Studies have reported that approximately 5.5 million deaths occurred due to diseases associated with air pollution in 2013. In the United States alone, air pollution has contributed to nearly 200,000 deaths, largely caused by asthma, bronchitis, and heart disease [1]. Air pollution is also economically detrimental. In 2016, it cost the global economy about 225 billion USD in lost labor income [2].

Similar to many other residents living in major cities who are exposed to particulates in the air from various sources, urbanites in South Korea encounter air pollution such as vehicle exhaust fumes every day. However, regardless of whether they reside in urban or rural areas, Koreans face substantially reduced air quality due to the yellow dust from Mongolian deserts every spring. Along with this yellow dust, pollution from China is also added, thereby making Korea's air quality definitively worse. When special alerts are given on particularly polluted days, half of all vehicles are banned from operating on public roads and all government buildings' parking lots in Seoul are shut down to discourage workers from using their cars. The elderly, children, and patients with respiratory illnesses are advised to remain indoors for the duration of the alert [3] [4]. In addition to the dust and pollution, Koreans are confronted with a heavy rainy season every summer, a weather

phenomenon known as the monsoon. The monsoon can inflict massive casualties, leave thousands of people homeless, destroy industrial capacity, and cause severe transportation delays [5].

In order to address the consequences of these atmospheric phenomena, the scientific community in South Korea has recently begun taking a greater interest in the ways that atmospheric phenomena impact people's lives. In the past, research simply focused on the loss of life and damage to the agriculture, fisheries, and manufacturing industries caused by atmospheric phenomena, overlooking their effects on people's daily lives [6] [7] [8] [9]. Most importantly, no study has been conducted regarding the effects on students' lives at school, even though middle and high school students are more impacted by atmospheric conditions than any other demographic group as their physical education classes and recesses are conducted differently based on the day's atmospheric conditions. Do students feel bothered by adverse atmospheric conditions, such as blankets of yellow dust and heavy rainfall, when studying? Are their mental and physical health negatively affected by these severe atmospheric conditions? This study was designed to explore whether the yellow dust and monsoon affect students' engagement in their studies through the mediating variable of their health. The outcomes of this study will be helpful for determining whether there are negative effects on students' academic engagement at school and, if so, what sort of institutional and policy changes should be made to mitigate them.

2. Impacts of the Atmosphere: Jangma and Hwangsa

South Korea has four distinct seasons, each of which has a different amount of precipitation. Annual precipitation ranges from 1000 mm to 1800 mm, but more than half of it falls during the monsoon season, called jangma, during which a stationary monsoon front lingers across the Korean peninsula for about a month in summer from late June to mid-July [10]. Monsoons occur when the moist air over the Pacific meets the cooler continental air mass [11]. Heavy rainfall during the jangma season causes floods and landslides, destroys homes, kills people, and generates significant economic loss. In addition, diseases like cholera run rampant in flooded areas. During the monsoon season in 1987, 167 people lost their lives and 512 more died as a result of the Thelma typhoon that struck during the monsoon period [12]. In 2001, the jangma was causing rain at a rate of 100 mm per hour and killed 54 people in the Seoul metropolitan area and flooded 21,144 houses, leaving more than 40,000 people homeless [13]. Although South Korea has developed flood control systems to prevent overall flooding, sudden local torrential rainfall can cause a significant amount of death and destruction.

Although the Korean climate has relatively stable levels of precipitation during the fall and winter, each spring yellow dust known as hwangsa blows over the country. The yellow dust has blown into Korea from the dry Mongolian desert for a long time. The hwangsa brings particles that are mostly between 1 and 10 μm . It also carries various minerals, such as

aluminum, calcium, potassium, and silicon, from Chinese industrial areas. Yellow dust has been blowing in more frequently and has become more harmful than ever before to the point that, on March 21, 2017, Seoul had the worst air quality in the world, second only to New Delhi [14]. The hwangsa can irritate the soft tissues in the eyes, nose, mouth, and throat, and provoke respiratory and cardiovascular problems due to its high concentration of minerals and other pollutants [15]. It can also damage sensitive equipment, such as computers, and stop production in factories. For instance, it increases the number of defects in silicon wafers produced for use in semiconductor chips and causes painting in automobile factories to stop due to concerns about dust particles getting into the paint. On days when the concentration of particulates is particularly high, hundreds of flights are suspended and approximately 30% of construction workers face lost wages because most construction must stop. The hwangsa also blocks sunlight, hindering the growth of crops [16].

Beyond macro-level effects, atmospheric conditions have strong effects on individuals' health and lifestyles. Students who spend most of their time participating in various indoor and outdoor activities are also vulnerable to undesirable atmospheric conditions. However, non-empirical research has been conducted on the impact of atmospheric conditions on South Korean students. This study attempted to fill this gap by examining the influence of the yellow dust in spring and the heavy monsoon rains in summer on middle- and high-school students' health and academic engagement. This study would therefore provide basic data to determine whether institutional and policy changes should be made to improve students' engagement at school.

3. Methods

Atmospheric conditions are expected to influence both students' health and academic engagement at school. Thus, the current study examined how the yellow dust and monsoon affected students' engagement as mediated by the effects on their health. The study was structured according to the following hypotheses:

Hypothesis 1: The intensity of air pollution caused by yellow dust and amount of rain caused by the monsoon would negatively affect middle and high school students' academic engagement. Hypothesis 2: Middle and high school students' health would be a mediating factor between atmospheric conditions and the students' academic engagement at school.

The independent variables in this study were the student experience of the intensity of yellow dust in the spring and the amount of rainfall in the summer for a given year. The respondents were asked with a single-item question, "How seriously have you recently experienced the yellow dust during the last spring (or the monsoon during the last summer)?" They also had to respond by choosing one option from a 5-point Likert scale where 1 corresponded to "not a problem at all" and 5 corresponded to "a very serious

problem" such that higher scores indicated greater severity of the relevant atmospheric condition.

The dependent variable for this study was students' academic engagement at school as measured by responses to Choo and Sohn's Korean version of the Utrecht Work Engagement Scale-Student (UWES-S) [17] [18]. The UWES-S consisted of 17 items scored on 7-point Likert scale with higher scores where 0 corresponded to "never" and 6 corresponded to "always" such that higher scores indicated greater frequency. The scale's Cronbach's Alpha was 0.953 in this study, indicating that it had high reliability and internal consistency.

Student health, which consists of both physical and mental health, was the mediating factor between atmospheric conditions and academic engagement at school. Physical health was measured by responses to the Korean version of the Whiteley Index (WI) developed by Shin and Won [19], which has been widely used to assess concerns or beliefs about physical illness. Responses to the WI questions could be given on a 5-point Likert scale where 1 corresponded to "not at all" and 5 corresponded to "a great deal" such that higher scores indicated that the respondent was more anxious about their physical health. The scale's Cronbach's Alpha was 0.822. Mental health was measured by responses to Park and Seo's Korean version of the Perceived Stress Scale (PSS) scale developed by Cohen, Kamarck, and Mermelstein [20] [21]. The PSS has been commonly used to measure perceived stress in various cultures. Responses to the PSS questions could be given on a 5-point Likert scale where 0 corresponded to "never" and 4 corresponded to "very often" such that higher scores indicated that the respondent experienced stress due to the event in question more frequently. The scale's Cronbach's Alpha was 0.933.

This study controlled for the effects of communication between parents and children on academic engagement because previous studies have shown that communication between parents and children affects behaviors at school [22] [23] [24]. Kim's Korean version of Parent-Adolescent Communication (PAC) survey originally developed by Barners and Olson was used to determine the quality of the communication between parents and children [25] [26]. The respondents were asked how accurately each statement described their relationships with their parents where a 0 corresponded to "not at all" and a 4 corresponded to "very well" such that higher scores indicated that the statement more accurately described their essence of communication. The first 10 items were related to the degree to which communication was open and the other 10 items were related to problems in communication. The Cronbach's Alpha for the openness part of the survey was 0.936 and the Cronbach's Alpha for the problematic communication part of the survey was 0.934. SPSS Statistics v.25 was used to conduct the statistical analyses.

In terms of sampling, this study's subjects came from one middle school for girls and one high school for girls, both of which were located in

Seoul, South Korea, that allowed for the conduct of surveys on their students. Based on the practice followed in other studies, a preliminary questionnaire was designed for a pilot study which was conducted in July 2017. The main questionnaire was then revised based on the findings of the pilot study. A total of 500 students, 300 of which were from the middle school and 200 of which were from the high school, were randomly selected by a random number generator, and the official survey was conducted in August 2017. Of the 351 questionnaires that were returned, which indicates a return rate of 70.2%, 345 valid questionnaires were applied for the final analysis.

4. Results

The subjects for the study were 13 to 16 years old ($M = 14.59$, $SD = 1.12$). More than two-thirds of them were reported to be middle school students (72.3%): 19.8% were in their first year of middle school, 29.7% were in their second year of middle school, 22.7% were in their third year of middle school, and 27.7% were in their first year of high school. In terms of gender, the respondents consisted of females only because the selected schools were girls' schools.

The survey results showed that 78.9% of the respondents reported experiencing serious atmospheric conditions in the previous year. The mean score of the question asking students about the seriousness of yellow dust that they had experienced during the preceding spring was 4.2 out of 5 and 79.1% of the subjects described the yellow dust as "a slightly serious problem" or "a very serious problem". The mean score of the question asking students about the volume of rain that they had experienced during the preceding summer was 4.26 out of 5 and 78.8% of the subjects described the volume of rain as "a slightly serious problem" or "a very serious problem".

As for the correlations among the variables, significant positive correlations emerged between yellow dust intensity and amount of rainfall ($r = 0.173$, $p < 0.01$), yellow dust and students' concerns about their health ($r = 0.110$, $p < 0.05$), students' concerns about their health and problematic communication with parents ($r = 0.221$, $p < 0.01$), and open communication with parents and academic engagement at school ($r = 0.204$, $p < 0.01$). However, other correlations, such as those between monsoon and academic engagement ($r = -0.116$, $p < 0.05$), students' concerns about their health and academic engagement ($r = -0.297$, $p < 0.01$), students' concerns about their health and open communication ($r = -0.128$, $p < 0.05$), open communication and problematic communication ($r = -0.638$, $p < 0.01$), and problematic communication and academic engagement ($r = -0.121$, $p < 0.05$) were negatively correlated. The correlation between open communication and problematic communication were relatively high because they were sub-variables of the same variable. The overall results of the analysis are given in [Table 1](#).

Table 1. Means, standard deviations, and correlations among the variables.

Variable	Mean	SD	1	2	3	4	5	6
1) Academic engagement	1.934	0.247	1	-0.078	-0.116*	-0.297**	0.204**	-0.121*
2) Yellow dust intensity	4.200	0.791	-0.078	1	0.173**	0.110*	-0.029	0.046
3) Amount of rainfall (monsoon)	4.260	0.932	-0.116*	0.173**	1	0.037	-0.018	0.074
4) Students' concerns about their health	1.123	0.412	-0.297**	0.110*	0.037	1	-0.128*	0.221**
5) Parents-students: Open comm.	2.930	0.235	0.204**	-0.029	-0.018	-0.128*	1	-0.638**
6) Parents-students: Problematic comm.	1.905	0.265	-0.121*	0.046	0.074	0.221**	-0.638**	1

Note: $SD = \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2 / n - 1}$.

*Correlation is significant at the 0.05 level (2-tailed);

**Correlation is significant at the 0.01 level (2-tailed).

Meanwhile, the maximum r-value found in this analysis was 0.638, the maximum Variance Inflation Factor (VIF) was less than 2.014, and the minimum tolerance among the variables was 0.537. Multicollinearity may be problematic when the correlation coefficients are greater than or equal to 0.7, the VIF values are greater than 10, or tolerance values are less than 0.1 [27], but based on the results of this study, multicollinearity was not problematic.

In order to examine whether the data supported the hypotheses, Baron and Kenny's four-step procedures were used to determine statistical significance: 1) between the independent variable and the dependent variable, 2) between the independent variable and the mediator variable, 3) between the mediator and the dependent variable, and 4) between the independent and the dependent variable while controlling for the mediator variable. If the results of the last analysis result in a statistically insignificant relationship between the original independent and dependent variables, there is full mediation. If it only reduces the statistical significance of the relationship, not completely blocking, then there is partial mediation [28].

According to this procedure, the statistical significance of the relationships between student perceptions of both yellow dust and amount of rainfall, academic engagement at school, and students' concerns about their health were measured. Table 2 shows the detailed results of the four-step procedure testing for mediation effects. Model 1 indicated that student perceptions of both atmospheric phenomena were statistically significantly related to their academic engagement (yellow dust: $B = 0.405$, $p < 0.05$; monsoon: $B = 0.503$, $p < 0.01$) such that the more severe that they perceived the intensity of yellow dust or greater that they perceived the volume of rain, the less that they engaged with studying at school. Open communication in the parent-student relationship was positively related to students' academic engagement. However, only student perception of the intensity of yellow dust

positively influenced students' concerns about their health, which is indicated by Model 2 ($B = 1.285$, $p < 0.05$). Problematic parent-student communication was positively correlated with students' concerns about their health. Model 3 also showed that students' concerns about their health negatively affected academic engagement ($B = 0.051$, $p < 0.01$). Open parent-student communication was positively correlated with academic engagement. Model 4 finally showed the relationship between student perception of the intensity of yellow dust and academic engagement at school became statistically insignificant when the variable of students' concerns about their health was controlled. This result indicated the full mediating effect of students' health concern between the independent and dependent variables. Although there seemed to be a statistically significant relationship between student perception of volume of rain and academic engagement [monsoon ($B = 0.436$, $p < 0.05$)], mediation effect of students' health concerns about their health was irrelevant; there was no statistically significant relationship between the amount of rainfall and students' concerns, which has already been examined by Model 2. These results indicated that the more severe students perceived yellow dust to be, the more concerned they became about their health, which in turn reduced their academic engagement at school.

Table 2. Logistic regression results of testing for mediation effect.

Variable	Model 1 (atmosphere → academic engagement)		Model 2 (atmosphere → health concern)		Model 3 (health concerns → academic engagement)		Model 4 (atmosphere, health concerns → academic engagement)	
	B	Exp (B)	B	β	B	Exp(B)	B	Exp (B)
(Constant)	0.548	1.730	25.412***		2.053	7.794	1.601	4.956
Yellow dust intensity	0.405*	0.667	1.285*	0.118			-0.313	0.732
Amount of rainfall (monsoon)	0.503**	1.654	-0.611	-0.066			0.436*	1.547
Parents-students: Open comm.	-0.376**	0.686	0.166	0.024	-0.325*	0.722	-0.352*	0.703
Parents-students: Problematic comm.	-0.029	0.972	1.686***	0.235	0.096	1.100	0.052	1.054
Students' concerns about their health					0.051**	0.951	0.046*	0.955
	df = 4 -2Log likelihood = 337.042 $X^2 = 24.152$ *** Cox & Snell $R^2 = 0.070$ Overall Percentage = 77.0%		F = 5.475 $R^2 = 0.064$ Adj. $R^2 = 0.053$		df = 3 -2Log likelihood = 332.188 $X^2 = 18.419$ *** Cox & Snell $R^2 = 0.055$ Overall Percentage = 76.9%		df = 5 -2Log likelihood = 323.631 $X^2 = 26.976$ *** Cox & Snell $R^2 = 0.080$ Overall Percentage = 76.2%	

Note: Academic engagement (0 = high; 1 = low). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Additionally, this study examined the mediation effect of students' concerns about their health by using bootstrapped confidence intervals. Controlling for open and problematic parent-student communication, 5000 sample mediation effects were applied. As shown in [Table 3](#), lower to upper limit of the bootstrapped confidence intervals were -0.161 to -0.008 at a 95% confidence level. Given that the confidence interval between the Lower Limit (LL) and the Upper Limit (UL) did not include 0, the mediation effect was determined to be significant [29]. Testing for mediation effects using bootstrapping also proved that atmospheric conditions were likely to increase students' concerns about their health and thereby reduce their academic engagement at school.

Table 3. Mediation effect as measured by bootstrapping.

Mediator	Coefficient	S.E.	Bootstrap	
			Confidence interval (95%)	
			Boot LLCI	Boot ULCI
Indirect effect	-0.059	0.038	-0.161	-0.008

Note: LLCI = Lower Level (2.5th percentile) Confidence Interval; ULCI = Upper Level (97.5th percentile) Confidence Interval.

5. Conclusions

Too often, we are unaware of the magnitude of the atmosphere's influence on our day-to-day lives and on Earth's ecosystem as a whole. Although previous studies have been conducted on these cause-and-effect relationships, the effect that the atmosphere has on students' lives in South Korea has been overlooked. Thus, this study examined how atmospheric phenomena particularly affected South Korean students' academic engagement at school. Responses to questionnaires from 345 middle and high school students in Seoul, South Korea were included in this study's final analysis.

In order to investigate the mediating effects of students' concern about their health on atmospheric conditions and school engagement, this study conducted Baron and Kenny's four-step regression analysis procedure and a bootstrap analysis. The results showed that both the perceived intensity of yellow dust and the perceived amount of rain negatively affected the students' academic engagement at school. However, the variable of students' concerns about their health was shown to completely mediate the relationship between perceived levels of yellow dust and academic engagement. No such mediating effect was shown on the relationship between the perceived amount of rain and academic engagement.

There are a number of policy suggestions to improve students' academic engagement that can be made based on the findings of this study. First, the amount of yellow dust during the spring should be reduced by preventing desertification in southern Mongolia and northern China. Although China has begun to combat desertification by planting forests, Mongolia has struggled to do so because of a lack of funds [30]. A great deal

of this yellow dust ultimately descends upon the Korean peninsula, so the Korean government should cooperate with other countries to assist in preventing desertification, perhaps in the form of providing economic aid to Mongolia. In order to reduce the damage caused by heavy rainfall during the monsoon, the government should forecast the amount of precipitation as accurately as possible, repair embankments and walls to prevent landslides, and improve sewer systems to more effectively deal with floods.

Second, school authorities should recognize the seriousness of the impact that yellow dust and heavy rainfall have on students' academic engagement at school. Yellow dust can impact students' concerns regarding their health and academic engagement at the same time. Thus, schools should provide air purifiers to reduce students' concerns about their health and practical education, training, and manuals for teachers on how to respond to yellow dust.

This study was the first on the effect of atmospheric phenomena on students' academic engagement at school, but it had some limitations. The subjects surveyed in this study were only from Seoul, so national or international populations must be studied to generalize the results of this study. This study also did not control for various variables, such as school facilities, that might affect students' academic engagement. Thus, future studies must overcome these limitations to better understand how atmospheric phenomena affect students' lives at school.

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SECTION I / СЕКЦИЯ I

ECONOMICS AND MANAGEMENT: PROBLEMS OF SUSTAINABLE GROWTH AND DEVELOPMENT / ЭКОНОМИКА И МЕНЕДЖМЕНТ: ПРОБЛЕМЫ УСТОЙЧИВОГО РОСТА И РАЗВИТИЯ

1.1. A Study on Spatial Distribution and Characteristics of Moving Companies

Dae Hyun Seo, Kabsung Kim
Yonsei University (Seoul, South Korea)

Abstract

The purpose of this study is to propose a method of establishing demand zone in the estimation of industrial complex needs. Demand estimates of existing industrial complexes are mainly based on survey method, which leads to excessive or underestimated demand depending on the extracted samples. Therefore, it has been argued that there is a need to analyze what movements the companies actually show. In this study, based on the status of about 450,000 companies included in the Hankyung Business Yearbook, the company DB book in Korea, each company analyzed the movement and the moving area by city, and based on this, the O-D table was created. This study will empirically validate the previous demand of the enterprises and provide information related to the establishment of the demand for the industrial complex in the future, which will contribute to the estimation of the actual demand of the industrial complex.

Keywords: Industrial Complex, Industrial Land Use, Spatial Distribution of Companies, Characteristics of Companies, Company Movement

1. Introduction

One of the Key projects in local industrial policy is the creation of industrial complexes. So, the government has supplied them to fulfill the policy goals in order to achieve the national economic growth.

In Korea, there are many industrial complexes have been built since to 1960's, and many of them were constructed by the government to achieve the government's industrial upbringing policy. In the beginning, national economic environment is very poor in Korea, so it was necessary to concentrate national competence in some areas. For example, "A Special Act on Land Acceptance for the Creation of Industrial Zone" was enacted in 1962, "Act on the Development of industrial Complex for the Export Industry Development" was established in 1964. As a result, industrial complexes were established in the 1960s to foster export industries centered on light industry. On the other hand, in the 1970s, industrial parks were built around the Southeast region in accordance with the policies for the promotion of heavy chemical industry. After the 1980s, large scale industrial complexes were built around the backward regions to achieve balanced national development.

As we have seen in the previous case, industrial parks in Korea are the main means of achieving government policy goals. In addition to its role as a hub for fostering strategic industries that are the basis of national economic growth, it has played an important role in the development of national industries by inducing the growth of underdeveloped regions and alleviating regional gaps in growth. It seems to be further expanded.

However, current industrial parks in Korea are becoming less competitive due to the price of land, and demand and supply imbalances are not achieved due to the lack of actual demand for new industries. In particular, in order to estimate the demand for industrial complexes, we follow the existing methods that depend on the questionnaire. Therefore, there is a problem that the demand is under- or over-estimated. Estimation of demand in the development of industrial complex is a very important process because it is the basis for establishing the size of industrial land use supply. It is a time when theoretical and empirical research is needed.

2. Literature Reviews

2.1. Industrial Demand Estimation Theories

Demand estimates of industrial complex can be divided into quantitative methods and survey methods. The quantitative methods have the following models. The time series model is a method of predicts future trends based on observed patterns in the past time series. When the growth rate gradually decreases when there is an upper limit of the observed data and it increases by more than a certain level, the modified index model, the Gompertz model, and the logistic model are used. In the case of the smoothing method which linearized the variation of time series data and grasps future trends, simple exponential smoothing method, linear moving average method, linear exponential smoothing method, and second exponential smoothing method are utilized. In addition, there are probabilistic time series models that probabilistically estimate future trends based on regular patterns of time series data, and Auto Regression (AR), Moving Average (MA), Auto Regression Moving Average (ARMA), and Auto Regression Integrated Moving Average (ARIMA) are mainly used.

The regression model estimates regression curves by using production function or panel data and estimates industrial demand based on this. The regression model is complementary to the time series model because it estimates the demand by reflecting the future economic structure. In the case of a multiple regression model using production function, it is a method to estimate the demand by modeling the linear relationship between the predicted variable and the result variable, and it is a merit that various socioeconomic factors can be reflected in the model. In general, Cobb-Douglas production function is used to estimate the model based on the production function reflecting capital, labor, and land. The panel regression model can reflect both time and space factors at the same time, which is a good way to estimate regional demand.

In the case of basic unit model, it is a method to calculate the total demand area by reflecting the future production amount or the number of workers to the area of the site per unit of production or per worker. This is a method of estimating future demand based on the assumption that the amount of unit production and the area required for each worker exist. It is useful because it is simple to use and can reflect various analysis methods at the same time. Japan and the UK are using this method to estimate demand for industrial sites. In Japan, the use of unit method is applied based on the amount of production by industry in the target year, and in the UK, it is recommended to use the unit method based on the prospect of employment size.

The survey method collects the responses directly or indirectly using standardized questionnaires to the subjects selected by certain criteria, and draws conclusions analyzing them. In Korea, the feasibility study method for estimating demand for industrial sites is set by law, and the questionnaire method is applied here. The sampling method of the questionnaire is using the allocation sampling, and the sampling frame uses the company information data.

2.2. Precedent Researches and Conclusion

In Korea, there are few studies related to the estimation of industrial complex demand, and most of them were analyzed using statistical data for empirical analysis. [1] estimated the real value added by analyzing the value-added projections of industry and the factors affecting the future economic growth, and then derived the land supply coefficient by using industry value-added amount and land area based on this, Respectively. [2] examined the changes in the demand trends of the manufacturing industry according to the changes in the metropolitan area by using the mining and manufacturing statistics and conducted a survey of 440 manufacturing companies with 10 or more employees nationwide. Questionnaire survey was conducted to investigate the preference of location and the intention to expand or expand in the future. [3] estimated the empirical relationship between the industrial complex demand and the future demand based on the estimated coefficients, using the statistical data of the National Statistical Office to predict the industrial complex demand. In order to forecast demand, we estimated the demand for future land area and estimated the probability of locating a particular area in the Seoul metropolitan area and the capital area using the binary logit model. [4] estimated the parameters by using the panel cointegration relation between the industrial site and the production volume for estimating the demand of the industrial land, and presented the demand forecast of the industrial land based on this. For this purpose, annual statistics of site area and production amount by industry were utilized from 1982 to 2009.

In addition to the case of Korea, related research is as follows. [5] focuses on the determination of industrial and commercial land use in urban development, using a spatial data analysis method in the period of 2000-

2010 in Beijing. In this study, exploring the impact of spatial independent variables on these two types of land use, using spatial logistic analysis. [6] aims to examine the influence of government and industrial agglomeration on industrial land prices by constructing hedonic pricing functions, using 693 industrial land parcels from 2002 to 2006 provided by public sector and private developers. In [7], land use change dynamics were investigated by the combined use of satellite remote sensing, Geographic information systems (GIS), and stochastic modelling technologies in Zhujiang Delta of China.

In this way, it is found that the existing researches have made a lot of studies to predict demand statistically using statistical data in Korea. It can be said that it is useful in that it can save time and cost in estimating demand based on data and estimation process is reasonable, but it is inappropriate to reflect the movement of actual companies. On the other hand, studies using spatial data such as satellite images and GIS have been attempted in overseas studies. However, it is pointed out that these data are not easy to obtain, and analysis is also in the initial stage. Therefore, in this study, based on the actual company data, it is necessary to examine how far the companies moved in the area and where they moved, it is meaningful. Above all, this study can be said to be different from existing researches in that it can construct data that can substitute without using statistical data related to industry and can carry out research on industrial transfer based on this.

3. Database Analysis

In this study, "Hankyung Company Overview" published by the Korea Economic Daily was used for setting the demand zone. The Hankyung Enterprise Overview is a corporate DB data set out to identify the current status and financial information of individual companies based on audit reports, financial reports, and company surveys of Korean companies held by the Financial Supervisory Service and NICE evaluation information. In this study, the change of the address of the company is described as the transfer of the company, and based on this, the transfer demand of the companies is grasped.

The data used in this study were obtained from the data for 7 years from 2011 to 2017, and the same company was examined through business number matching. The collected data were analyzed by data cleaning process. Data cleaning process was performed by extracting valid data that can be analyzed from the entire data. It was based on the existence of the business number that can be confirmed as the same company and the address information at the district level to identify whether the company was transferred. There are two problems occurred in this process. First, data is missing that can't be confirmed as a company number or address is missing. In this case, the data of the company without the business number was deleted. In the case of the data without address in 2017, the business information was searched by using the business number, and the confirmed address information was directly inputted to the city district level.

Second, there were some areas where the address system changed partly due to the change of administrative districts, including Changwon City, Cheongju City and Sejong City. In the case of Changwon City and Cheongju City, the previous administrative area was changed to the changed administrative area. On the other hand, in case of Sejong City, in addition to the whole of Yeongi Gun, some of Gongju City and Cheongwon Gun are included. In this study, Yeongi Gun was included.

For reference, address information was extracted to the city district level. Therefore, if the company moves within the municipal district, it is not identified as the company movement. In addition, it should be noted that former information was handled only at the metropolitan level. The current status of the company subject to analysis is as follows. About 1.05 million companies have been acquired through the DB, and 451,543 data with business number and address information ([Table 1](#)).

Table 1. Number of companies.

Year	Number of companies	
	Number of Database	Analysis Target
2011	150,815	143,793
2012	208,902	-
2013	152,727	-
2014	164,675	-
2015	172,539	104,176
2017	206,731	203,574
Total	1,056,389	451,543

Source: The Korea economic daily, Hankyung company overview (2011-2017).

According to the data of the National Statistical Office in Korea, the total number of companies in 2015 is about 3.87 million, and regional distribution between analyzed data and statistical data are as follows ([Table 2](#)).

Table 2. Spatial distribution of company.

Region	Analytical data					Statistical data	
	2011	2015	2017	Total	%	2015	%
Gangwon-do	3083	2028	4232	9343	2.07	133,517	3.45
Gyeonggi-do	29,382	23,069	47,485	99,936	22.13	827,983	21.37
Gyeongsangnam-do	9590	6735	12,161	28,486	6.31	262,950	6.79
Gyeongsangbuk-do	5768	4455	8649	18,872	4.18	218,796	5.65
Gwangju	4375	4936	8384	16,902	3.74	113,424	2.93
Daegu	4472	4143	6143	13,364	2.96	200,070	5.16
Daejeon	3416	2560	5287	11,263	2.49	111,815	2.89
Busan	8937	6233	11,014	26,184	5.80	278,850	7.20
Seoul	46,295	29,937	56,199	132,431	29.33	820,658	21.18
Sejong	262	372	824	1458	0.32	10,480	0.27
Ulsan	2898	2258	3987	9143	2.02	80,805	2.09
Incheon	5829	4113	8413	18,355	4.06	186,011	4.80
Jeollanam-do	5499	4896	9450	19,845	4.39	147,198	3.80

Region	Analytical data					Statistical data	
	2011	2015	2017	Total	%	2015	%
Jeollabuk-do	4159	2987	6154	13,300	2.95	146,654	3.79
Jeju-do	1348	1191	2339	4878	1.08	55,155	1.42
Chungcheongnam-do	4560	3596	7109	15,265	3.38	158,308	4.09
Chungcheongbuk-do	3920	2854	5744	12,518	2.77	121,493	3.14
Total	143,793	106,363	203,574	451,543	100.0	3,874,167	100.0

Source of statistical data: national statistical office in Korea, census on establishments (2015).

In order to test whether the analytical data reflects the present status of statistical distribution, we conducted a paired t-test and confirmed that the null hypothesis that the two groups are equal at the 1% significance level cannot be rejected. Therefore, it can be seen that the data used in this study reflects the distribution of actual companies to some extent ([Table 3](#) and [Table 4](#)).

Table 3. Paired samples statistics.

Variable	Mean	N	Std. Deviation	Std. Error Mean
D_Data	26,561.3529	17	34,883.79272	8460.56247
D_Stat	227,892.1756	17	234,709.2912	56,925.36464

Table 4. Paired t-test between analytical data and statistical data.

Variable	t	df	Sig. (p)
D_Data - D_Stat	-4.133	16	0.001

4. Results

Of the 451,543 companies surveyed, 20,670 were transferred to the companies identified through address information. Seoul is the region with the highest number of moving in and out companies ([Table 5](#)).

Table 5. O-D table about moving company (region level).

Moving out	Moving in																	
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	Total
R1	119	34	5	8	-	2	1	4	14	4	1	4	8	12	3	5	9	233
R2	71	2408	30	42	26	25	30	28	579	18	8	204	43	41	18	193	110	3874
R3	16	29	406	44	6	7	3	160	25	3	26	1	24	12	16	17	15	810
R4	3	40	18	254	4	87	3	15	36	2	25	6	11	8	4	22	7	545
R5	1	18	2	3	554	1	4	2	21	11	5	2	197	20	2	3	2	848
R6	2	26	13	153	2	412	8	6	21	1	1	1	4	2	2	3		657
R7	3	24	8	3	2	8	370	4	35	45	2	2	6	7	2	63	22	606
R8	2	17	166	12		3	5	1059	43	1	19	3	9	8	5	3	1	1356
R9	57	1939	34	50	25	17	29	59	5656	10	14	137	33	32	23	76	49	8240
R10	1	10		2	4	2	10		2			3	5	5		36	16	96
R11	1	6	12	32		1		18	12		301	2	1	1	2	3	3	395
R12	10	301	5	5	4	2	5	2	86	10		462	7	8	2	40	16	965
R13	3	36	11	10	148	2	1	14	23	11	2	4	508	33	6	10	4	826
R14	3	23	6	4	14		5	8	13	8	1	5	23	262	4	13	1	393
R15	4	12	2		1			1	5	2	2	1	3	1	17	1		52
R16	5	80	11	8	3	5	28	2	30	56	5	10	15	20	3	170	30	481
R17	6	45	13	13	3	3	18		33	30	1	2	3	6	2	15	100	293
Total	307	5048	742	643	796	577	520	1382	6634	212	413	849	900	478	111	673	385	20,670

Notes: R1 (Gangwon-do), R2 (Gyeonggi-do), R3 (Gyeongsangnam-do), R4 (Gyeongsangbuk-do), R5 (Gwangju), R6 (Daegu), R7 (Daejeon), R8 (Busan), R9 (Seoul), R10 (Sejong), R11 (Ulsan), R12 (Incheon), R13 (Jeollanam-do), R14 (Jeollabuk-do), R15 (Jeju-do), R16 (Chungcheongnam-do), R17 (Chungcheongbuk-do).

4.1. Results from the Region Side

In [Table 5](#), Seoul (R9) is the region with the largest number of companies moving. In terms of business inflows, Seoul has superior industrial infrastructures than other regions. In [Table 2](#), 20% of the national enterprises are located in Seoul and 30% of the analyzed companies. So, it is highly probable that agglomeration economy from the transfer company will occur. In addition, Korea's major conglomerates are headquartered in Seoul, and have higher education institutions such as universities. Therefore, it is advantageous for the exchange of knowledge and talent to improve the competence of the company, and the possibility of innovation is higher than other regions.

On the other hand, in terms of corporate outflow, Seoul has high fixed costs due to high land prices and high labor costs. In addition, the Seoul metropolitan area is limited in terms of business expansion, and in the case of other attempts, various supports are provided for attracting companies, so that it can be said that the economic incentives for transferring the business are sufficient. The fact that there are many corporations is also one of the reasons why the number of absolute outflow companies is analyzed.

When the data were reviewed, a total of 6634 companies moved from other regions and 8240 companies moved to other regions. According to the data, it was analyzed that the net outflow of 1606 occurred in Seoul during the period.

The net outflows of companies in most of the regions were found to be Gyeonggi-do, which was the largest in the region, and the outflows were also found in Incheon, Gangwon-do and Chungcheongnam-do. On the other hand, Daegu and Daejeon showed some net inflows. These results demonstrate that the effect of the regional dispersion policy of the government was successful in Seoul, but the effect is limited because most companies moved to Gyeonggi-do. On the other hand, Gangwon-do and Chungcheongnam-do seem to have succeeded in attracting companies in the metropolitan area. It seems that the two regions are adjacent to the metropolitan area, and the transportation and industrial infrastructures are improved by local policy support ([Figure 1](#), [Table 6](#)).

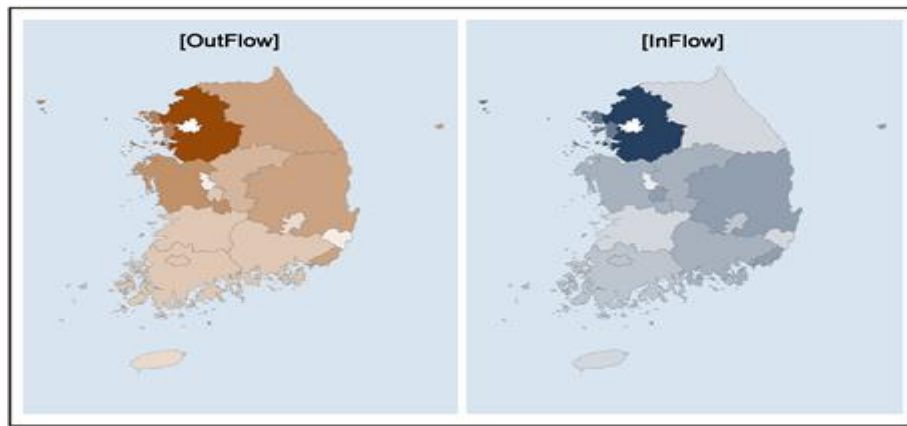


Figure 1. Net flows in Seoul (region level).

Table 6. Company movement in Seoul (region level).

Region	Net flows (per company)		
	Outflow	Inflow	Total
Gangwon-do	57	14	-43
Gyeonggi-do	1939	579	-1360
Gyeongsangnam-do	34	25	-9
Gyeongsangbuk-do	50	36	-14
Gwangju	25	21	-4
Daegu	17	21	4
Daejeon	29	35	6
Busan	59	43	-16
Seoul	5656	5656	-
Sejong	10	2	-8
Ulsan	14	12	-2
Incheon	137	86	-51
Jeollanam-do	33	23	-10
Jeollabuk-do	32	13	-19
Jeju-do	23	5	-18
Chungcheongnam-do	76	30	-46
Chungcheongbuk-do	49	33	-16
Total	8240	6634	-1606

Gangnam-gu is the largest number of companies moving district, and 70.9% of the total outflow companies and 80.4% of the total inflow companies are moving in Seoul. The spatial distribution of the former companies in Gangnam-gu is as follows ([Figure 2](#), [Table 7](#)).

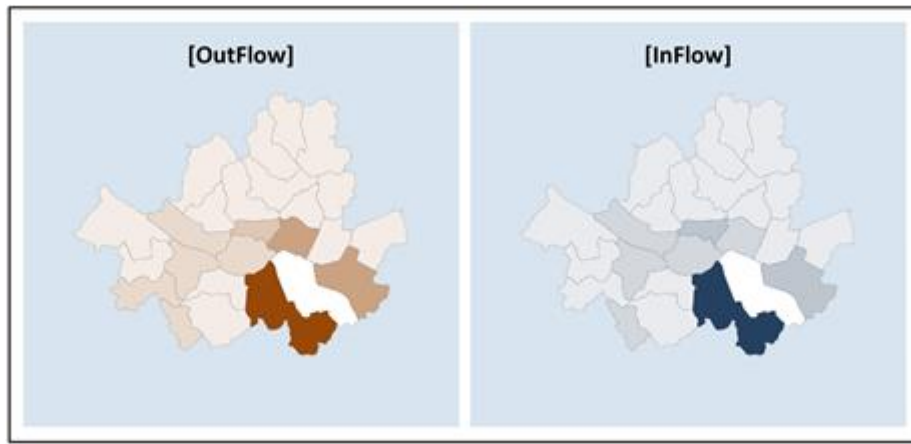


Figure 2. Net flows in Gangnam-gu (district level).

Table 7. Company movement in Gangnam-gu (district level).

District (Gu)	Net flows (per company)		
	Outflow	Inflow	Total
Seocho	361	319	-42
Sungdong	160	38	-122
Songpa	145	75	-70
Jung	105	76	-29
Youngdeungpo	61	45	-16
Geumchun	57	36	-21
Mapo	56	58	2
Yongsan	45	36	-9
Guro	41	26	-15
Jongro	32	33	1
Gangdong	27	18	-9
Gangjin	24	25	1
Ganak	14	10	-4
Gangseo	12	12	0
Dongdaemun	11	14	3
Dongjak	9	7	-2
Sungbuk	9	8	-1
Seodaemun	7	12	5
Dobong	6	2	-4
Yangchun	6	5	-1
Jungrang	6	3	-3
Nowon	5	5	0
Gangbuk	3	3	0
Enpyung	-	10	10
Others	494	214	-280
Total	1696	1090	

4.2. Results from the High-Growth Company

In Korea, policy support is provided to companies with high growth potential. To this end, we set up high-growth companies, which are enterprises with more than 10 employees and an increase in sales or employees by an average of more than 10% a year.

In this study, we examined the current state of high-growth companies. In 2015-2017, the number of enterprises that meet the standards of high-growth companies among the previous companies is 1734, which is almost 8.4% of the total number of moving companies ([Table 8](#)).

Table 8. O-D Table about moving company—high-growth company (region level).

Moving out	Moving in																	Total
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	
R1	10	5	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	18
R2	9	232	2	7	4	4	1	9	52	4	-	20	3	4	2	20	12	385
R3	-	-	31	-	2	-	2	15	4	2	2	-	3	1	1	2	2	67
R4	-	1	2	23	-	11	-	2	4	-	4	-	-	-	1	3	1	52
R5	-	3	-	-	41	-	-	-	-	3	-	-	35	2	-	2	-	86
R6	-	1	-	11	-	31	-	-	2	-	-	-	-	-	-	-	-	45
R7	-	3	3	-	-	1	36	-	5	9	-	-	-	-	-	7	2	66
R8	-	4	16	2	-	1	-	87	2	-	2	-	1	-	-	-	-	115
R9	11	109	-	4	-	1	2	2	405	1	2	10	5	4	1	3	5	565
R10	-	2	-	-	2	-	1	-	-	-	-	2	2	1	-	6	2	18
R11	-	-	1	6	-	-	-	3	-	-	21	-	-	-	-	-	-	31
R12	2	27	-	1	-	-	1	-	8	-	-	33	-	1	1	5	1	80
R13	-	2	-	-	20	1	-	2	1	-	-	-	59	3	-	1	-	89
R14	-	4	-	1	1	-	-	-	2	-	-	-	4	19	-	1	-	32
R15	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	3
R16	-	7	-	-	-	2	2	-	5	2	1	-	3	2	1	31	1	57
R17	-	3	1	1	-	-	3	-	1	3	-	-	-	1	-	2	10	25
Total	32	404	56	56	70	52	48	120	493	24	32	65	115	39	9	83	36	1734

Notes: R1 (Gangwon-do), R2 (Gyeonggi-do), R3 (Gyeongsangnam-do), R4 (Gyeongsangbuk-do), R5 (Gwangju), R6 (Daegu), R7 (Daejeon), R8 (Busan), R9 (Seoul), R10 (Sejong), R11 (Ulsan), R12 (Incheon), R13 (Jeollanam-do), R14 (Jeollabuk-do), R15 (Jeju-do), R16 (Chungcheongnam-do), R17 (Chungcheongbuk-do).

In Seoul (R9), the number of high-growth companies was also higher, and the number of outflows to Gyeonggi-do was relatively high. On the other hand, outflows to other regions were not so high. [Figure 3](#) shows the regional distribution of high-growth companies moving in Seoul. Compared with [Figure 1](#), which shows the regional distribution of the entire moving companies, it is more evident that most of the companies which is moving from Seoul were moving within the Seoul metropolitan area.

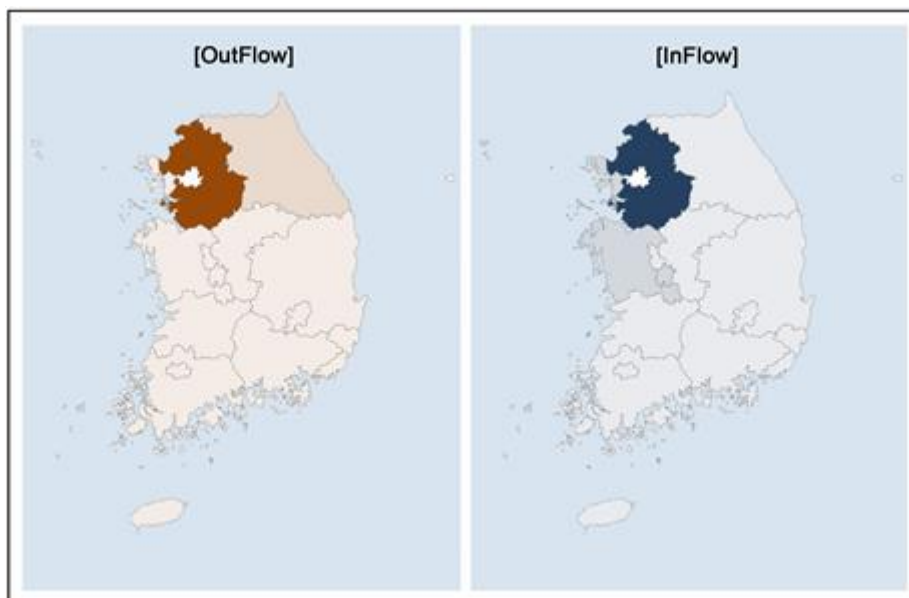


Figure 3. Net flows in Seoul high-growth company (region level).

For high-growth firms, it is important to find a location where they can easily acquire knowledge and labor, and the location requirements of the metropolitan area adjacent to the commodity market are very favorable (Table 9).

Table 9. Company movement in Seoul—high-growth company (region level).

Region	Net flows (per company)		
	Outflow	Inflow	Total
Gangwon-do	11	2	-9
Gyeonggi-do	109	52	-57
Gyeongsangnam-do	-	4	4
Gyeongsangbuk-do	4	4	-
Gwangju	-	-	-
Daegu	1	2	1
Daejeon	2	5	3
Busan	2	2	-
Seoul	405	405	-
Sejong	1	-	-1
Ulsan	2	-	-2
Incheon	10	8	-2
Jeollanam-do	5	1	-4
Jeollabuk-do	4	2	-2
Jeju-do	1	-	-1
Chungcheongnam-do	3	5	2
Chungcheongbuk-do	5	1	-4
Total	565	493	-72

5. Conclusions

The cause of economic development in East Asia including Korea is various factors, but it is known that the role of government has contributed in part [8]. Since the 1990s, the goal of economic development policy in

Korea is balanced development of the region, and company relocation is an important element of the policy. Therefore, looking at the spatial distribution of moving company is the first step in examining how the effect of the policy can be.

This study analyzes company data to establish a demand zone for estimating industrial complex demand, and based on this data, O-D tables for city and district are prepared. In the analysis, we examined how the regional characteristics appear in the O-D Table_results. The purpose of this study is to set the demand impact area for each city and district based on the prepared O-D Table. As with estimating housing demand, estimating demand for industrial complexes by setting impact zones will contribute to supplementing existing quantitative methods and surveys.

In this study, spatial migration of firms occurred in the metropolitan area, and migration to other regions was partially transferred to neighboring areas such as Gangwon-do and Chungcheongnam-do. Especially, for companies with high growth potential, the movements in the metropolitan area were more prominent. It is more important to create a favorable environment for business activities rather than policy incentives, so creating an industrial infrastructure within the region will be most important.

This study concludes that the level of reviewing the limitations of existing industrial complex demand estimation methods and presenting the O-D table on the demand zone setting for improvement of future demand estimation method.

The most difficult point in industrial research is the availability of useful statistical data. In academic research, this study is very useful in that it can acquire company transfer information by only annual data on company basic status. If we can study the changes in the distribution and characteristics of industries in the region through the basic data of the companies, it will be able to complement the existing survey methods for enterprise research and statistics generation. In the practical social area, this study can contribute to the demand estimation of industrial sites for regional development and the achievement of the policy goal of regional industrial development. From the viewpoint of balanced regional development, it will be possible to provide the transfer demand of the enterprises, and thus provide the basis for establishing policies such as the creation or remodeling of industrial complexes. If we complement the various characteristics of the enterprise, it can be used as a basic data for understanding and predicting the overall trend of the inter-regional or inter-country industry. In future research, we will find out how the movement of industry is different according to industry and scale and contribute to the actual demand estimation for future industrial parks such as high-tech industrial complexes.

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1.2. Европейские модели децентрализации и перспективы их применения для Украины

Наталия Михайловна Литвин

Межрегиональная Академия управления персоналом
(Киев, Украина)

Во многих странах есть своя история и традиции местного самоуправления. А в некоторых европейских странах местное самоуправление восходит к средневековью и уже давно является частью конституции страны. Также есть страны, у которых местное самоуправление является недавним явлением.

Независимо от своей формы и истории, местное самоуправление проявляется во всех европейских странах и разными способами

способствует демократии, участия общественности и улучшению оказания услуг.

Развитие местного самоуправления в Украине - одна из приоритетных задач, о важности которой говорится на самом высоком уровне. Решение этой задачи зависит прежде всего от эффективности и производительности взаимодействия между государственной и муниципальной властью.

Цель. В статье раскрыто экономическое содержание и функции децентрализации. Рассмотрены модели финансовой децентрализации, приведены общие черты и особенности каждой из них, что позволило оценить отечественную модель финансовой децентрализации. Выявлены основные возможности и противоречия децентрализации в Украине.

Ключевые слова: финансовая децентрализация, модели организации местного самоуправления, объединенные территориальные общины.

Постановка проблемы. В Украине процесс передачи полномочий из центрального уровня на местные по управлению доходами и расходами вызывает необходимость увеличения результативности реализации предоставленных полномочий и эффективности управления бюджетными средствами общин. Для решения задачи необходимо проанализировать зарубежный опыт развитых стран, которые успешно реализовали концепцию финансовой децентрализации.

Анализ последних исследований и публикаций. Теоретической основой данного исследования стали труды отечественных и зарубежных исследователей, в частности, А. Бориславской, Л. Демиденко, Ю. Наконечной, В. Дмитровской, И. Костенюк, М. Кульчицкого, А. Молдован, А. Мурзакова, В. Наконечного, В. Роман, I. Jourmard, C. Giomo, E. Ruśkowski, J. Salachna. Анализ освещенных в данных научных исследованиях моделей местного самоуправления, механизма формирования местных бюджетов и моделей финансовой децентрализации позволил определить и оценить перспективный инструментарий и пути повышения результатов финансовой децентрализации в Украине.

Задания. Раскрыть экономическое содержание финансовой децентрализации в рамках реформирования местного самоуправления в Украине на основе зарубежного опыта.

Изложение основного материала исследования. Сегодня в Украине этап социально-экономического развития характеризуется существенными трансформационными изменениями. В последние годы реализован ряд важных реформ, в частности, территориальной, управленческой, финансовой, правовой, что обусловило изменения в бюджетной системе Украины и взаимоотношениях между бюджетами

различных уровней, в контексте укрепления самостоятельности местных бюджетов и местного самоуправления.

В развитых европейских странах есть четкое распределение функций, полномочий и финансовых ресурсов между центральным правительством и местными органами власти. Децентрализация — это прежде всего создание условий для развития, расширения компетенций местных административных органов, действующих в пределах своей компетенции самостоятельно и независимо от центральной власти [2].

Эффективность публичного управления на низком уровне достигается посредством расширения их властных полномочий, также повышается эффективность и качество предоставления общественных услуг.

Поэтому важным является поиск оптимального варианта между объемом предоставленных полномочий и их поддержкой соответствующими финансовыми ресурсами [7]. Четко прослеживается действенность этого механизма на примере развитых европейских стран таких, как Швеция, Франция, Германия, Литва и другие. Для того, чтобы оценить возможности апробации зарубежного опыта целесообразно сделать сравнительный анализ проведения финансовой децентрализации в странах, которые имеют высокий уровень финансовой автономии.

Итак, одна из самых распространенных в современном мире моделей местного самоуправления является англосаксонская, возникла в Великобритании, а затем получила распространение в Испании, Италии и других европейских странах.

Характерной чертой этой модели является то, что местные органы власти формально выступают как автономные образования, осуществляющие власть, возложенную на них парламентом. Также для этой модели характерно отсутствие на местах полномочных представителей центрального правительства, которые занимаются органами местного самоуправления.

Континентальная модель впервые была сформирована во Франции, поэтому ее часто называют французской, историческое развитие которой повлияло на ее специфику. Впоследствии модель была заимствована и другими государствами, такими, как Нидерланды, Польша, Словакия.

Главное ее отличие от англосаксонской заключается в характере взаимоотношений органов местного самоуправления с органами государственной власти. В рамках континентальной модели большее распространение получили идеи государственной теории самоуправления, потому что в ее основе заложена административная опека органов самоуправления и присутствие на местах агентов центрального правительства. Французская модель имеет достаточно

высокий уровень централизации, сохранено иерархию управления и ограниченную автономию.

Сходство между англосаксонской и континентальной моделями местного самоуправления можно видеть прежде всего в том, что функционирование обеих моделей основано на подобных принципах, основой структуры муниципальной власти здесь выступают представительные органы. Отличие между этими моделями заключается прежде всего в различии форм государственного устройства.

Смешанная модель функционирует в Германии, Австрии и других странах. Эта модель вобрала черты от двух вышеупомянутых моделей и имеет принципиальное отличие, а именно, возможно совмещение функций государственного и местного управления.

Однако есть много общих черт во всех вышеуказанных моделях, а именно: равенство и перераспределение; выравнивание качества государственных услуг на всей территории страны; развитие местной и региональной автономии на принципах демократии, максимальное решение местных проблем; обеспечение культурной, языковой и этнической идентичности; конкуренция между местными органами власти и региональными уровнями власти.

Итак, какую-либо одну модель в качестве идеальной выделить невозможно. Дело в том, что та или иная модель всегда будет отражать национальные, территориальные и политические особенности государства, а также учитывать исторические традиции, потребности местных жителей, и, безусловно, будет способствовать развитию местного самоуправления и государства.

Мировой опыт в местном самоуправлении очень разный, есть общие тенденции, правила, которые можно применять в Украине. Это, например, четкое распределение полномочий, надзор и ответственность местных органов, а также принципы распределения расходов.

Табл. 1. Сравнительная характеристика моделей децентрализации

	Административно-территориальные образования	Финансовая децентрализация
Украина	876 объединенных территориальных общин	- распределение налогов между различными звеньями бюджетной системы; - трансфертное финансовое выравнивание (дотации, субвенции и другие виды межбюджетных трансфертов) - весомое место принадлежит налогу на доходы физических лиц (более 20%), местные налоги составляют более 14%; - источник наполнения местных бюджетов расширен за счет переданных из государственного бюджета ряда налогов и введены новые сборы.

	Административно-территориальные образования	Финансовая децентрализация
Германия	Территориальные единицы состоят из земель, округов, районов и общин (базовое звено)	- распределение налогов между различными звеньями бюджетной системы; - трансфертное финансовое выравнивание; - общины имеют право самостоятельно устанавливать налоговые ставки и выбирать источники налогообложения.
Польша	379 уездов, 2479 гмин и 16 воеводств	источниками собственных доходов бюджетов гмины стали: налог на недвижимость, сельскохозяйственный налог, лесной налог, налог с транспортных средств, с доходов физических лиц, налог на наследство, а также ряд сборов: гербовый, местный, административный и др. Кроме того, доходы формируются поступлениями от налога на доходы физических и юридических лиц; целевыми субвенциями, дотациями.
Словакия	38 районов и 121 территориальных единиц	- финансирование собственных функций происходит за счет собственных доходов общин; - финансирование делегированных полномочий происходит за счет целевых трансфертов.

Систематизировано автором на основе [1; 2; 3, 4, 6; 8; 9; 11; 12]

Среди различных нынешних типов местного самоуправления есть общие черты, которые характеризуют процессы децентрализации в европейских странах. Проанализировав законодательство и отечественную практику, можно прийти к выводу, что именно смешанную модель местного самоуправления реализовано в Украине.

Германия является представителем группы стран с федеративным устройством, основа реализации финансовой децентрализации состоит из принципа автономии и принципа участия. Согласно действующему законодательству территориальными единицами этой страны являются: земли, округа, районы и общины (базовое звено).

Отличие от украинских территориальных общин состоит в том, что немецкие имеют право принимать собственные законы. Общей чертой является то, что в Украине и Германии подобная многоуровневая система финансового выравнивания. Инструментами этой системы является распределение налогов между различными звеньями бюджетной системы и трансфертное финансовое выравнивание (дотации, субвенции и другие виды межбюджетных трансфертов).

В бюджетной системе Германии особенностью является закрепление за каждым уровнем налогов, которые направляются только к одному из бюджета. Следовательно, финансовая децентрализация Германии предусматривает, прежде всего, участие государства в бюджетном регулировании, земли должны заниматься образованием и культурой, а все, что касается жизни общества

относится к полномочию общин, а федерация только несет ответственность за целостность экономического развития страны.

Несмотря на сходство концепций реформы финансовой децентрализации интересным для Украины есть опыт унитарной страны Польши. Финансовая децентрализация в Польше была завершающей реформой после изменений местного самоуправления и административно-территориального устройства. Итогом таких реформ в стране стала трехступенчатая система территориальных единиц: «гмина - уезд - воеводство» [11]. Это стало движущей силой в выстраивании рациональной, демократической административной системы с независимым местным самоуправлением. Децентрализация функций и полномочий была подкреплена источниками доходов, следующим шагом стала реформа финансовой децентрализации. Источники формирования бюджета гмины состоят на 40% из собственных доходов и 60% из субвенций и дотаций из центрального бюджета [1, 11, 13].

Отношения между гминами строятся на экономически взаимовыгодных условиях. Объединяя свои ресурсы, общины более эффективно используют местные бюджеты. От рационального взаимодействия соседних гмин выигрывают все: происходит экономия бюджетных средств, люди получают качественные услуги.

Польская гмина в отличие от украинской территориальной общины имеет статус юридического лица, что в корне изменило его отношения с центральной властью. В законах четко прописаны полномочия и задачи, которые выполняет местное самоуправление. В то же время каждая единица самоуправления имеет свой отдельный бюджет, независимый от бюджета всей страны. Прозрачность публичных финансов и гласность принятия сметы общественных расходов сводит возможность коррупции к нулю.

Отличительной особенностью является то, что в Польше бюджетам гмин из центрального правительства выделяют деньги на образование. Медицина и образование в Украине финансируются за счет медицинской и образовательной субвенций.

Также в Польше существует рейтинг инвестиционной привлекательности гмин. В Украине на практике, если потенциальные инвесторы хотят инвестировать в определенную территорию, находящегося за пределами села, то это будет проблематично потому, что нет схемы планирования территории за селом. Для решения этой проблемы необходимо, чтобы каждая территориальная община имела схему планирования, на которой будет четко понятно, где зарезервирована земля для производства.

Благодаря децентрализации в Польше были фактически ликвидированы основные монополии. Только после проведения ряда реформ жители почувствовали, что сами могут влиять на события в своей территориальной общине.

Результатом проведения реформ стало разграничение функций и полномочий между государственной властью и местными органами. Государство отвечает за внешнюю политику страны и национальную безопасность, а местные власти отвечают за предоставление качественных услуг населению определенной территории.

Целесообразным к внедрению в отечественные реалии опыт финансовой децентрализации Словакии. Несмотря на масштабную коррупцию во всех сферах экономики Словакии, безработицы и ряд других экономических проблем, постепенно, в несколько этапов был проведен ряд реформ. Результатом - выстроена трех уровневая модель государственного управления - «община - областное самоуправление - государство». Благодаря проведенным изменениям государственная власть стала максимально отделена от местной, как результат в основном проблема была преодолена [5].

Отличительной особенностью от Украины является то, что в правительстве Словакии ограничен перечень функций. Но надо отметить, что контроль в части делегированных полномочий, за деятельностью местной власти сегодня осуществляется со стороны правительства. Расширение прав общин и краев было подкреплено источниками доходов, в результате реформы бюджетной системы было передано на местный уровень. В общем, финансовые ресурсы были распределены таким образом, что правительство и регионы получили мощную финансовую базу для своей деятельности [6].

Отечественные ученые утверждают, что Украине до сих пор не удалось создать эффективную и действенную систему местного самоуправления, а хронический дефицит финансовых ресурсов территориальных общин и их чрезмерная раздробленность не дали возможность децентрализовать бюджетную систему Украины. Проблема распределения полномочий между «центром» и местными общинами обостряется желанием территориальных органов иметь дополнительные бюджетные ресурсы с одновременным отсутствием опыта выполнения дополнительных функций [6].

Необходимо отметить, что в Украине благодаря финансовой децентрализации появились новые возможности для наполнения бюджетов общин. Учитывая переданные части общегосударственных налогов и сборов в бюджеты общин, в основном большинство так и остались дотационными, следовательно, они и сейчас является финансово несостоятельными.

Вывод. Благодаря проведенному анализу можно сделать выводы, что на сегодня в Украине децентрализация бюджетной системы является незавершенной.

Следует учитывать богатый зарубежный опыт, он может быть полезен и использован при строительстве украинской модели взаимодействия органов государственной власти и местного самоуправления.

Дальнейшие этапы укрепления процесса базы объединенных территориальных общин должны зависеть от анализа результатов пройденного этапа реализации финансовой децентрализации, выявление ее достоинств и недостатков. В то же время реализация финансовой децентрализации должна опираться на административно-территориальную реформу и новую философию государственного управления.

Главной проблемой реформы является отсутствие единого центра принятия решений, при реализации реформы финансовой децентрализации необходимо четко понимать цели, функции государства и органов местного самоуправления.

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SECTION II / СЕКЦИЯ II

EXACT SCIENCE, TECHNIQUE AND TECHNOLOGY AT THE PRESENT STAGE / ТОЧНЫЕ НАУКИ, ТЕХНИКА И ТЕХНОЛОГИИ НА СОВРЕМЕННОМ ЭТАПЕ

2.1. Нанотехнология - XXI ғасырдың басты серпілісі

Тілекші Тілекқабылқызы Бақтығалиева

магистрант. Халел Досмұхамедов атындағы
Атырау мемлекеттік университеті (Атырау қ. Қазақстан)

XXI ғасырдың басы нанотехнологиялар мен наноматериалдардың дамуының революциялық бастамасы екендігі баршамызға анық. Қазіргі таңда олар әлемдегі барлық дамыған мемлекеттерде адамзат қызметінің (өнеркәсіп, ақпарат саласында, энергетика, радиоэлектроника, транспортта, биотехнология және медицинада) аса маңызды салаларында қолданыс тапқан.

Кейінгі жылдары нанотехнологияны жоғары технологияның аса көп уәде беретін тармақтарының бірі ретінде және XXI ғасырдың экономикасының жүйе түзуші факторы ретінде қарастыра бастады. Нанотехнология барлық өндірістік қызметтің жаңа парадигмасының дамуын ынталандыра, ол өзі өмір сапасын арттырудағы жаңа бетбұрыстардың көзі және постиндустриалды қоғамда көптеген әлеуметтік мәселелердің шешімі болып саналады.

Нанотехнологиялар - бұл қазіргі дәуір ғылымының «ұшқыр» аймағы болып отыр. XX ғасырдың екінші жартысындағы ғарыш зерттеулері мен ғаламтор секілді, наноәлем де бүгінгі күні мектеп оқушыларының, студенттердің және ғалымдардың ой-көңілін жаулап алған. Нанотехнология тіпті өз инвестицияларын жоспарлайтын қаржы мамандары үшін де маңызды рөл атқарады. Жаңа технологиялар әдетте, жаңа өнімдер мен кіріс арудың тәсілдерінің пайда болуын білдіреді. Сондықтан бүгінде инвесторлар мен саясаткерлер де нано әлемдегі жаңалықтарға қызығушылық танытады.

Наноәлем материалды әлемнің ең негізінде орналасқандықтан (атомдар мен молекулалар деңгейінде), ол ғылыми зерттеулердің барлық саласын қамтиды. Бұл нанотехнологияның маңызды аспектісі – олардың біздің айналамызды ғажайып кейіпте безендіріп жүруі болып табылады. Адамзат шығармашылығының әр саласы қалай болса да олардың әсерін сезетін болады.

Нанотехнология - наноөлшемді объектілер негізіндегі материалдар мен бұйымдардың өндіру технологиясы.

Нанотехнология өзара байланысқан химия, физика мен биология ғылымдарының күрделі кешенді үш ғылыми бағытымен бірге жүреді.

Объекттердің өлшемдері кеміген сайын жүйенің потенциалды әсер ету жылдамдығы артады, бұл өз кезегінде электроника мен есептегіш техниканың маңызды аспектісі болып саналады.

"Нанотехнология" терминін құрылымын нанометрлік масштабта, яғни атомдар, молекулалар мен молекулалық түзілімдер диапазонында реттелетін материалдарды, құрылғылар мен жүйелерді жасау және пайдалану деп түсінеді. Бұл технология осындай объектілермен жұмыс істей білуді және олардың ішінен принципті жаңа молекулалық ұйымға ие анағұрлым ірі құрылымдарды құруды білдіреді. Осыған байланысты наноматериалдар мен құбылыстардың қасиеттерін іргелі зерттеумен айналысатын наноқұрылымдар мен наноқұрылымдарды құрумен жұмыс істейтін нанотехнология және наноинженерия - оларды пайдаланудың тиімді әдістерін іздеумен айналысатын наноғылым сияқты ұғымдар пайда болды.

Нанотехнологиялар ғалымдар, инженерлер мен тіпті, қаржы мамандарының пәнаралық сабақтарының тұтасқан саласы болып «бір күнде» пайда бола салған жоқ. Көптеген сенсациялық ашылулар мен жиі болатындай нанотехнологияның пайда болуына ұзақ жылдар бойы жүргізілген қарқынды зерттеулер және адам тұрмысындағы жаңа бағыттар негізіндегі жаңа құрал-жабдықтардың ашылуы негіз болды.

Бұл өте қызықты білім салалары, өйткені ғалымдар физика, химия, биология, материалтану, электрондық және компьютерлік техника және басқа да ғылыми пәндер тоғысында жұмыс істейді. XX ғасырдағы ғылымның жылдам дамуы нанобөлшектер мен наноқұрылымдардың бақыланатын синтезінің 80-ші жылдардың аяғында пайда болуына алып келді. Кластерлерден (атомдар мен молекулалардың шағын топтары) жасалған материалдар мен жүйелер мүлдем жаңа қасиеттерге ие болды. Себебі, шағын масштабтарда кванттық механикалық, яғни материяның толқындық қасиеттері көрінеді. Нанокластерлердің өзара әрекеттесуі наноқұрылымдардың бірегей және әр түрлі қасиеттерін анықтайды.

Әсіресе әсерлі нәтижелерді жаңа материалдар жасауда нанотехнологияларды пайдаланудан күтуге болады. Бұл экстремалды, тұтынушылық қасиеттер тұрғысынан, бағдарламаланатын қасиеттері бар, өте берік және пластикалық, аса жеңіл, сыртқы жағдайларға бейімделетін материалдарды өндіруге мүмкіндік береді. Наноматериалдар арасында нанокомпозиттер - нанобөлшектермен арматураланған қарапайым полимерлерден тұратын арзан және берік материалдар ерекше орын алады. Қазір ғалымдар оларды алудың өнеркәсіптік технологияларын әзірлеуде. Нанокомпозиттер құрылыста, жабдықтар мен жиһаздарды, тұрмыстық электр құралдарын және т. б. өндіруде қолданылады. Сондай - ақ көміртекті нанотрубкаларға да назар аудару керек-диаметрі бірнеше нанометрлерде созылған цилиндрлік құрылымдар. Олар өте жоғары беріктікке, эмиссиялық қасиеттерге және кең ауқымда өзгеріп отыратын өткізгіштікке ие.

Мәселен, нанотүбектер негізінде эмитенттерді әзірлеу өте аз көлденең өлшемдермен және қоректендірудің төмен кернеуімен ерекшеленетін электронды аспаптардың жаңа класын жасауға алып келеді [1].

Нанотехнологияларды дамыту медицина мен биологиядағы іргелі өзгерістерге алып келеді. Адам ерекшеліктерін ескере отырып, жеке генетикалық кодтардың шифрын алуға, тірі организмдерге енгізілген биоэлектронды құрылғыларды қашықтықтан басқаруды сынамаалауға, сондай-ақ ауруларды ерте диагностикалау және алдын алу үшін адам денсаулығының жай-күйі туралы сигнал беретін наносенсорлық жүйелерді әзірлеуге болады.

Нанотехнологиялар энергетикасында энергияны алу, жинақтау және тиімді пайдалану әдістерін дамытуға елеулі әсер етеді. Мысалы, наноқұрылымды катализаторлар сутегіні тиімді алудың және сутегі отынын кеңінен пайдаланудың жаңа мүмкіндіктерін ашады. Оларды енгізу осы саладағы энергия тұтынуды және ластаушы заттардың шығарылуын азайтуға, қоршаған ортаның жай-күйін бақылау құралдарының жақсаруына, қалдықтарды, оның ішінде ядролық қалдықтарды өңдеудің жаңа тиімді әдістерін әзірлеуге әкелуі тиіс.

Нанотехнологиялар қару-жарақ жүйелерінің жаңа элементтік базасын құруға күшті әсер етеді. Наноқұрылымдарды қолдану оларды "интеллектуалды" етеді, әскери қызметшілердің жауынгерлік іс-қимылдарды жүргізу аймағында болуын азайтуға мүмкіндік береді. Осы саладағы қолданыстағы бақылау жүйелері толық өзгереді. Қазірдің өзінде осы супертехнологиялардың көмегімен химиялық, биологиялық және ядролық қару датчиктерінің жаңа буыны әзірленуде. Жеңіл, жинақы, бірақ толық функционалды ұшқышсыз жауынгерлік ұшақ құру бойынша әзірленімдер жүргізілуде. Ғарыш техникасының құрылғыларын миниатюралау салмағы көп есе жеңіл болатын спутниктерді құруға алып келеді, бұл ғарышқа шығарылатын пайдалы жүктің көлемін арттырады.

Нанотехнологиялар қазірден бастап жұмыс істеуде. Өндірістік кәсіпорындар материалдардың бұрынғы қасиеттерінен асып түсетін, жаңа наноқасиеттері бар көптеген тауарлар шығаруда. Молекулалық деңгейде кейбір материалдарды қоса отырып, ғалымдар олардың өміршеңдігін және беріктілігін жоғарылата алды.

Нанотехнологияның негізінде қазіргі таңда жасалынып жатқан өнімдердің саны күннен күнге артуда. Мысалы, заманауи күннен қорғайтын кремдерді айта кетсек. Заманауи түссіз кремдер көрінетін жарықты өткізеді, бірақ зиянды ультракүлгін шағылысуларды жұтып алады. Олар ультракүлгін сауле шығаруды тиімді шағылыстыратын титан диоксидін және цинк оксидінің нанобөлшектерінен құралады. Яғни, бұл кремдер бұрынғы кремдердің тек қана жетілдірілген түрлері, жұмыс істеу принциптері бірдей. Бірақ, құрамындағы бөліктердің өлшемі өте кішкентай.

Беттерді өңдеудің наномасштабты технологиялары механикалық, термиялық, биологиялық, электрондық, оптикалық, химиялық қасиеттері жақсартылған тауарларды жасауға мүмкіндік береді. Заттың үстінгі қабатын нанотехнологиялар құрамдары бар жақсырақ өнімдер шығаруға керек болады. Төменде оларды қолданудың болашақтағы аймақтары келтірілгін:

- Автокөліктер мен құрал-жабдықтарды тозудан қорғау;
- Жұмсақ материалдарды қорғау (мысалы, полимерлік, ағаштан жасалған және текстильді);
- Антивальді және өспейтін жамылғылар;
- Текстиль мен керамикалар үшін өздігінен тазаланатын беттік қабықшалар;
- Автокөліктер мен құрал-жабдықтар үшін антикоррозиялық қорғаныш;
- Турбиналар мен қозғалтқыштар үшін термотұрақты жамылғылар;
- Құрылыс материалдар мен аспаптар үшін термоизоляция;
- Биологиялық сәйкес келетін имплантандар;
- Антибактериялық медицина материалдары мен құралдары;
- Транзисторлар үшін өте жұқа компоненттер;
- Фотохромды және электрохромды терезелер;
- Антибликті экрандар;
- Тиімділігі жоғары күн батареялары.

Қазіргі уақытта нанотехнологиялар жүздеген өнімдерді өндіру үшін қолданылды. Алайда болашақтары әлі алда, нанотехнологиялар өздерінің тамаша жолдарының басында тұр, ал олардың саны әлі өте аз. Өзірше наноматериалдардың адам ағзасына зиянды әсері жақсы зерттелмеген. Бұл ақпаратты жинау кезеңінде тұрған зерттеудің кең саласы болып табылады [2].

2003 жылдан бастап нанотехнологиялар бойынша зерттеулер Қазақстан Ұлттық Ғылым академиясы үйлестіретін іргелі зерттеулер бағдарламасының басымдықтарының бірі болды. Біздің елімізде осы бағыттағы зерттеулерді орындайтын және нанотехнологиялар мен аралас пәндерде әзірлемелері бар ғылыми ұжымдар бар. Бұл жартылай өткізгіш және металл жүйелердегі нанокластерлер мен наноқұрылымдарды синтездеу, наноөлшемді катализаторлар, сенсорлық наноқұрылымды материалдар мен көміртекті наноқұрылымдар саласындағы зерттеулер. Іске асыруға дайын және нанотехнологиялық элементтерді қамтитын инновациялық өндірістердің бірнеше жобалары бар. Бұл силандарды алу және тазалау сатысы арқылы кремний өндірісі; белсенді фазаның наноөлшемді бөлшектері бар катализаторлар өндірісі; нано кеуекті сезімтал қабаты бар газ сенсорлары өндірісі. Бұл әзірлемелер патенттермен қорғалған, технологиялық жаңалығы бар және жоғары экспорттық әлеуетке ие, бұл өндірісті ұйымдастырудан тез қайтарымды

алуға мүмкіндік береді, зерттеу және инновациялық жобаларды өрістету үшін қосымша қаражат көзін береді.

Қазақстан Үкіметі әзірлеген 2015 жылға дейінгі индустриялық-инновациялық даму бағдарламасы елдің шикізаттан қайта өңдеуге көшуіне баса назар аудару ғылыми маңызға ие болды. Ғылыми ойдың ең озық жетістіктерінсіз жасау мүмкін емес жоғары технологиялар сұранысқа ие болады. Осыған байланысты ғалымдар Мемлекет басшысының үш технопарк құру туралы шешімімен үлкен үмітті байланыстырады: Алматы түбіндегі Алатау кентінде - Ақпараттық технологиялар орталығы, Степногорск қаласында - биотехнологиялық орталығы, Курчатов қаласында - Ядролық технологиялар орталығы. Олар қазақстандық ғалымдардың ең батыл ғылыми идеяларын жинақтауға арналған полигон болуы тиіс.

Қазіргі нанотехнология әдісінің ауқымы зор болғандықтан елімізде жүзге жақын жобалармен қауымдастық ұйымдар айналысуда. Олардың негізгі бағдарламалары келесідей ауқымды қамтиды: нанотехнологияларды энергиялық жүйелерде дамыту үшін жаңа наноматериалдар түрлерін құрастыру; Қазақстанның мұнай-газ саласында пайдаланылатын жаңа наноматериалдар мен нанотехнологиялар түрлерін алу; тау-кен өндірісінің нанотехнологиясын зерттеу және дамыту; ақпараттық технология мен микроэлектроника үшін жаңа квантты құрылымды заттарды өндіру; нанотехнологияның жаңа әдістерін пайдалана отырып, биоматериалдардың жаңа түрлерін синтездеу.

Алайда, нанотехнологиялардың барлық орасан зор артықшылықтары жалпыұлттық бағдарлама болған кезде ғана барынша жоғары дәрежеде іске асырылуы мүмкін екендігін үнемі есте сақтаған жөн. Негізгі акценттер тиімділігі жоғары іргелі зерттеулер мен нанотехнологиялық өнімдер өндірісін ұйымдастыру үшін инфрақұрылым құруға алып келуі тиіс. Онда негізгі акценттер тиімділігі жоғары іргелі зерттеулер мен нанотехнологиялық өнімдер өндірісін ұйымдастыру үшін инфрақұрылым құруға алып келуі тиіс. Бұл ретте ғалымдарды, технологтарды және нанотехнологиялар саласында өндіріс ұйымдастырушыларын даярлауға, сондай-ақ жаратылыстану ғылымдары бойынша тиісті мамандықтар мен олардың алдыңғы қатарлы ұлттық университеттердегі қосымшалары үшін пәнаралық оқу бағдарламаларын әзірлеуге ерекше назар аудару қажет. Тек осылай ғана біз Қазақстан экономикасы қызметіне, бүкіл қоғамға осы заманауи технологияларды қоя аламыз [3].

Жақын болашақта наноқұрылымдарды алу және өңдеудің дамуын қарастырған кезде нанотехнологияны химия және биологияда пайдаланудың үлкен мүмкіндіктері анық көрінеді.

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2.2. Рационализация безопасности полетов путем совершенствования бортового оборудования

Надежда Александровна Долженко

кандидат политических наук, ассоциированный профессор кафедры
№ 15 «Летная эксплуатация воздушных судов и обслуживание
воздушного движения» Академии гражданской авиации
(г. Алматы, Казахстан)

Айтолкын Алматовна Кульманова

Студентка 2 курса группы ЛЭ-17-4.1 Академии гражданской авиации
(г. Алматы, Казахстан)

Современный взгляд на идею безопасности полетов в авиации

Безопасность в полете играет первостепенную роль в деятельности и процессе развития международного воздушного транспорта. Она зависит от надежности и качества функционирования всех элементов авиационной техники. Государства берут на себя основную ответственность за обеспечение контроля в сфере авиационной безопасности независимо от любых изменений в системе экономического регулирования. [1] Лидирующие государства развиваются в осуществлении контроля за обеспечением безопасности в полете и в соответствии с их обязательствами по Чикагской конвенции. С 2001 по 2011 год происшествия с воздушными суднами, которые были обусловлены потерей управляемости в полете, были самой первой причиной катастроф в мировой гражданской авиации. Авиационные происшествия типа LOC-I очень часто приводят к катастрофическим последствиям, и в основном в живых остаются лишь единицы. Так же большинство авиационных происшествий вызвано активными или скрытыми условиями полета. После Конференции в 2009 году, были подняты вопросы, касающиеся проблем потери управляемости в полете (LOC-I) и попадания самолетов в сложные пространственные положения. Королевское общество аэронавтики (RAeS) начало активизацию исследования причин LOC-I и приниматься за подготовку консультаций по предотвращению подобных

происшествий путем возможных совершенствований международных общих стандартов в области гражданской авиации. Данная работа была инициирована Международным комитетом Королевского общества аэронавтики (RAeS) по летной подготовке и обучению в обширных областях рабочих порядков (ICATEE), а ИКАО в свою очередь оказала поддержку этой деятельности.[2] Изучение данных в отрасли авиационных происшествий привело к ошибкам которые связаны с потерей управляемости в полете (LOC-I). И это свидетельствует о том, что сопровождающие факторы могут быть разделены на следующие разновидности: работа систем воздушного судна, состояние внешней среды, действия самих пилотов или экипажа, либо любой объединенной конфигурацией этих трех факторов. Проблема безопасности в полете стала настолько серьезная, что ИКАО провела отдельное заседание по обсуждению и согласованию установления начальной правовой основы для полетов всевозможных дронов. Комитетом гражданской авиации была выпущена главенствующая группа из представителей, которые в свою очередь заинтересованы министерством и ассоциаций, которое также трудится над разработкой нормативной базы по эксплуатации беспилотных летательных аппаратов. [3] Обычно, сложная ситуация в полёте комплектуется в результате неблагоприятного стечения обстановки – поперечного воздействия комплекса эксплуатационных причин. Данными ошибками могут быть вариации управления пилота, механические отказы различной систем, информационные или логические ошибки в работе бортовых систем, отклонения от нормативного сценария полёта, неблагоприятные погодные условия, варианты центровки и конфигурации летательного аппарата. Различные пробелы в структуре знаний специалиста – аэродинамика, динамика, конструктора, инженера, пилота, эксперта – о сценариях многопричинных ситуаций повышают риск неожиданного развития катастроф типа «цепная реакция». Изучение подобных ситуаций в практических испытаниях, на пилотажно-кабинных симуляторах, математических моделях затруднено из-за технических, финансовых, либо других ограничений. Управление обеспечением авиационной безопасности базируется на вероятностных методах, но управление безопасностью полета должно держаться на информационном методе.[4] Главная суть самого подхода говорит о том, что выделяются системы, которые жизненно необходимые для функционирования летательного аппарата, устанавливается набор некоторых параметров, которые характеризуют штатную деятельность этих систем и решается «коридор» допустимого изменения параметров. Через определенную систему датчиков данная информация переносится в бортовую информационную систему (БИС). В бортовой информационной системе эта информация подвергается обработке и при приближении контролируемых нормативов к границам «коридора», автоматически

передается на их коррекцию, либо же для командира воздушного судна формируется управляющее влияние на компенсацию возникающих на борту отклонений параметров. Помимо этого, эта информация по радиоканалу начинает передавать сигнал на землю и при достаточном интервале времени в необходимой ситуации производится анализ информации экспертами на земле с выработкой рекомендаций по действиям пилота и дальнейшей передачи их на борт летательного аппарата. В эту же отрасль можно отнести и сам процесс руководства полетами (управление воздушным движением), где, по существу, каждое указание руководителя полетов (диспетчера) решает задачу управления безопасностью полета. Если взять же сам процесс управления авиационной безопасностью, то необходимо делить на: автоматизированное управление авиационной безопасностью с употреблением технических средств и выдачу управляющих влияний на устранение нежелательного развития ситуации; анализу информации в бортовой информационной системе и выдачи командиру воздушного судна управляющих воздействий на компенсацию отклонений параметров в виде предлагаемых действий; передачу информации на землю, её анализу экспертами и выдачи управляющих воздействий летчику в виде апробирующих действий; управление воздушным судном со стороны группы руководства полетами.[5] Мы живем во время, когда возможности авиационной, расчетной техники и формы программирования дают возможность поставить вопрос о создании бортовой системы управления безопасностью полета. Исходя из вышесказанного, уникальность построения системы управления авиационной безопасностью полетов в том, что она состоит в необходимости решения задачи авиационной безопасности на трех уровнях. Первый контур – руководство обеспечением авиационной безопасности. Второй контур – руководство авиационной безопасностью полета. Сосредоточивания совершенствования бортового оборудования для повышения авиационной безопасности полетов летательного аппарата: Рассмотрен как совокупность процедур по улучшению перспективного комплекса бортового оборудования летательного аппарата с целью повышения мировой авиационной безопасности полетов. Эти действия охватывают все этапы кругооборота от проектирования до эксплуатации летательного аппарата. [6]

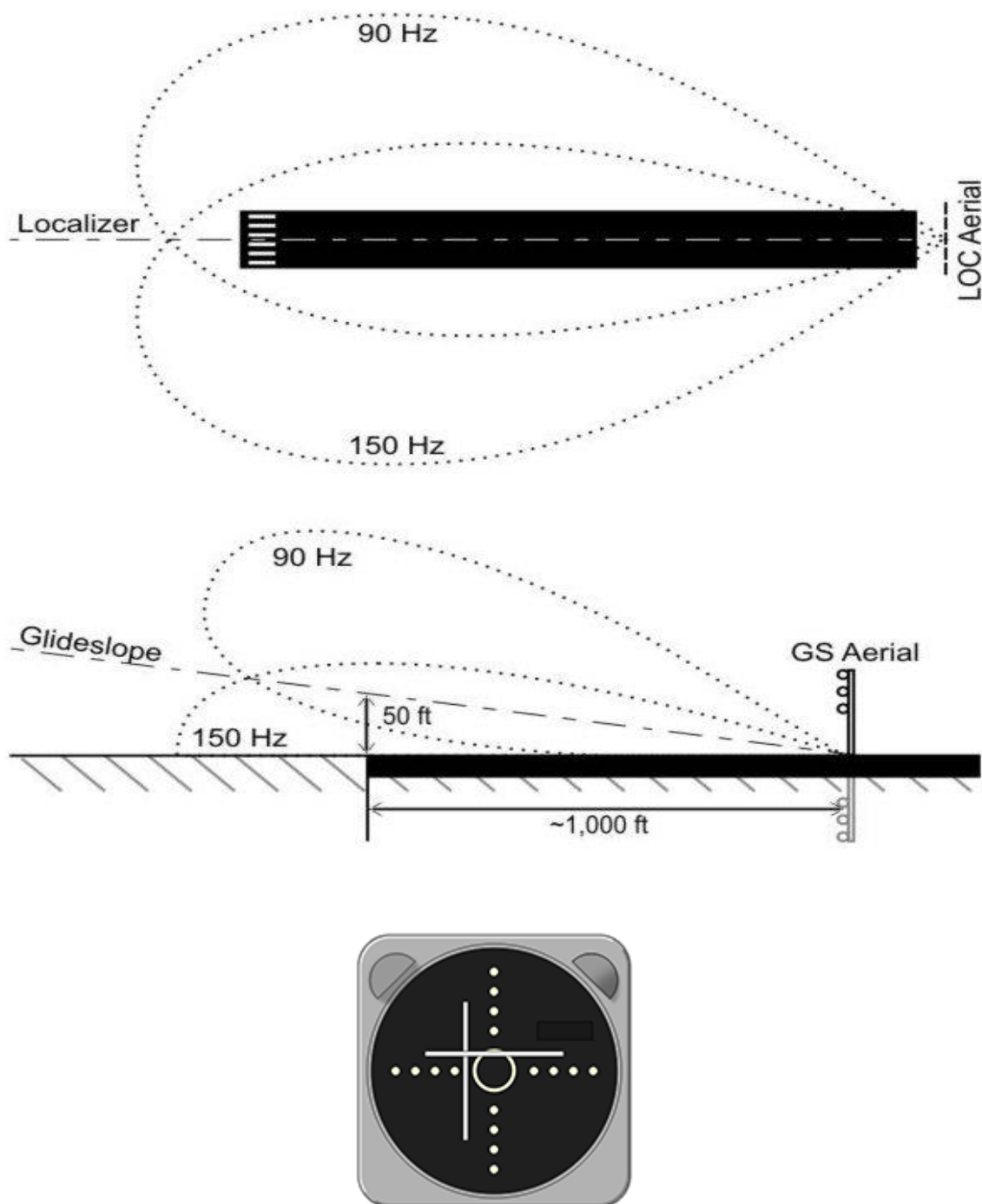
Рассмотрены три ключевых составляющих гарантированного безопасного полета: техническая безопасность на первом, то есть на этапе проектирования; процесс деятельности и безопасность при выполнении полетов; производительная безопасность при управлении техническим состоянием летательного аппарата. Техническая пилотажная безопасность снабжается внедрением перечня организационно-технических и технологических действий на этапе проектирования самолета или вертолета, которые гарантируют

обеспечение заданного уровня надежности и эффективности деятельности сложного высоко интегрированной совокупности бортового оборудования. Действительная авиационная безопасность подразумевает перечень технологических решений по эрудированной информационной поддержке экипажа с целью выявления, анализа и прогнозирования угроз авиационной безопасности полёта и помощи экипажу в выходе из сложных ситуаций путем совокупного интеллектуального анализа информации о внешней обстановке полета. Эксплуатационная авиационная безопасность обеспечивается включением перечня технологических решений по многоуровневому мониторингу технологического состояния летательного аппарата и интеллектуальной информационной поддержки экипажа и участников авиационной жизнедеятельности.[7] Проблемы и будущие перспективы жизнедеятельности авиационной безопасности гражданской авиации.

Проблема посадки: самая распространенная проблема. Значительная часть авиационных происшествий и катастроф связано с заходом на посадку летательного аппарата. Для этого есть определение: столкновение с землей в управляемом виде, по-английски — Controlled Flight Into Terrain, CFIT. В той же статье процитировано: «Основными причинами CFIT являются: ошибки пилотов (особенно в сложных метеоусловиях), неисправная или же неустойчивая деятельность навигационного оборудования». Так же в некоторых случаях недолета/перелета при посадке не относятся к CFIT.

В чем же состоит проблема посадки самолета? Сама суть в том, что самолет — весьма хрупкая конструкция, а пилотирование — достаточно тяжелый процесс, так как воздух — область с низкой плотностью. Когда воздушное судно заходит на посадку оно должно с высокой точностью лететь на посадочной глиссаде, чтобы безопасно попасть на начало взлетно-посадочной полосы с гарантировано безопасным курсом и скоростью. Для воздушного судна недолет часто приводит к повреждению шасси самолета и в последствии, к катастрофе, а перелет — к невозможности вовремя остановить движение с похожими последствиями. Помимо этого, сам процесс захода на посадку начинается на большом расстоянии от аэропорта, приземление же в некоторых случаях может осуществляться в плохих метеоусловиях и т.д. Решение проблемы: Для качественной авиационной безопасности полетов около земли и захода на посадку были произведены самые разные системы — TAWS (Система предупреждения о приближении к земле), курсовые и глиссадные системы — ILS (метрового диапазона), MLS (сантиметрового диапазона). Более продвинутые в этой сфере системы — ILS и MLS в своих последних вариантах позволяют совершать посадку при отсутствии видимости.

При уходе воздушного судна в сторону от правильной глиссады по курсу или высоте, выходит разность сигналов и высвечивается предупреждение для пилотов.



В данном случае пилот видит, что ему стоит направить самолет более левее и вверх.

Перспективы развития

Прежде всего — фиксирование. Современные бортовые системы обладают довольно хорошими массогабаритными свойствами, а также весьма низким энергопотреблением. [8] В мировой промышленности, где также в приоритете надежность и безопасность, многие

производственные оборудования руководствуются определенными контролерами, информация с которых докладывается диспетчеру, откуда они руководствуются. После распределения по всему фюзеляжу, соединяющие общими шинами несколько заменяющих систем, четко выставив им определенные приоритеты, можно рассчитывать на повышение безопасности и надежности. Помимо этого, модульная концепция, когда неисправный функциональный узел можно будет оперативно заменить исправным, позволит сократить время на сам ремонт и обслуживание воздушного судна, внесение самодиагностики в как можно большем количестве мест позволит не только исправить проблему, но и, при наличии дублирующего узла, быстро ее устранить. Естественно, что реализовано это должно быть должным образом, и при любом отказе неработающий узел не мог бы повлиять на жизнедеятельность оставшейся системы (шумы, замыкания, опасные уровни давления не должны влиять на работоспособность других модулей или передачу данных). Еще очень сложная проблема — телеметрия и дистанционное управление. Очень много катастроф и происшествий произошло из-за несоблюдения дисциплины или ошибок летчиков. С одной стороны — получение руководства летательным аппаратом извне — весьма опасная возможность. Применение биометрических устройств для контроля состояния экипажа так же может быть одним из выходов. В разных состояниях паники, растерянности, усталости довольно сильно замедляется реакция, ухудшается координация и т.д. В этом случае перехват управления может быть хорошим выходом. И уязвимостей у этой системы быть не должно. [9]

Сейчас же мы рассмотрим проблему навигации и приближения к объектам. Система позиционирования довольно хорошо облегчает работу летчикам. Если же приближающиеся воздушные суда будут передавать друг другу свои координаты местонахождения, то это будет еще одним каналом, кроме радара и диспетчера для предотвращения столкновения в воздухе или на полосе. Фазированная многодиапазонная курсовая антенная решетка вместе с определенной характеристикой радио-отражателей на летательных аппаратах также может предупредить о столкновении в воздухе. Для этого, конечно, должно быть реализовано определенное соответствующее информационное руководство, которое предупредит летчика и даст информацию в форме рекомендации по действиям для предотвращения данной катастрофы. При сближении с земной поверхностью расстояние до нее контролируется с помощью радиовысотомера, но при посадке же в условиях плохой видимости этого не всегда достаточно. [10] Применение, к примеру, инфракрасных камер определенных диапазонов, расположив на полосе различные нагревающиеся элементы и передавая их изображение на мониторе в пилотской кабине можно достичь весьма существенного повышения

точности посадки. Эксплуатируя радио-отражатели на взлетно-посадочной полосе, волны миллиметрового диапазона, адаптивные передатчики на борту воздушного судна можно построить систему, позволяющую осуществить посадку практически в любых метеорологических условиях и в любое время суток. Разработка программного обеспечения для таких систем — одна из самых сложных задач в конструкции. При работе с железом все более-менее хорошо и наработано, но в этом случае модульность программного обеспечения может быть как достоинством, так и недостатком. В этой сфере авиации множество вопросов, но убедительных и конкретных ответов мало. Это тоже еще одна из причин, по которым создание гибкой и безопасной системы управления летательным аппаратом так долго откладывается.[11]

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2.3. ЖОО студенттеріне арналған 3D-модельдеу технологиясының элементтерін оқытуда пайдалану

Жаннұр Ержанқызы Ержанова

магистрант, Семей қаласының Шәкәрім атындағы мемлекеттік университеті (Семей қ., Қазақстан)

Айжан Сайлаухановна Рысжанова

аға оқытушы, Семей қаласының Шәкәрім атындағы мемлекеттік университеті (Семей қ., Қазақстан)

Қоғамдағы жаһандық ақпараттандыру қазіргі заманғы ақпараттық ортада шығармашылық қабілеті жоғары, сапалы қызметке дайын маман даярлау білім беру жүйесінің басты міндеттерінің бірі болып табылады.

Қазіргі заманға сай кәсіби маман болу үшін мектептегі, жоғарғы оқу орнындағы оқыту бағдарламасында алған білім мен дағдыларын игеру жеткіліксіз, адамдарға талдау жасау, оларды ұйымдастыру, проблемаларды шешу жолдарын және құралдарын табу, топта жұмыс істей білуге, оның іс-әрекеттері мен шешімдерін жауапкершілікке алуға, перспективалы ойлауға, нәтижені болжауға, яғни кәсіптік қызметте кәсіби біліктіліктің жоғары деңгейіне ие маман болуы қажет.

Адамдарды өмірге және ақпараттық қоғамдағы жұмысқа дайындау білім беруді ақпараттандырудың басты мақсаты болып табылады және де ақпараттық технологияларды меңгеру практика жүзінде еркін пайдалануға мүмкіндік береді. Сондықтан, компьютерлік технологияны студенттердің кәсіби бағдарында қолданудың өзектілігі айқын: бұл қоғамды ақпараттандыру үдерісінің жылдам дамуымен байланысты.

Бұл процесс қоғамдық өмірдің интеллектуалдық қызметтің барлық аспектілеріне әсерінің артуымен байланысты және үлкен көлемдегі ақпараттың пайдаланылуына, оны өңдеуді автоматтандыру қажеттілігіне бағытталған болуы қажет[1].

Оқу процесін модернизациялау пассивті жүйеден, яғни қалыпты оқыту тәсілінен, ғылыми-зерттеу қызметіне және тәжірибеге назар аударуға бағытталған белсенді жүйеге өтуге қажет. Қазір жаңа ақпарат пен меңгерілу қажет білім көлемі өсіп келе жатқанын ұмытпауымыз керек, ал оны меңгеруге бөлінген уақыт өзгеріссіз қалуда. Ақпараттандыру процесі оқытушыларға студенттердің білім деңгейін кеңейтуге мүмкіндік береді, бұл өз кезегінде оқытудың жалпы деңгейіне оң әсер етеді.

3D-модельдеу – қазіргі ақпараттық-коммуникациялық технологиялардың ішінде қолданылуы жағынан танымал түрі болып табылады, бұны тек кәсіпқой қолданушы ғана емес, сондай-ақ жаңа пайдаланушыларда еркін меңгере алады. Компьютерлік графикасыз заманауи мультимедиялық бағдарламаларды елестету мүмкін емес [2].

3D-модельдеу арқылы біз мамандандырылған бағдарламалық қамтамасыз етуді пайдалана отырып, заттың 3D үлгісін (немесе үш

өлшемді объект ретіндегі сұлбасын) әзірлей аламыз. Үшөлшемді модель жолдар (Lines) мен қисық беттерді (Curved Surfaces) бір-бірімен байланыстырылған нүктелер (Points) жиынтығы арқылы жасалады. Қазіргі уақытта заманауи 3D пішімдердің, интерфейстің қарапайымдылығы мен ыңғайлылығы, сондай-ақ үш өлшемді модельдеуді практикалық тұрғыдан қолдану мүмкіндіктері кеңейуде [3].

3D-модельдеу элементтерін сабақ өткізуде қолдану студенттердің тәжірибелік сабақтарын жетілдіруге ықпал етеді, ал бұл өз кезегінде техникалық мамандықтарды табысты меңгеруіне әкеледі.

Компьютерлік модельдерді құру студенттердің түсінігін тереңдетіп қана қоймай, сондай-ақ модельдеу саласындағы интеллектуалды дағдыларын дамытуға ықпал етеді және де шығармашылық қабілеттерін дамытуға мүмкіндік береді.

Компьютерлік 3D модельдеу математика, физика және т.б. ғылымдармен информатикаға пәнаралық байланыстарымен сипатталады. Осы сала бойынша толық ғылыми көзқарас қалыптасуы, шығармашылық қабілеттерін дамыту, болашақта білікті маман болу үшін студенттер компьютерлік 3D модельдеу негіздерін меңгеруі, өз білімін арнайы салада қолдана білуі қажет [4].

Студенттің кәсіби құзыреттілігін дамытуда 3D-модельдеуді оқыту мұғалімнің оқу процесіне көптеген білім беру технологияларын қолдануды талап етеді. Олар:

- Білім алушылардың ойлау дағдыларын дамытатын, білім деңгейін кеңейтуге ықпал ететін проблемалық оқыту;

- көп деңгейлі білім беру, оның жүзеге асырылуында мықты студенттер өздерінің қабілеттерін шыңдай түседі, әлсіз студенттер оқуда табысқа жету мүмкіндігін алады, оқытудың ынталандыру деңгейі артады;

- жобаға негізделген оқыту әдістері, студенттердің шығармашылық қабілеттерін дамытуға, кәсіби және әлеуметтік тұрғыдан өзін-өзі анықтауға мүмкіндік береді;

- Оқудың зерттеу әдісі, студенттерге өз бетінше білімдерін толықтыруға, зерттелетін мәселеге тереңірек қарауға мүмкіндік береді және оны шешу жолдарын ұсынады, ол өмірге деген көзқарасты қалыптастыру кезінде маңызды болып табылады. Бұл әрбір студенттің жеке даму траекториясын анықтау үшін маңызды.

Оқу үрдісін ұйымдастыру үшін білім беру процесінің сипаты мен ұйымдастырылуына елеулі әсер ететін ақпараттық технологиялар пайдаланылады, себебі студент пен оқытушы арасындағы қарым-қатынас сипаты өзгереді, кейбір педагогикалық функциялар компьютерге берілді [5].

3D-модельдеуді тиімді оқыту арнайы әдістерсіз және дидактикалық материалдарсыз мүмкін емес, өйткені сабаққа қатысқысы келетіндердің аумағы үлкен және әртүрлі деңгейде болып келеді. Студенттердің әрқайсысына берілген тапсырманы орындауға арналған

егжей-тегжейлі нұсқаулардың болуы әрбір студентке оның қабілеттеріне және оқу жылдамдығына сәйкес, тиімді түрде «жүктеп қоюға» мүмкіндік береді.

3D-бағдарламадағы практикалық тапсырмалар шығармашылыққа негізделген және кеңістіктегі модельдеу элементтерімен жұмыс жасауға мүмкіндік береді. Мұндай сабақтарда төмендегі әдістер қолданады:

- студенттердің компьютерлерде синхронды жұмысы, оның міндеттері: студенттердің білімін нығайту, дағдыларын, компьютерде өз бетімен жұмыс істеу қабілетін қалыптастыру;

- компьютерде студенттерге қажетті тәуелсіз танымдық қызметін ұйымдастыру және қажет болған жағдайда өздік жұмыстарды орындау.

Сабақтың жоғары деңгейін қамтамасыз ету үшін және барлық студенттердің жұмысын жандандыру үшін практикалық тапсырмалар студенттерге дайын 3D модел құруға мүмкіндік беретін толық алгоритмі бар нұсқау түрінде ұсынылады.

Графикалық ортамен танысқаннан кейін, модельдің қозғалысы, айналуы, өлшемін өзгерту, көшіріп алу және басқа да әрекеттерді меңгерген студенттер қарапайым кешенді тапсырмаларды орындап, 3D редакторында қарапайым модельдермен жұмыс істейді, бірақ түсініктемелер мен нұсқауларды пайдалану қажеттілігі әлі жоғалмайды. Оқу үрдісін басқару және студенттің өз бетімен жұмыс жасауын ұйымдастыру арнайы нұсқаулықпен жұмыс жасауын талап етеді. Студент мұндай жеке тапсырма орындау барысында, қажет болған жағдайда нұсқаулықта келтірілген алгоритмге сүйене отырып басқаларға тәуелсіз жұмыс жасауға мүмкіндік алады [6].

Студенттің қолында нұсқаулық болған жағдайда ол әрдайым өз іс-әрекетін бақылап, саналы түрде қателіктерін түзете алады. Бұл әдіс студентке өз іс-әрекетін бақылауда ұстауға, дәйекті, мақсатты түрде әрекет етуге тәрбиелейді. Практикалық жұмыс барысында топ мүшелері объектілерді қалай модельдеуге болатынын, пайда болған проблемаларды шешу жолдары туралы өздерінің жорамалдарын ұсынуға мүмкіндіктері бар. Бұдан басқа, топтық жұмыс басқалармен диалогқа түсуге, өз көзқарастарын дәлелдеуге, кәсіби құзыреттіліктерін қалыптастыруда маңызды болып табылады.

Бұл технология білім алушыларға бұрын алынған білімдері мен дағдыларды пайдаланып, алдына қойылған міндеттерді шеше отырып, тәжірибелік сабақта өз мүмкіндіктерін білдіруінің арқасында білім алу процесін қызықты өткізуге мүмкіндік береді. Мәселені шешу және әдістерді таңдау білім алушылардың өз еркінде қалады. Бұл технология білім беру нәтижесін оңтайландыруға және кәсіби қызметті жандандыруға әкеледі.

3D модельдеу технологиясының элементтерін пайдалану кезінде білім алушылардың кәсіби құзыреттіліктерін табысты қалыптастырудың маңызды факторы дұрыс бағдарламалық қамтамасыз ету болып табылады.

Үшөлшемді компьютерлік графиканы көптеген қолданбаларды пайдаланып жасауға болады. Оларды келесі топтарға бөлуге болады:

- сандық скульптинг бағдарламалары;
- ойынға арналған бағдарлама;
- сұйықтық анимациясын және де текстураны құру сияқты нақты тапсырмаларды орындауға мүмкіндік беретін жоғары мамандандырылған бағдарламалар;
- әмбебап 3D-редакторлар.

Әрине, 3D модельдеу дағдыларын қалыптастыру үшін студенттер жоғарыда аталған бағдарламалардың бәрі қажет, бірақ таңдау әмбебап 3D редакторларының пайдасына жасалған болатын, ол кеңістіктікте ойлау, шығармашылық ойлау мен логиканың дамуына ықпал етеді [7].

Әмбебап 3D редакторлары, әдетте, модельдеу, анимация және визуализация үшін барлық қажетті құралдарды қамтиды.

Бағдарлама таңдағанда келесі факторларға назар аудару қажет. Олар:

- бағдарлама қызметі;
- пайдалану ыңғайлылығы (интуитивті интерфейс және т.б.);
- қол жетімділік, бағасы.

3D модельдеу - үш өлшемді объектілі модель құру процесі. 3D моделдеу міндеті - қажетті нысанның визуалды үшөлшемді бейнесін жасау. Пайдалануға ыңғайлы, түсінікті бағдарламаны таңдау арқылы үшөлшемді модель жасау оңайырақ болады [8].

Осылайша, осы тәжірибе барысында 3D-модельдеу технологиясының элементтерін пайдаланудың оңтайлы шарттары студенттердің кәсіби құзыреттіліктерін қалыптастыруға мүмкіндік береді.

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SECTION III / СЕКЦИЯ III

SOCIETY AND PERSONALITY / ОБЩЕСТВО И ЛИЧНОСТЬ

3.1. Developing Speaking Skills Using English Language Movies

Nazym B. Kydyrbayeva

Korkyt Ata Kyzylorda State University, graduate student,
the Faculty of Philology, History and Law
(Kyzylorda, Kazakhstan)

Salima I. Sadybekova

Korkyt Ata Kyzylorda State University,
Candidate of Philological Sciences, assistant professor
(Kyzylorda, Kazakhstan)

Speaking is crucial skills necessary for effective communication in any language throughout the world. English language is widely used for communication and the competence in English is considered as an added potential. The ability to speak in English fluently internationalizes the outlook of the people in comparison to the other languages used for communication. English is the language of the international business, technology, science and travel and the ability to speak in English is kind of a linguistic power according to the linguist Kachru [1]. In Kazakhstan context of teaching English language, the majority of the teachers are non-native. Most of the non-native teachers may see themselves as inadequate models for developing speaking. The main purpose of this article is to use English language movies as authentic materials to enhance the speaking skills of junior school pupils. English language movies as authentic materials are possible to use to boost the confidence of the pupils to enhance the communicative skills. Watching English language movies help the students learn English phrases can be used in real life situations, improve vocabulary, catch authentic language, learn sentence patterns and become familiar with the different accents of native speakers, opportunities to listen to correct pronunciation and intonation patterns. Other than these benefits some websites mention that the visuals are more effective to the learners to listen to the language expressions and facial expressions and gestures helping the learners to focus on the verbal messages. Subtitles of the movies are useful in developing listening skills. Use of English language movies in ESL classrooms is a refreshing learning experience for pupils when compared with the techniques like rote learning of English vocabulary and drill practices as the movies are valuable resources with colloquial English in real life context and teachers can be used movies to develop the speaking and listening skills of learners making them more autonomous learners.

The use of movies in English foreign learning makes learners more attractive and motivated to learn. The use of movies can be an entertaining

and motivating tool also for learners with different skill level. Movies provide the learners with real life language effort, which may be difficult to receive otherwise in a non-English speaking environment. In addition, according to many previous studies there are several reasons to use movies in foreign language teaching. Some of these reasons are authenticity, the quality and amount of input provided by movies and the several positive effects those movies have on language learning, for instance; the exposure to foreign language and the entertaining aspect of films which also affects student's motivation [2].

Movies can be considered as authentic materials that are applied in classroom and they provide the learners in a situation, that they may find themselves with real learning [3]. In addition, the real learning supports the learners to recognize that there is a relationship between the simple traditional classroom teaching and the real world. Therefore; the foreign language is utilized in real daily life situations outside the classroom [4].

Using films in EFL teaching may seem to be irrelevant, and some teachers may think that using films is too time-consuming. Moreover, films are quite often used as a light stimulation in the beginning of a lesson or in the end of it. In addition, teachers do not necessarily consider the film as a proper teaching resource, since it may be seen only as entertaining and not as educational. However, Stoller [5] mentions that some teachers have at first commented on technical difficulties associated with using films and film equipment, but on the other hand have agreed that films enhance the study of culture as well as English language skill development. Using films has brought authenticity, variety, reality and flexibility into EFL classrooms.

Allan [6] also highlights the realistic examples that the films enable. Combining both audio and visuality makes film a comprehensive tool for language teaching. The visuality also supports the students: it helps learners by supporting the verbal message and provides a focus of attention while they listen.

To sum up, the learners who are studying English in a non-English speaking environment, it is very important to experience real communicative situations in which they will learn how to express their own views and opinions, and to develop their oral fluency and accuracy which are very essential for the success of FL communication. Using English Language movies aid due to the effectiveness into speaking skills and motivating factor to develop the speaking skills and communication ability comes from the belief that movies are usually conceived in a format that holds the interest of the most students.

There are given a list of movies and serials which can be used at FL lessons. [7]

Beginner	Elementary	Pre-intermediate	Intermediate	Upper
The Jungle Book	Extra	Here & There	The Lion King	The Ghost Writer
Forrest Gump	Mulholland Drive	The Black Cauldron	The Flat mates	Fargo
	Groundhog Day	Addams Family Values	The Others	Breaking Bad
	The Lake House	Matrix	Alf	Pulp Fiction
	The Social Network	Charlie and the Chocolate Factory	The Simpsons	Pirates of the Caribbean: The Curse of the Black Pearl
	The Holiday	A Most Violent Year	Harry Potter and the Sorcerer's Stone	One Flew Over the Cuckoo's Nest
	Indecent Proposal	The Terminal	Harry Potter and the Chamber of Secrets	One Flew Over the Cuckoo's Nest
	My Big Fat Greek Wedding	Miracle on 34th Street	Just Married	Billy Madison
		Snow White	Home Alone	House MD
		Cinderella	Twins	Pirates of the Caribbean
		Any Walt Disney Movies	Two Weeks' Notice	

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3.2. Әр қайсысына педагог: инклюзивті білім – шетелдік және отандық тәжірибе

Бибигуль Амангельдиновна Дюсенбаева

докторант. Абай атындағы Қазақ ұлттық педагогикалық университет
(Алматы қ., Қазақстан)

Айзат Нүркеновна Кельдегулова

М. Козыбаев атындағы Солтүстік Қазақстан мемлекеттік университеті
аға оқытушы (Петропавл қ., Қазақстан)

Инклюзивті білім қазіргі әлемдегі танымал және кең таралған білім парадигмаларының бірі болып табылады. Алайда, педагогикалық тәжірибені бір елден екіншісіне ауыстыру туралы мәселе Ресейде де, шетелде де білім беру жүйелерін жаңғырту кезеңінде айрықша маңызды болып табылады және арнайы зерттеулерді қажет етеді.

Заманауи білім беру жүйесі жалпыға бірдей бағдарламаға сәйкес оқуға және академиялық жетістіктердің нәтижелерін көрсетуге қабілетті арнайы білім қажеттіліктері бар балаларға ғана арналған, олар бәріне бірдей қалыпты болып табылады. Нәтижесінде, жалпы білім беру үдерісінен арнайы білім беру қажеттіліктері бар балалар «жалпы білім беру үдерісінен» шығып қалады, өйткені жалпы білім беретін оқу орындарының педагогикалық ұжымы түзету және арнайы педагогика саласында олармен жұмыс істеуге қажетті білімі жоқ. Қазіргі заманғы мектептегі осы және басқа да көптеген мәселелер инклюзивті білім беруді дамытуға арналған [1].

Халықаралық тәжірибеде ерекше қажеттіліктері бар адамдарда дамып келе жатқан жетіспеушіліктерді еңсеруді үйрететін, оқытатын және айналысатын маманның кәсіби қызметінің мазмұнына екі тәсіл бар. Мұғалімдерді оқыту стандарттары ел арасында айтарлықтай өзгереді және жиі дұрыс емес. Жоғарғы оқу орындарындағы мұғалімдерді оқыту орта мектепте жұмыс істеу үшін арнайы білім беру қажеттіліктері бар оқушыларды тиімді қолдана алатын сенімді, білімі мен дағдылары бар мамандарды сирек дайындайды.

Ресей, Беларусь, Қазақстан, Украина, Германия, Австрия, Венгрия, Болгария, арнайы ағартушы (мұғалімі-терапевт, *surdopedagogs*, *tiflopedagog*, *oligophrenopedagogs*, логопед мұғалімі) қызметі, жатады: Шығыс Еуропа және (Балтық қоспағанда) бұрынғы кеңестік блоктың елдерінде оқытушылық қызметке. Батыс Еуропа мен Американың көптеген елдерінде «арнайы мұғалім» педагогикалық лауазымға тағайындалды. Бұл ережелер 2008 жылғы Халықаралық стандарттық кәсіптер классификациясында (ISCO-08) ұсынылған (Халықаралық стандартты кәсіптердің жіктеуі 2008 (ISCO-08)).

Инклюзивтік білім беру (француздық «инклюсиф» - оның ішінде «қамту» деген француз сөзінен - қорытынды жасаймын) - жалпыға бірдей білім беруді дамыту процесі, ол барлық адамдарға, оның ішінде

ерекше қажеттіліктері бар балаларға арналған білімге қол жеткізуді білдіреді. Инклюзивті білім берудің негізі - бұл балаларға қатысты кез-келген дискриминацияны жоққа шығаратын идея, бұл барлық адамдарға тең деп қарастырылады, сонымен бірге арнайы білім беру қажеттіліктері бар балалар үшін қажетті жағдайлар жасайды [2].

Әлемнің көптеген елдерінде арнайы білім беру қажеттіліктері бар адамдарға көмектесу үшін жақсы дайындалған және мотивацияланған мұғалімдер жоқ. Бұған бұқаралық ақпарат құралдарында ерекше қажеттіліктері бар балаларды қабылдау мен оларды қабылдау, олардың қатысуын және инклюзивті сыныптағы барлық балалардың нақты жалпы білім жетістіктеріне жетуіне үлкен ықпал етеді. Екінші жағынан, арнайы оқытылған мұғалімдердің жетіспеушілігі жалпы білім беретін мектептердегі маргиналдық топтардан шыққан балаларды оқытуға зиян тигізбеуі мүмкін.

Мұғалімдер арнайы білім беру қажеттіліктері бар балаларды оқыту кезінде арнайы педагогика мен психология саласындағы мамандардың білімі мен қолдауын жиі білмейді.

Мұғалімдерді даярлаудың ұлттық стандарттары ел бойынша айтарлықтай ерекшеленеді және жиі дұрыс емес. Жоғарғы оқу орындарындағы мұғалімдерді оқыту орта мектепте жұмыс істеу үшін арнайы білім беру қажеттіліктері бар оқушыларды тиімді қолдана алатын сенімді, білімі мен дағдылары бар мамандарды сирек дайындайды. Соңғы зерттеулер ағымдағы жағдайды жақсартудың бес негізгі стратегиясын анықтады. Әрбір мемлекет бұқаралық мектептерде арнайы білім қажеттіліктері бар балаларға «қосу», яғни, енгізу мәселелеріне қатысты мәселелерді шешуге міндеттенеді [3], [4].

Шет елдерде ерекше қажеттіліктері бар балаларға арналған арнайы білім беру жүйесі оның ерекшеліктері мен тұжырымдамаларын көрсетеді. Осылайша, Құрама Штаттарда және Канадада бұқаралық және арнайы білім берудің бірігуі болды. Бұл елдерде ерекше қажеттілігі бар адамдарға білім берудің тәсілдері бар, олар баланың қалауы мен қабілеттеріне негізделген жеке жоспарлауды, сондай-ақ, жалпы білім беретін мектептерде мүгедектігі бар балаларды «қамтуға» мүмкіндік береді. Заңнамалық деңгейде арнайы білім беру қажеттіліктері бар адамдар айтарлықтай қолдау көрсетеді. Мұғалімдер мен басқа да мамандардың дайындығы мәселесі іс жүзінде жоқ [5, 6].

Мексикада енгізу мәселелері бойынша жетекші рөл жалпы білім беруді қолдау қызметтеріне (USER - тұрақты білім беру бойынша қызметтерді қолдау тобы) және көп функциялы орталықтарға (MACs - көп назар аударатын орталықтар) тиесілі. Инклюзивті білім беруді жүзеге асыруға арналған Мексикадағы білім беру бағдарламасы ата-аналарға немесе қамқоршыларға, сондай-ақ арнайы білім беру қажеттіліктері бар балалармен жұмыс істейтін негізгі білім берудегі мұғалімдерге бағытталған. Мексика болашақ мұғалімдерді білім берудің барлық деңгейлерінде, бастауыш деңгейден бастап университеттегі

білімге дейін инклюзивті білім беру үдерісінде жұмыс істеуде жетекші орынға ие. Еуропалық елдердің басым бөлігі инклюзивтік білім берудің дамыған жүйесі бар. Әрбір ел қосымша білім беру қажеттіліктері бар балаларға арналған іс-қимыл бағдарламасын анықтады, мысалы, 2004 жылы Біріккен Корольдікте ерекше қажеттіліктері бар балаларға қажетті көмекке жол бермеу және оларға уақытылы көмек көрсету мақсатында әрбір Балалар ісі (ЕКМ) атты құжат әзірленді. білім беру қажеттіліктері [8]. Финляндияда Ұлттық стандартта бекітілген бірыңғай білім беру бағдарламасы бар және оқыту «Барлығы үшін мектеп» принципі бойынша жүзеге асырылады [9].

Батыс елдерінің бәрі де жеткілікті түрде оқытылған оқытушылар емес, яғни инклюзивтік білім беруде мұғалімдердің дайындық мәселесі маңызды және өзекті болып қала береді. Мысалы, мемлекет деңгейінде енгізу үдерісінің минималды үйлестірілуіне байланысты елде үлкен айырмашылықтар болған Италияда, мұғалімдерді интеграциялау үшін жеткіліксіз деңгей, тіпті арнайы мектептердің жүйесін жаңғырту мәселесі де туындайды [10].

Швецияда инклюзивті білім беру мәселесі бойынша мұғалімдердің қолы жетпейтіндігі мен тәжірибесі болмағандықтан, жалпы білім беретін мектептерде интеграцияланған білім беру барлық мүдделі тараптардың қажеттіліктерін қанағаттандырмайды [11].

Норвегияда мұғалімдердің қосылуға дайын екендігі туралы айтатын болсақ, мұғалімдер мен ата-аналар арасындағы белгісіздікті атап өтуге болады [12].

Азия елдерінде мүмкіндігі шектеулі балаларды тәрбиелеу бойынша белсенді жұмыс жүргізілуде. Мысалы, Үндістан Мүгедек балаларды оқыту жобасы әзірледі, ал Вьетнамда инклюзивті білім берудің ұлттық жобасы бар. Бұл елдерде инклюзивтік мектептер арнайы мектептермен қатар жүреді. Үндістанда инклюзивті сыныпта жұмыс істеу үшін мұғалімдерді оқыту маңызды мәселе болып табылады, бұл білім беру стратегиясын басқаруға студенттік бағдар беру. Вьетнамда мұғалімдерді оқыту бойынша «педагог кадрларды даярлау бағдарламасы» жүзеге асырылуда, елде негізгі оқытушылар мен жаттықтырушылар түрінде арнайы білім беру қажеттіліктері бар балалармен жұмыс істейтін мұғалімдерге жақсы дамыған жүйе бар; инклюзия саласында мұғалімдерді жүйелі түрде дайындаудан өту [13].

Алайда, 1996 жылдан бастап, Өзбекстан мүгедектігі бар балаларды жалпы білім беру үдерісіне біріктіру бойынша жұмыстар жүргізіп келеді. Балалар мекемелерінің сапалы жұмысын қамтамасыз ету үшін оқытуды ұйымдастыру үшін көп нәрсе жасалды.

Осылайша, ерекше қажеттіліктері бар балалардың инклюзивті білімін енгізу және енгізу процесі бүкіл өркениетті әлемді қамтиды. Әлемнің әртүрлі елдерінде инклюзивті білім беруде арнайы мұғалімді даярлаудың отандық және шетелдік тәжірибесін ескере отырып, мұғалім нақты әлеуметтік-мәдени және әлеуметтік-экономикалық

жағдайларды, елдердің саяси бағдарлануын, білім беру дәстүрлерін ескере отырып, жалпы білім беру жүйесіне үйретілген деп қорытынды жасауға болады.

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3.3. Үштілділік – болашаққа сенімді қадам

Әсел Дәуренбекқызы Бижанова

Магистрант, Қорқыт Ата атындағы Қызылорда
мемлекеттік университеті (Қызылорда, Қазақстан)

Қазіргі кезде қазақстандық жоғары білімге деген көзқарас түбегейлі өзгеруде. Бұл көптеген себептерге байланысты, ал ең бастысы - 2030 жылға дейінгі Қазақстанды дамыту бағдарламасы [1]. Елбасы Нұрсұлтан Назарбаев өзінің 1998 жылғы Жолдауында елдің жетістіктері мен проблемаларын баяндап, 2030 жылға дейінгі кезеңде ел дамуының басымдықтарын жариялады. 2007 жылы Мемлекет басшысының «Жаңа әлемдегі жаңа Қазақстан» Жолдауында [2] Қазақстан Республикасының Президенті Нұрсұлтан Назарбаев елдің және оның халқының бәсекеге қабілеттілігін қамтамасыз ету үшін мәдени бағдарламаны бірте-бірте жүзеге асыру керек деп мәлімдеді. Бұл міндетті қазақ тілін ресми тіл ретінде дамыту, орыс тілін коммуникация тілі және ағылшын тілін жаһандық экономикаға табысты интеграциялау құралы ретінде қолдану керек.

Содан бері үштілділік басты елдің мәдени бағдарламасы ретінде жүзеге асырылды. Алайда көптілділік тұжырымдамасы кейінірек ел үшін жаңа болмағанын атап өту керек. Қазақстан көп жылдар бойы елдің түрлі халықтары тілдерін үйренуге басымдық беріп келеді. Мектептерде, кәсіптік лицейлерде және жоғары оқу орындарында білім беру қазақ және орыс тілдерінде жүргізіледі. Сонымен қатар, барлық оқу орындарында шетел тілдері оқытылды. Бұл Қазақстандағы тілдік білім берудің қалыптасуы мен үш тілде білім беру үрдісі пайда болғаны туралы айтады. Дегенмен, қазақстандық білім беру мекемелері көптеген тілдерде оқытылатын тілдерде жақсы тіл біліктілігін қамтамасыз етпеді, сондықтан тіл үйрету мен оқытуға жаңа көзқарас енгізу қажет болды. Қазіргі бағдарлама қазақстандық білім берудің әлемдік деңгейде бәсекеге қабілетті болуына, үздік әлемдік университеттерге түсуге, ұялы және өмірдің барлық түрлерін үйренуге мүмкіндік беруі үшін жоғары сапалы болуға тиіс. Мұны жасай отырып, жоғары моральдық құндылықтармен және ұлттық ерекшеліктерімен үйлесімді адамның, дүниетанымдық мол адамның дамуының маңыздылығын ұмытпау керек [3].

2012 жылы Қазақстан Республикасының Білім және ғылым министрлігі мен бірнеше жоғары оқу орындары көптілді білім беруді енгізу бойынша эксперимент жасаған бірнеше тілде білім берудің қазіргі заманғы жағдайы мен мүмкіндіктері туралы көптілді білім беруді дамыту тұжырымдамасын әзірледі [4]. үш тілді оқытуды енгізу талданды және үш тілде білім беруді дамытуда басымдықтар айтылды. Тұжырымдама тіл білімінің мазмұнын шолуды, қазақстандық білім беру мекемелерінде тілдерді оқытудағы жаңа стратегияны, сондай-ақ ғылыми негізделген

және жалпы үштілді оқыту бағдарламасына сәйкес келетін тілдік мазмұнды талап етеді.

Бағдарламаның негізгі мақсаттарының бірі - үш тілде білім беру бағдарламалары бойынша курстар өткізуге қабілетті университеттің оқытушылары; қазақ тілін қолданудың беделін арттыру; Қазақстандағы тілдік әртүрлілік жүйесін қолдау; коммуникативтік салада орыс тілінің жұмысын қамтамасыз ету; Ағылшын және басқа да шет тілдерін оқытуға жүйелі ғылыми-әдістемелік қамтамасыз етуді қамтамасыз ету; көптілді білім беру инфрақұрылымын дамыту; тілдік білім берудің мәдениетаралық құрамын дамыту; және өз халқының мәдени құндылықтарымен таныстыру арқылы Қазақстандағы интеллектуалды өсуді қамтамасыз ету.

Қазақстандық үштілділік жүйесіндегі білім беру принциптері:

$\frac{3}{4}$ Қазақ - орысша - ағылшынша;

$\frac{3}{4}$ тілдер бөлек оқылады;

$\frac{3}{4}$ Тілдерді үйрену ана тіліне негізделген;

$\frac{3}{4}$ Шет тілін үйрету - шет тілінде ойларды білдіру, оның мәдениетін үйрету;

$\frac{3}{4}$ Үштілді тұлғаны дамыту;

$\frac{3}{4}$ Өңдеуді дамыту алгоритмі: субвокализация - ауызша сөйлеу - жазбаша сөйлеу; [5].

Осылайша, қазіргі уақытта білім беру мекемесінің маңызды міндеті - оқушылардың жаһандық мәдени құндылықтарды үйрету, оларды жаһандық деңгейде басқа мәдениеттердің адамдарымен сәтті байланысуға және өзара әрекеттесуге мүмкіндік береді. Шетел мәдениетін, тарихын, географиясын, әдебиетін, өнер және ғылымын оқыған студенттер өз мәдениетін және тілін жақсы түсінеді. Тілдік және шет тілдерін өзара байланыстыратын оқыту мен зерттеу тәжірибесі оның тұлғаның үйлесімді дамуына әсерін дәлелдейді [6].

Қазақстандық жоғары оқу орындарында үш тілде білім беруді енгізу тактикасы:

1. Үштілді оқыту бағдарламаларын іске асыру бойынша нормативтік құқықтық актілерді әзірлеу;

2. Үш тілде білім беру бағдарламалары бойынша мұғалімдерді оқыту тренингтері;

3. Үштілді оқытуға бейімделетін әлемдік тәжірибені пайдалану;

4. Тілдерді оқытудағы стандарттарды дамытатын орыс және қазақ тілдерін оқыту және оқытудың ұқсас модельдерін әзірлеу мақсатында шет тілін оқытудың және оқытудың деңгейлік моделін қайта қарау.

5. Үштілді оқытудың ұлттық үйлестіру орталығын құру [5].

Бағдарламаның кейбір нақты нәтижелерін айтуға болады. Білім және ғылым министрлігі терминдердің үш тілдік сөздіктерін (ағылшын-қазақ-орыс), оқулықтарды, жұмыс кітаптарын басып шығаруға ықпал етті; ол мемлекеттік білім беру мекемелерінде мұғалімдерді кәсіби даярлау және қайта даярлау жөніндегі республикалық бюджеттік

бағдарламаның орындалуын бақылайды. Болон процесінің принциптерін қазақстандық жоғары білім беру жүйесінде жүзеге асыру бақыланады, ол негізгі жетістіктер мен кемшіліктерді айқындауға және жетілдіру стратегиясын жасауға мүмкіндік береді. Үштік тілін дамытудың аймақтық бағдарламалары әзірленді. Жоғары оқу орындарының қазақстандық және шетелдік ұйымдармен, кәсіпорындармен және оқу орындарымен байланыстары күшейтілді. Жоғары оқу орындарында ағылшын тілінде оқытылатын оқытушылар мен профессорлардың саны қарқынды өсіп келеді. Көптеген студенттер академиялық мобильділікке және шетелде жұмыс бағдарламаларына қатысады. Университеттерде үштілді оқытуда университеттік саясатты үйлестіретін, үш тілде мамандарды даярлау мен біліктілігін қамтамасыз ететін үш тілде білім беру орталықтары құрылды. Қазақстанның бірнеше мектептері мен жоғары оқу орындары үштілді оқыту бағдарламаларын және ағылшын тілінде оқытылатын бірнеше интеграцияланған курстарды жасады. Жаңа мектеп оқулықтары алты тілде: қазақ, орыс, йигур, өзбек, түрік және неміс тілдерінде жарияланады. Қазақстандық жоғары оқу орындарында үш тілдесуді жүзеге асыру «Ұлттың бес институтты реформалау жоспарын іске асырудың жүз қадамы» (20.05.2015) [7] және 2015-2016 жылдарға арналған үш тілде білім беруді жетілдіру жоспары 30 қазан, 2015 [8].

Үш тілді оқыту тұжырымдамасы өңірлік деңгейде жүзеге асырылуда. Бағдарламаның үш кезеңі бар. Бірінші кезеңде (2015-2016 оқу жылы) ағылшын тілінің сабақтарының саны көбейтіледі және 10-12 студенттің академиялық топтары құрылады. Облыстың барлық орта мектептері ағылшын және қазақ тілдеріндегі оқулықтар мен оқу-әдістемелік материалдарды пайдалана бастайды. Екінші кезең (2016-2017 оқу жылы) география, биология, физика, математика және т.б. пәндері бойынша ағылшын, қазақ (орыс тілінде оқитын орта мектептер үшін) және орыс тілінде (қазақ тілінде оқитын орта мектептер үшін) . Ағылшын, қазақ (орыс тілінде оқитын студенттер үшін) және орыс тілі (қазақ тілінде оқитын студенттер үшін) мұғалімдеріне жоғары бітіру деңгейін қамтамасыз ететін бонустар жүйесі енгізіледі. 2017-2018 оқу жылының соңғы сатысы A1, A2, B1 [9] еуропалық стандарттарына сәйкес ағылшын, қазақ және орыс тілдерінде төрт тілде оқитын студенттердің коммуникативті құзыреттілігін бағалауды енгізуді болжайды. Бағдарлама Британдық Кеңес пен Назарбаев Университетінің қолдауымен және ағылшын тілінің 79 оқытушысы жұмыс істейтін ағылшын тілінің мұғалімдеріне арналған үш оқу орталығын құруды қарастырады.

Үш тілде білім беруді жүзеге асырудағы жетістіктерді бағалай алмайсыз, алайда, мақсаттардың орындалуына кедергі келтіретін кейбір нәрселер бар, олардың бірі Болон принциптеріне сәйкес жоғары білім беруді өзгерту болып табылады. Болон процесі және академиялық ұтқырлық орталығының [10] SWOT-талдауы мемлекет Болонның саяси

және білім беру мақсаттарына қолдау көрсететіндігі, магистратура мен аспиранттар бағдарламаларының мазмұны Болон процесі Қазақстанның көптеген ЖОО-ларында білім беру бағдарламалары еңбек нарығына және қоғамның қажеттіліктеріне сәйкес өзгертіледі, халықаралық байланыстар мен шетелдік жоғары оқу орындарымен әріптестік қарым-қатынасты дамытуға, сондай-ақ еуропалық білім беру және ғылыми-зерттеу мекемелеріне қолжетімділікті қамтамасыз етеді. Болон процесі қазақстандық жоғары білім беру жүйесіндегі инновацияларды күшейтеді, бірақ процесті қазақстандық университеттерде Болон принциптері мен параметрлерін енгізу, университеттер мен қоғамның өзара қарым-қатынасы төмендігі, қазақстандықтар арасындағы айырмашылықтар туралы әдістемелік және ұйымдастырушылық қолдаудың жеткіліксіздігі мен процедураларға кедергі келтіреді. және еуропалық білім беру жүйелері, оқушылардың еркін академиялық ұтқырлығы туралы ереженің жоқтығы және шетелдік жоғары оқу орындарымен тиімді ынтымақтастықты қамтамасыз ететін бірнеше білікті мамандар бар. Бұдан басқа, қазақстандық академиялық қоғамдастық Болон процесіне және оның тұжырымдамасына сәйкес жоғары білім беру жүйесіндегі өзгерістер туралы жақсы хабардар емес. Жағдай шетелдік жоғары оқу орындарында Болон принциптерін енгізуді үнемі қадағалайтын институттардың жоқтығынан нашарлады. Сондықтан елдегі үш тілде білім беруді дамытуға ықпал ететін қазақстандық студенттердің академиялық ұтқырлығы жағдайын жақсарту үшін Болон принциптерін іске асыру жеделдетіп, ҚР Білім және ғылым министрлігінің деңгейінде жүйелі түрде жүргізілуге тиіс. Қазақстан Республикасының ғылымы, бірақ университет деңгейінде. Университеттерге «Бес институтты реформалау жоспарын іске асырудың жүз қадамында» ұсынылған автономия берілсе ғана жүзеге асырылатын болады деп ойлаймыз.

Үш тілде білім беру бағдарламалары бойынша курстарды әзірлеу мен дамытуда нақты мәселе білім беру бағдарламасының аяқталуында үш тілде маман болуы керек дағдылар мен біліктілікке қатысты нақты талаптар болмаған. Бұл бос орынды толтырмай, бағдарламаның кез-келген бағытын дұрыс жобалау мүмкін емес. Бағдарламаның әлеуметтік және ұйымдастырушылық аспектілерін іске асыруға жауапты адамдардың назарын одан да алаңдату қажет. Біз адамдарға тіл үйренуге ынталандырудың маңыздылығын, әлемдік жетекші университеттермен тығыз байланыстар орнатуды немесе ағылшын тілінің мұғалімдеріне арналған кәсіби даму бағдарламаларын қамтамасыз етудің қажеттілігін жоққа шығара алмаймыз, алайда әдіснамасы дұрыс болмаса, көптеген күш-жігер жұмсалуды мүмкін. Мұнда әлі де көптеген мәселелер шешілуде, олардың біреуі тілдік тұлғаның дамуымен көрінеді. Шет тілін меңгерудегі көптеген қиындықтар ана тілінде тілдік дағдыларды дамытудың жеткіліксіздігімен байланысты. Тілді меңгерудің бастапқы кезеңінде фонетикалық

дағдыларды дұрыс меңгеру өте маңызды, яғни фонемалық есту, сондай-ақ сөздік талдау мен синтезге байланысты. Олай болмаған жағдайда, бұл орфографиялық қателіктердің көбеюіне, оқуға және жазуға үйрену қиындықтарымен ғана туындаған кезде ғана емес, сонымен қатар оқитын шетел тілінде де болады. Сол сияқты, сөздік сөздіктің төмендігі, комбинаторлық потенциалда білімнің жетіспеушілігі, сөздердің стилистикалық стратификациясы және сөздікті құру адамның сөйлеуге және жазуға қабілетті кез келген тілде дұрыс сөйлеу қабілетін шектейді. Өз ана тілінің құрылымын нашар білу адамның ана тілінде өрескел қателіктерге әкеліп қана қоймай, шет тілінің оқу грамматикасын және, демек, шет тілінде сөйлеу мен жазуды дамытуға өте қиын. Кейде бұл іс жүзінде мүмкін емес, себебі ана тілінің құрылымы туралы білімнің жетіспеушілігі тілдік кедергіге әкеледі, ол өтеле алмайды. Жоғарғы оқу орындарында жиырма жыл бойы оқытушылық тәжірибе бірінші курстарда оқитын тілдің өз тілінде де, ағылшын тілдерінде де айтарлықтай төмендеуін көрсетті, олар мектеп бағдарламасының өзгергеніне байланысты болуы мүмкін. Біздің ойымызша, Қазақстанда үш тілді оқыту бағдарламасын сәтті жүзеге асыру тек ана тілін мұқият оқып-үйрену кезінде ғана мүмкін болады. Қарастыруды қажет ететін тағы бір мәселе - қазақ, орыс және ағылшын тілдеріне арналған оқу-әдістемелік материалдар. Қазіргі уақытта жаңа тілдік оқулықтарды әзірлеуге тырысқан кезде, тәрбиешілердің көбі ең жақсы сатылатын оқу курсының құрылымы мен мазмұнын көшіру үрдісіне бейімделеді, олардың көпшілігі өздерінің ана тілін ескере отырып жасалмаған оқушылар, грамматиканы алу процесін қиындатады. Тәжірибе көрсеткендей, жоғары сапалы Longman, Oxford University Press және McMillan оқулықтарымен (A1, A2, B1, B2 деңгейлері) оқитын университеттің студенттері күнделікті лексиканы жақсы меңгеріп, тыңдаудың жеткілікті деңгейін алады, бірақ олардың грамматикалық дағдылары дұрыс қалыптаспаған. Осылайша, шет тілін оқытуды және әлемдік тәжірибеден оқытуды үйрену қажет, бірақ біздің елде тіл үйренудің мақсаттарын, отандық, қазақ / орыс тілдерінің ерекшеліктерін, оқушылардың тілдерін есте сақтаған жағдайда ғана қажет. қазірдің өзінде бар әлемдік тәжірибені пайдалану, бірақ оны өршіл мақсаттарға сәйкес жақсарту.

Тағы бір қиындық - интеллектуалды курстарды жобалау және дамыту, бұл тек жақсы тіл біліктілігін ғана емес, сонымен қатар тілдік дағдыларды қалыптастыруда қолданылатын оқыту әдістерін де талап етеді. Сондықтан интеграцияланған курстар өткізетін мектеп және жоғарғы оқу орындарының оқытушылары шетел тілін үйретудің тілінде де, әдістерімен де оқытылуы керек, өйткені бұл тілдік интеграцияланған курсты тиімді етудің жалғыз жолы. Бұл қазақстандық ұстаздардың алдында тұрған көптеген қиындықтар ғана, бірақ мемлекеттің қолдауы, жоғары оқу орындарының автономиясы және педагогтардың біліктілігі

Қазақстан Республикасында үш тілде жоғары білім беруді жүзеге асыруға көмектесетініне үміттенеді.

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SECTION IV / СЕКЦИЯ IV

GREEN WORLD / ЗЕЛЕНЫЙ МИР

4.1. A Study on Locations of Death and Factors Associated with Death among Cancer Patients in South Korea

Yong Joo Rhee^{1,2}, Yoon-Hee Tae³, Yong Joo Lee⁴, Soomok Jang³,
Joachim Cohen⁵, Young-Soon Choi³

¹Department of Health Sciences, Dongduk Women's University
(Seoul, South Korea)

²Department of Psychiatry and Behavioral Sciences, Feinberg School of
Medicine, Northwestern University (Chicago, Illinois, USA)

³National Health Insurance Service
(Wonju, Kangwon-do, South Korea)

⁴Department of Palliative Medicine, Seoul St. Mary's Hospital, College of
Medicine, The Catholic University of Korea, Banpo-daero, Seocho-gu
(Seoul, South Korea)

⁵Vrije Universiteit Brussel (VUB) & Ghent University, End-of-Life Care
Research Group (Brussels, Belgium)

Abstract

Background: Location of death has been used to examine an indicator for good death. This study aims to examine location of death among patients with three major cancers (gastric, liver, and lung) and other factors associated with location of death in South Korea. *Methods:* We selected the medical and pharmacy claims data for health services and location of death among the 42,596 decedents with cancer (lung 16,632, liver 15,872, gastric 10,092) from 2009 to 2013. We used logistic regressions to identify factors associated with home death. Outcome measures are locations of death (hospital, outpatient clinics or emergency room and home). *Results:* Only 8.9% died at home whereas 46.5% died in hospital as inpatients. Patients with more than one comorbid cancer or receivers for any supportive care were significantly more likely to die in hospital. Female and younger than 55 years old liver cancer patients were associated with home death. Patients living in metropolitan area, or paying more insurance premium, or being public aid beneficiaries, were associated with home death. *Conclusions:* The supportive care service use prior to death was significantly associated with increasing odds to hospital death. Being older than 75, or having multiple cancers was significant factors associated with hospital death, whereas living in metropolitan area, lower income or emergency visit were significant factors with home death. These findings are opposite to what is found, as the palliative care and hospice is predominantly hospital-centered. The findings emphasize a need to available end-of-life care in community for dying patients.

Keywords: Supportive Care, Location of Death, National Health Insurance Program (NHI), Cancer, End-of-Life Care

1. Introduction

A death at home has been considered as a significant outcome and a "good death" in a large body of research in end of life care [1] [2] [3] [4] [5] due to better quality of care [2] [6] and autonomy [3] [5] [6]. The main body

of literature shows that people prefer to die at home [5] [7] [8] [9] irrespective of their health conditions and living arrangements prior to death [7] [8].

Several studies have suggested that palliative care provision may improve the chances of people to receive care in the final days outside hospital or at home and to die there [8] [10] [11] [12] [13]. Cancer patients are more likely to receive hospice and palliative care compared to other dying patients, both in hospital settings and at home, and their chances of achieving a chosen home death are better [14] [15] [16] [17]. Also, hospice and palliative care use were associated with home death for cancer patients in European countries [1] [11]. However, South Korea has a different situation. The majority of hospice and palliative care is being provided in hospital in South Korea, and this may be one of the explanations for the relatively high rate of hospital deaths (87.2%) among cancer patients in South Korea [18]. If the hospital-focused development of palliative care in South Korea is indeed an explanation for the large proportion dying in hospital [19], this could also imply that those cancer patients get a supportive type of care at the end-of-life, which can include use of services such as hospice and palliative care and die so in the hospital rather than at home [20].

This study, therefore, aims to examine location of death use among patients with three major cancers (gastric, liver, and lung) and its association with home death in South Korea. These three cancers have been reported as the three major cancers for causes of deaths which took up over half among all cancers in South Korea [20].

This study has the following research questions:

- 1) What is the prevalence of home death among patients with three major cancers in South Korea?
- 2) What other factors are associated with home death among patients with three cancers in South Korea?

2. Methods

2.1. Data and Study Cohort

This study used medical and pharmacy claims data from the National Health Insurance (NHI) of decedents in 44 tertiary general hospitals from January 1st, 2009 to December 31, 2013 in South Korea. The dataset included all medical and pharmacy claims for health services uses and eligibility information of gender, age and insurance premium level. The National Health Insurance Service (NHIS), the single public payer, has full authority to access all deaths for all citizens through the electronic claims dataset system in South Korea.

Among the initial records for all 84,462 deaths, we developed the analytic dataset for this study limiting cases were diagnosed and died of the major three cancers: gastric (C16), liver (C22), or lung (C34) cancers as a primary cause. The initial claims data were then used to identify decedents diagnosed with these three cancers as a primary diagnosis and attendant treatment during the last month prior to death. We only examined the last

episode claim per decedent that was equal to the number of decedents. Thus, one last record for deaths diagnosed and died of these three major cancers (gastric (C16), liver (C22), lung (C34) cancers) as a primary cause were selected in this study. The NHIS provided the de-identified subset blinded medical and pharmacy claims data for this research project extracted from their own Hospice and Palliative Promotion project dataset. The Institutional Review Board at NHIS Ilsan Hospital already approved for the previous Hospice and Palliative Promotion project (IRB number #3-1725-A-N-01) at NHIS before conducting this research project. Therefore, there is no need for any extra Institutional Review Board approval nor informed consents for our research project.

2.2. Measures

2.2.1. Dependent Variable: Locations of Death

Place of death comprised the categories of hospital, outpatient clinics or emergency room and home. There are two kinds of datasets for these decedents: the medical services claim and reports for death. Comparing these two datasets, we identified the locations of death (hospital, clinic or emergency room) if the last date for medical record (i.e. inpatient, outpatient clinic, or emergency room) was identical to that of the death report. Due to no field for the place of death itself in these datasets, we used the operational definition for "home death" if patient with cancer was not identified to die in the above three medical settings (hospital, outpatient clinic or emergency room). We assumed that cancer patients died at home if the last date for medical records were not matched with the dates of death report. Using current two datasets, we found the nursing home death would be extremely rare and was difficult to differentiate with hospital death. Most of nursing home death were coded in "hospital". Therefore, we did not differentiate the nursing home deaths with hospital death in this study.

2.2.2. Independent Variables

Supportive Care Use

We identified the uses of supportive care services if there were claim records reimbursed for palliative care unit, aseptic room patient care, lead-shield room patient care, isolation rooms and medications (narcotic pain pills, antiemetic agent for anti-cancer drug). These services are defined as non-aggressive treatment that does not aim for cure in this study, so we defined as "supportive" care. When we found any reimbursed claims for chemotherapy, immunotherapy, basic tests for treatments (i.e. PET-CT, bone densitometry) in the last month of life, we defined these services for aggressive treatment for cancer. However, we excluded these cases for supportive care use, associated with treatment purpose procedure or test in this study.

Independent variables were age (0 - 40, 41 - 55, 56 - 64, 65 - 74, 75 - 84, 85 years+), sex (female, male), insurance type (the employee insured, the self-employed insured, public aid), and degree of urbanization of the municipality of residence (metropolitan city (population $\geq$ 1 million, city (1

million > population $\geq 30,000$), and rural). In South Korea, employees pay their contributions based on income under the National Health Insurance Program, whereas the self-employed do on the basis of income and asset. The public aid beneficiaries are low income bracket and do not pay any contribution under the public aid program which is subsidized by the government tax. The degrees of their monthly contributions were evenly distributed and categorized into 20 groups (the lowest grade 1 to the highest grade 20) excluding the public aid beneficiaries. This rank was used as proxy information for beneficiaries' economic status such as income. The extents of health care services use were analyzed using the number of emergency visits in the last episode. We used the total number of cancers as comorbid condition as we could not differentiate clearly the primary and secondary cancers in medical claims. We did not consider other comorbid chronic disease as comorbid condition as these patients were severely dying of cancer in this study (i.e. hypertension, diabetes).

2.3. Statistical Analysis

We analyzed data for three groups separately for patients with gastric cancer, liver cancer and lung cancer.

For each patient with gastric cancer, liver cancer and lung cancer separately, a multivariable logistic regression model was constructed to determine independent predictors of home death. As patients with these three cancers have different paths in prognosis or pain levels at the last days of lives, we ran the model's individually. Due to big sample sizes for each group from the national datasets, statistical tests may be able to present meaningful results with significant power. Therefore, we developed the model's to examine interactions factors in the separate models.

The independent variables in each model were age, sex, urbanization, health care services use (ER visit) prior to death, severity of cancer (number of cancers), and level of monthly insurance contribution group.

To investigate associations between home death and factors which contributed to health services use effects, two sets of multivariable logistic regression models were performed. Using home death as the dependent variable, we developed two models consisting of all independent variables for each insurance type (model 1), and then adding interactions; emergency visits and monthly contribution level, emergency visit and insurance type and female and monthly contribution group (model 2) in order to gain more insight on the respective role of these covariates. All models were checked for multicollinearity (tolerance and variance inflation factor collinearity statistics). Model 2 was designed to re-examine the associations among higher medical utilizations, severity of cancers, economic levels, and home death after running model 1. All analyses were conducted using SAS 9.3. version (SAS Institute Inc., Cary, North Carolina).

3. Results

3.1. Descriptive Statistics

[Table 1](#) shows that descriptive statistics of demographics or health services use among those who died of three major cancers (gastric, liver and lung cancer) in 44 tertiary hospitals. Among decedents with three major cancers total 42,596 patients (lung 16,632, liver 15,872, gastric 10,092) were identified. 71.6% of decedents were male. Their mean of age was 64.0 years and most lived in urban area (87.3%). Over half of them were covered by any employer's insurance. The most frequent comorbid chronic diseases were diabetes among liver patients (14.4%), lung patient (9.7%) and gastric patients (9.3%). The next frequent comorbid chronic disease was hypertension among three major cancer patients (lung, 6.8%, liver, 6.0%, gastric cancer, 5.7%).

Table 1. Descriptive statistics among patients with major three cancers prior to death.

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)		Total	
		N	%	N	%	N	%	N	%
	Total	10,092	100	15,872	100	16,632	100	42,596	100
Gender	Female	3240	32.1	3630	22.9	3846	23.1	10,716	25.2
	male	6852	67.9	12,242	77.1	12,786	76.9	31,880	74.8
Age group	0 - 40 yrs	709	7.0	533	3.4	286	1.7	1528	3.6
	41 - 55 yrs	2294	22.7	4190	26.4	1903	11.4	8387	19.7
	56 - 64 yrs	2407	23.9	4833	30.4	4089	24.6	11,329	26.6
	65 - 74 yrs	2726	27.0	4229	26.6	6317	38.0	13,272	31.2
	75 - 84 yrs	1666	16.5	1822	11.5	3521	21.2	7009	16.5
	85 yrs & older	290	2.9	265	1.7	516	3.1	1071	2.5
Age (means)		62.6		61.8		67.2		63.9	
Region	Metropolitan City	5471	54.2	8716	54.9	8652	52.0	22,839	53.6
	City	3400	33.7	5207	32.8	5586	33.6	14,193	33.3
	Rural	1217	12.1	1940	12.2	2386	14.3	5543	13.0
	unclear	4	0.0	9	0.1	8	0.0	21	0.0
The grade of monthly contribution	unclear	380	3.8	586	3.7	527	3.2	1493	3.6
	1 grade (0% - 5% rank)	279	2.8	411	2.6	508	3.1	1198	2.8
	2 grade (6% - 10% rank)	317	3.1	484	3.0	451	2.7	1252	2.9
	3 grade (11% - 15% rank)	266	2.6	492	3.1	485	2.9	1243	2.9
	4 grade (16% - 20% rank)	253	2.5	472	3.0	427	2.6	1152	2.7
	5 grade (21% - 25% rank)	262	2.6	430	2.7	420	2.5	1112	2.6
	6 grade (26% - 30% rank)	274	2.7	470	3.0	460	2.8	1204	2.8
	7 grade (31% - 35% rank)	325	3.2	522	3.3	543	3.3	1309	3.3

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)		Total	
		N	%	N	%	N	%	N	%
	8 grade (36% - 40% rank)	383	3.8	525	3.3	575	3.5	1483	3.5
	9 grade (41% - 45% rank)	347	3.4	627	4.0	562	3.4	1536	3.6
	10 grade (46% - 50% rank)	410	4.1	607	3.8	629	3.8	1646	3.9
	11 grade (51% - 55% rank)	420	4.2	649	4.1	647	3.9	1716	4.0
	12 grade (56% - 60% rank)	409	4.1	734	4.6	702	4.2	1845	4.3
	13 grade (61% - 65% rank)	440	4.4	712	4.5	656	3.9	1808	4.2
	14 grade (66% - 70% rank)	442	4.4	681	4.3	737	4.4	1860	4.4
	15 grade (71% - 75% rank)	525	5.2	788	5.0	784	4.7	2097	5.0
	16 grade (76% - 80% rank)	475	4.7	823	5.2	944	5.7	2242	5.3
	17 grade (81% - 85% rank)	696	6.9	957	6.0	1078	6.5	2731	6.4
	18 grade (86% - 90% rank)	686	6.8	991	6.2	1179	7.1	2856	6.7
	19 grade (91% - 95% rank)	606	6.0	895	5.6	1010	6.1	2511	5.9
	20 grade (96% - 100% rank)	1080	10.7	1663	10.5	2081	12.5	4824	11.3
Insurance type	Employer^	5823	57.7	8860	55.8	10,013	60.2	24,696	60.0
	Self-employed	3452	34.2	5659	35.7	5392	32.4	14,503	34.0
	Public Aid	817	8.1	1353	8.5	1227	7.4	3397	8.0
Intensity of Medical Care	Non-aggressive care services#	412	4.1	270	1.7	431	2.6	1113	2.6
Number of ER visits		5243	52.0	6890	43.4	7783	46.8	19,916	46.7
	1	4425	43.8	8632	54.4	8349	50.2	21,406	50.3
	2	1	0.0	2	0.0	3	0.0	6	0
Number of Cancers	1	3381	33.5	10,992	69.3	7254	43.6	21,627	50.1
	2	3493	34.6	3245	20.4	4,815	29.0	11,553	27.1
	3	2015	20.0	1149	7.2	2,847	17.1	6011	14.1
	4	869	8.6	366	2.3	1,189	7.1	2424	5.7
	5	334	3.3	120	0.8	527	3.2	981	2.3
Comorbid Other Chronic Disease									
	Hypertension	579	5.7	946	6.0	1127	6.8	2652	6.2
	Diabetes	936	9.3	2283	14.4	1609	9.7	4828	11.3
	Depression	142	1.4	70	0.4	177	1.1	389	0.9
	Coronary Artery Disease (CAD)	286	2.8	293	1.8	662	4.0	1241	2.9

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)		Total	
		N	%	N	%	N	%	N	%
	Chronic Obstructive Pulmonary Disease (COPD)	254	2.5	230	1.5	2020	12.1	2504	5.8
	Renal failure	114	1.1	221	1.4	173	1.0	508	1.2
	Others	7666	75.6	11,778	74.2	9623	57.8	28,089	65.9
Health Services	CT	212	2.1	297	1.9	359	2.2	868	2.0
	MRI	28	0.3	42	0.3	95	0.6	165	0.4
	PET	14	0.1	24	0.2	37	0.2	75	0.2
	Chemotherapy	616	6.1	1121	7.1	1098	6.6	2835	6.7
	Pain management Pharmacotherapy (Cancer)	956	9.5	1071	6.7	1478	8.9	3505	8.4
	Cardiopulmonary Resuscitation (CPR)	11	0.1	16	0.1	22	0.1	49	0.1
	Psychotherapy	5	0.0	4	0.0	10	0.6	19	0.0
	Intubation Use	17	0.2	26	0.2	38	0.3	81	0.2
	Ventilator Use	31	0.3	43	0.3	70	0.4	144	0.3
	Emergency Room Visit	46	0.5	88	0.6	86	0.5	220	0.5
	Intensive Care Unit Use	44	0.4	73	0.5	97	0.58	214	0.5
Place of Death	Inpatient Hospital	5082	50.36	6488	40.9	7370	44.3	20,346	45.2
	Outpatient or Emergency Room	4069	40.32	7992	50.5	7764	46.7	23,748	45.8
	Home	941	9.32	1392	8.8	1498	9.0	4282	9.0

*All information of demographics was described at the end of life time period.

^Employer insurance includes governments, public and private schools, and any private employers. #We used own operational definition of hospice and palliative care called "non-aggressive treatment" in this study for cases if there were no any aggressive treatments for cancer i.e. chemotherapy CT, MRI, PET, gene test or sonography.

Only 1.7% of liver cancer patients received only supportive care services whereas 4.1% of patients with gastric cancer received only supportive care services prior to death. The most frequently received health services were pain management (8.2%) and chemotherapy (6.5%). Gastric cancer patients (9.5%) used more pain management medication while 6.7% of patients with liver cancer used medication for pain management. More than 90% died in hospital: less than half (45.6%) in the inpatient hospital and an almost equal proportion in the outpatient hospital or emergency room; 8.9% died at home.

Over half of decedents had employer insurance among all patients while 8.0% of decedents were covered by medical aids.

Among all 42,596 deaths, only 8.9% died outside of hospital or outpatients' clinics. Most of death occurred in inpatient setting (46.5%).

3.2. Factors Associated with Home Death among Patients with Three Cancers

3.2.1. Age and Gender

[Table 2](#) presents the logistic regressions results among patients who died of gastric, liver, and lung cancer. [Table 3](#) includes the logistic regression results with the interaction variables.

Among gastric cancer patients, those aged between 65 and 74 were significantly to die at hospital, clinics or emergency room (OR = 0.575, $p < 0.01$, model 1) or patients those aged between 75 to 84 were less likely to die in any places in hospital. (OR = 0.668, $p < 0.05$, model 1) in [Table 2](#). Patients aged 41 - 55 with liver cancer (OR = 1.482, $p < 0.01$, model 1) or lung cancer (OR = 1.856, $p < 0.01$, model 1) were significantly more likely to die at home.

Table 2. Factors associated with home death among patients with three major cancers (Model 1).

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)	
		Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Gender	Female (vs. male)	1.122	(0.958 - 1.315)	1.124	(0.975 - 1.297)	1.199**	(1.043 - 1.378)
Age group	0 - 40	Reference category		Reference category		Reference category	
	41 - 55 yrs	0.896	(0.633 - 1.268)	1.482*	(1.090 - 2.015)	1.856**	(1.226 - 2.808)
	56 - 64 yrs	0.714	(0.506 - 1.007)	1.279	(0.943 - 1.735)	1.605*	(1.085 - 2.372)
	65 - 74 yrs	0.575**	(0.410 - 0.806)	1.135	(0.834 - 1.544)	1.326	(0.903 - 1.947)
	75 - 84 yrs	0.668*	(0.467 - 0.956)	0.983	(0.707 - 1.368)	1.130	(0.764 - 1.671)
	85 yrs & older	0.769	(0.447 - 1.322)	0.762	(0.470 - 1.234)	0.931	(0.581 - 1.493)
Region	Rural	Reference category		Reference category		Reference category	
	Metropolitan City	1.512**	(1.231 - 1.857)	1.270**	(1.070 - 1.507)	1.308**	(1.121 - 1.527)
	City	1.181	(0.954 - 1.461)	1.119	(0.934 - 1.341)	1.236**	(1.05 - 1.455)
The grade of monthly contribution	Grade 1 - grade 20	1.010	(0.997 - 1.022)	1.016**	(1.006 - 1.027)	1.011	(1.001 - 1.021)
Intensity of Treatment	Supportive Care Use	0.637**	(0.472 - 0.860)	0.542**	(0.383 - 0.768)	0.939	(0.668 - 1.32)
Insurance type	Employer (vs. community-based insurance)	1.180*	(1.023 - 1.361)	1.230**	(1.096 - 1.380)	1.461**	(1.306 - 1.635)
Public aid	Medical Aid Beneficiary	1.150**	(1.072 - 1.235)	1.146**	(1.058 - 1.242)	1.088**	(1.03 - 1.15)
Health Care	Number of ER visits	1.197**	(1.026 - 1.397)	1.115	(0.983 - 1.266)	1.120	(0.99 - 1.267)
Comorbidity	Number of Cancers	1.731**	(0.555 - 0.964)	0.690**	(0.555 - 0.857)	0.653**	(0.525 - 0.812)
Interactions	ER visit * monthly contribution	-		-		-	

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)	
		Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
	ER visit Insurance type *	-		-			
	Female * monthly contribution	-		-		-	

*P < 0.05, **P < 0.001, Model 1: Logistic regression result without interactions.

Table 3. Factors associated with home death among patients with three major cancers (Model 2).

		Gastric Cancer (C16)		Liver Cancer (C22)		Lung Cancer (C34)	
		Adjusted OR	95% CI	Adjusted OR	95% CI	Adjusted OR	95% CI
Gender	Female (vs. male)	1.440*	(1.076 - 1.927)	1.234	(0.961 - 1.584)	1.186	(0.931 - 1.512)
Age group	0 - 40	Reference category		Reference category		Reference category	
	41 - 55 yrs	0.904	(0.638 - 1.28)	1.483*	(1.091 - 2.016)	1.857***	(1.227 - 2.810)
	56 - 64 yrs	0.719	(0.51 - 1.015)	1.276	(0.941 - 1.731)	1.606**	(1.086 - 2.374)
	65 - 74 yrs	0.574**	(0.409 - 0.805)	1.129	(0.83 - 1.537)	1.327	(0.903 - 1.949)
	75 - 84 yrs	0.667*	(0.466 - 0.955)	0.982	(0.705 - 1.366)	1.130	(0.764 - 1.672)
	85 yrs & older	0.761	(0.442 - 1.308)	0.757	(0.467 - 1.227)	0.932	(0.582 - 1.495)
Region	Rural	Reference category		Reference category		Reference category	
	Metropolitan City	1.515**	(1.233 - 1.861)	1.274**	(1.073 - 1.512)	1.309***	(1.121 - 1.528)
	City	1.181	(0.954 - 1.461)	1.122	(0.936 - 1.344)	1.237***	(1.051 - 1.456)
The grade of monthly contribution	Grade 1 - grade 20	1.024**	(1.007 - 1.041)	1.009	(0.994 - 1.023)	1.012	(0.999 - 1.025)
Intensity of Treatment	Supportive Care Use	0.634**	(0.47 - 0.856)	0.543**	(0.384 - 0.769)	0.936	(0.666 - 1.316)
Insurance type	Employer (vs. community-based insurance)	1.428*	(1.079 - 1.889)	1.033	(0.832 - 1.282)	1.420**	(1.143 - 1.765)
Public aid	Medical Aid Beneficiary	1.151**	(1.073 - 1.236)	1.144**	(1.056 - 1.24)	1.088**	(1.030 - 1.150)
Health Care	Number of ER visits	1.212	(0.992 - 1.481)	1.033	(0.954 - 1.357)	1.065	(0.905 - 1.253)
Comorbidity	Number of Cancers	0.741*	(0.561 - 0.977)	0.692**	(0.556 - 0.86)	0.653**	(0.525 - 0.813)
Interactions	ER visit * monthly contribution	0.983	(0.962 - 1.004)	1.019*	(1.002 - 1.037)	0.997	(0.980 - 1.014)
	ER visit * Insurance type	0.982	(0.730 - 1.321)	0.966	(0.761 - 1.225)	1.119	(0.883 - 1.418)
	Female * monthly contribution	0.977*	(0.955 - 0.999)	0.992	(0.972 - 1.011)	1.001	(0.982 - 1.020)

*P < 0.05, **P < 0.001, Model 2: Logistic regressions results with interactions.

Female gastric cancer patients (OR = 1.44, $p < 0.05$, model 2, [Table 3](#)), and female lung cancer patients (OR = 1.199, $p < 0.05$, model 1, [Table 2](#)) were significantly more likely to die at home comparing to male patients with gastric or lung cancer. Female gastric cancer patients paying for greater monthly premium contribution were significantly less likely to die at home (OR = 0.977, $p < 0.05$, model 2, [Table 3](#)).

3.2.2. Urbanization

All three cancer patients; gastric cancer patients (OR = 1.512, $p < 0.01$, model 1, [Table 2](#)), liver cancer (OR = 1.27, $p < 0.05$, model 1, [Table 2](#)) and lung cancer patients (OR = 1.308, $p < 0.01$, model 1, [Table 2](#)) who lived in metropolitan area were significantly more likely to die at home than those who lived in rural area.

3.2.3. Insurance Types and Monthly Premium Contribution Level

Among those had employer insurance, gastric cancer patients (OR = 1.18, $p < 0.01$, model 1, [Table 2](#)) and liver cancer patients (OR = 1.23, $p < 0.01$, model 1, [Table 2](#)) and lung cancer patients (OR = 1.461, $p < 0.01$, [Table 2](#)) were significantly more likely to die at home.

Patients who paid more monthly premium were significantly more likely to die at home among gastric cancer (OR = 1.024, $p < 0.01$, model 2, [Table 3](#)), liver patients (OR = 1.016, $p < 0.01$, model 1, [Table 2](#)), and lung patients (OR = 1.011, $p < 0.05$, model 1, [Table 2](#)).

Medical aid beneficiaries with gastric cancer (OR = 1.150, $p < 0.01$, model 1, [Table 2](#)) or liver cancer (OR = 1.146, $p < 0.01$, model 1, [Table 2](#)) or lung cancer (OR = 1.088, $p < 0.01$, model 1, [Table 2](#)) were significantly more likely to die at home.

3.2.4. Supportive Care Use

Using only supportive care was significantly associated with death in any ward in hospital such as hospital room, emergency room or clinics among gastric cancer patients (OR = 0.637, $p < 0.01$, model 1 and liver cancer patients (OR = 0.542, $p < 0.01$, model 1)) in [Table 2](#).

3.2.5. Emergency Room Visit and Total Number of Cancers

If gastric cancer patients (OR = 1.197, $p < 0.01$, model 1) or liver cancer patients (OR = 1.115, $p < 0.05$, model 1) or lung cancer patients (OR = 1.120, $p < 0.05$, model 1) had a higher number of emergency room visits in the last month of life, they had significantly higher probabilities to die at home. The interaction factor between emergency room visit and monthly premium contribution level was significantly associated with home death among liver cancer patients (OR = 1.019, $p < 0.05$, model 2, [Table 3](#)).

All patients with greater numbers of comorbid cancer were significantly associated with hospital death. In particular, gastric cancer patients with other comorbid cancer had lower odds to die at home (OR = 0.743 $p < 0.001$, model 2, [Table 3](#)).

4. Discussion

Most of patients with any cancer in South Korea are more likely to die in hospital (87.2%) which is surprisingly greater than other countries [18]. Compared to other countries, there are particular factors associated with hospital death related to the end-of-life care. Among them, lack of home hospice care service is most attributing factor of hospital death in terminal cancer patients. To improve quality of death, Korean medical system needs to develop home hospice care service.

This study examined the location of death among the major three cancer patients (gastric, liver and lung) using medical claims dataset and examined the factors associated with home death. This study is the first empirical study using the national level of claims data for the decedents with major three cancers in South Korea and examined the death places. Those who received only supportive care in the last month of life were significantly more likely to die in any places in hospital. If patients with more than one cancer had greater probability to die in hospital, living in a metropolitan area, being female among gastric and lung cancer patients, or being younger was associated with home death.

Considering the quality of life among the dying patients and preferences, it is clear that most people have preferred their home as the place of death over a bed in hospital [21] [22] [23] and dying home is ideal for the dying individuals and their families [24] [25]. However, the prevalence of home death is still lower [25] [26]. South Korean situation is also not exceptional, either. Majority of descendants do die in hospital although the Koreans prefer to die at home [27] [28].

Location of death and its factors have been studied in diverse the advanced end-of-life health system. In Japan, availabilities for hospice or palliative care at home were significantly associated with home death better psychological status for patients and families [20] [29] [30]. Also, Japanese patients had greater change to die at home without any preferred place for death [31]. Diverse studies revealed the factors associated with home death: caregivers' preferred place, caregivers' support, numbers of hospital admissions, palliative care visits [33] [34], being married, higher educations, and urbanization [11]. However, dying patient with greater need for medical attention (i.e. pain management) had high probability of dying in hospital. So, if pain is controllable at home, there would be greater chances to let the patients die at home [30] [31].

Urbanization factor implies the access for medical services. Living in metropolitan area increases access to hospital often so it is easy to discharge and to be readmitted to hospitals whereas residents in rural or small cities.

Therefore, supportive hospital care services increase the chance of hospital death rather than decreasing it and living in metropolitan area increased the chance of home death. Being female or living in metropolitan area was associated with hospital death in the previous study [32] [33].

We found that both decedents with higher income and low income who got supported by public aid were more likely to die at home interestingly. This finding rooted the two different reasons why these two groups led to home death; one with greater resource wanted to die at home for better death and the other with lower access to medical services or support might not be able to receive sufficient services at medical setting.

Hospice or palliative care is indeed strongly hospital-focused in South Korea. Palliative care at home is also available but it is a service provided by the hospital to patients that cannot be hospitalized for some reason and when a registered nurse is available [35] [36]. A majority of hospice and palliative care services in South Korea still concentrate on predominantly cancer patients in tertiary hospitals supported by the Cancer Control Policy [37]. The pilot project for home-based hospice and palliative care services have begun since 2016 March, which is an extension form of hospice and palliative care services provided by only certified hospitals [38].

The end-of-life care, hospice or palliative care services are being under-utilized in Korea still. In 2012, among those who died from cancer only, 11.9% received palliative care from various institutions. In 2013, about 10% (8084) cancer patients obtained services from palliative care institutions. These findings indicate that the current support system is still lacking, especially when compared other countries with hospice and palliative care under system.

Limitations

This study has limitations. First, there was no exact information where the patients died except hospital, emergency room, or clinics. So, home deaths may be overestimated in this study. There is no method to link with even the death certificate so we could not identify with the actual cause of death for our study sample. Due to the privacy act for patients, it is impossible to incorporate between the medical records and the death certificate. Thus, it might generate major inaccuracy for the place of death, and it was impossible to validate the issues for this study.

Second, hospice or palliative care use was not clearly identified as an independent service code in the data system back then. The end-of-life care system is being in progress to add more services and payment system still during the study period. Even it is very controversial to use the terms hospice and palliative care at the same time for different stakeholders.

Despite these limitations, this study is a rare study to examine the locations of death as outcomes defined by operative definition using the large secondary claims data and its factors among patients with major cancers in South Korea. This effort reveals a few valuable findings to understand the patterns of health care services and significant factors associated with supportive care use among the dying patients.

5. Conclusion

Patients with three major cancers in South Korea were more likely to die at home if they lived metropolitan area, or were paying higher insurance

premium, or were covered by employer insurance. The cancer patients who had supportive care services prior to death were significantly more likely to die in hospital in Korea. Patients with multi-cancers or being older had increased odds of dying in hospital. The end-of-life care system in Korea developed in hospital settings without the extensive or various formats of other choices for the dying patients often set the boundaries against the preferences of patients or family members still.

List of Abbreviations:

NHI: National Health Insurance
NHIS: The National Health Insurance Service
CT: Computed Tomography
PET: Polyethylene Terephthalate
MRI: Magnetic Resonance Imaging
ER: Emergency Room
CAD: Coronary Artery Disease
COPD: Chronic Obstructive Pulmonary Disease
CHF: Congestive Heart Failure
CPR: Cardiopulmonary Resuscitation
OR: Odds Ratio

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4.2. Antibacterial Coating of Chitosan Nanoparticles. Alternative Use of the Resource of Crustacean *Artemia salina*.

Fayruza Sh. Suleymanova

Intern student of the 6th course of the Department of General Surgery.
Kazakh Medical University of Continuing Education
(Almaty, Kazakhstan)

Tashkul N. Parmankulova

The Department of General and Clinical Pharmacology.
Kazakh Medical University of Continuing Education
(Almaty, Kazakhstan)

Abstract

With the incredible growth toward urbanization, many organizations will employ the use of antimicrobial coating as a method of keeping germs away and maintaining a healthy environment for their people. The combination of humidity, temperature, the presence of dust, dirt and grease stains in textiles create a favorable environment for the reproduction of microorganisms. The medical staff of any medical institution daily contacts with various factors of the infectious and non-infectious nature that affect to their health and performance. Therefore, the hospital environment should be regarded as an extremely aggressive microecological area.

The aim of the work is the development and testing of antimicrobial coating of medical clothing, instruments, suture material.

Tasks:

1. To obtain an antimicrobial coating with chitosan component
2. To study the effect of chitosan on pathogenic bacteria (*St. aureus* / *E. coli*)
3. Develop a technology for applying chitosan to medical clothing, instruments, suture material
4. Conduct clinical trials of chitosan coating against *Staphylococcus saprophyticus* and *Escherichia coli*.

Scientific novelty of the idea

In our study, it is planned to isolate chitosan nanoparticles from *Artemia Salina* [2], crustaceans living in salt lakes of Kazakhstan and apply a coating on medical clothing, instruments, suture material [6] and research that chitosan coated textiles may improve atopic dermatitis severity by modulating skin *Staphylococcal* profile [5]

The main source of chitosan is still *Arthropoda* — the shells of shrimp, crab, lobster, lobster and crayfish (Nikolaeva, 1968; Sen, Mathew, 1975; Austin, Brine at al. 1981; Bykov, Furman, 1999). Crustacean shells are expensive raw materials, the price of which depends on the species, age and seasonal yield. We can use our raw materials *Artemia salina*, which are annually mined in volumes up to 100 thousand tons per year in the salt lakes of Pavlodar region. Due to the high reproduction of *Artemia salina* (the crayfish breeds, giving four offspring per season), [7] with all the rules for

catching, it is possible to ensure the production of chitin and chitosan using substandard raw materials.

Research

Aim To enhance the efficiency of biological, chemical and physical properties like antibacterial activity, wash durability, air-permeability and biocompatibility, cotton fabric materials were finished with chitosan and herbal nanocomposites. **Methodology** Extracts of *Senna auriculata* and *Achyranthes aspera* with chitosan solution was bulk finished on 40 cotton fabrics. To increase the functional properties, chitosan and herbal extract nanocomposites were finished on to another set of fabrics (nanocomposite finishing). Different functional properties were carried out for both the sets of fabrics and comparatively analyzed. Antibacterial activity was carried out using standard EN ISO 20645 method and durability of finished fabrics was done using a standard AATCC – 124 test method. Physical properties like tensile strength, abrasion resistance and air-permeability were analyzed using the standards, ASTM D 5035-2006, AATCC 119-2004 and ASTM D 737-1996 respectively. Biocompatible properties of the finished fabric were determined by HET-CAM to ensure that material do not cause irritation points on skin surface. **Results** Antibacterial activity of nanocomposite finished fabrics showed more inhibitory zones of 31 mm for *E. coli* and 29 mm for *S. aureus* when compared to bulk finished fabrics. Nanocomposite finished fabrics showed good durable properties and physical properties than bulk finished fabrics. Bulk and nanocomposite finished fabrics showed good biocompatible properties when analyzed using a standard HET-CAM test. **Conclusion** The study concludes that, nanocomposites could provide better functional properties than the bulk finished fabrics. The nano-sized particles in the composites was considered significant for its functional applications in hospital-based fabrics to prevent the transmission of nosocomial infections. [3]

Method of producing nanoparticles of low-molecular chitosan [4]

Substance: method of producing nanoparticles of low-molecular chitosan involves preparing a solution of pre-purified low-molecular chitosan in filtered 1-2 wt % aqueous acetic acid, adding solutions of hydroxides of alkali metals or ammonia for 2 hours, dispersing the system using a mechanical mixer at a rate of 200-300 rpm at temperature 20°C to pH 6.9-7.0. Further, the dispersion is centrifuged at 10000 rpm. The obtained solid residue is redispersed in bidistillate while mechanically mixing at a rate of 200-300 rpm at temperature 20°C.

Effect: invention simplifies the method of producing nanoparticles of low-molecular chitosan and apparatus design without formation of undesirable harmful substances.

Practical solution: Launch a line of medical clothing with an antibacterial ecologically clean coating. Other applications are possible: bedding in military hospitals, antiseptics, masks, urethral catheters, medical equipment coating, suture material in surgery and etc.

Thus, it can be concluded that in order to minimize the spread of infectious diseases within medical institutions, it is necessary to introduce antibacterial textiles for medical stuff, at the same time studying the useful resource of Kazakhstan - *Artemia Salina* and the search for new applications for this product.

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4.3. Effect of Waste Management on Climate Change

Rimma T. Turekeldieva

candidate of biological sciences, associate professor of the department "Ecology". M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Marina V. Novozhilova

candidate of philology, associate professor, head of the department "Foreign languages". M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Kumissay A. Tlepova

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Aygerim A. Serikova

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Aiym R. Karazhigitova

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

According to most scientists and politicians, the climate change caused by anthropogenic emissions of greenhouse gases, is the most important problem of humanity at the present stage. Therefore, the problem of

combating climate change and the active participation of countries in the system of international climate regulation are the most urgent nowadays.

On the one hand, waste poses a threat, but on the other hand, today it is perceived as a new opportunity, especially in connection with climate change. As a result, on the one hand, there is the issue of reducing emissions - methane in relation to landfills and carbon dioxide (CO₂) and nitrogen oxides (NO_x) in relation to waste incineration. On the other hand, no less important is the potential "contribution" which, through waste management, can be made to displace those activities that lead to global warming and to the implementation of carbon "absorption" as part of such management. We can quote from the US Environmental Protection Agency (USEPA) publication: "Among the efforts to slow down climate change processes are measures aimed at reducing carbon dioxide and methane emissions, as well as changing forest management long-term carbon storage in wood" [4].

Various options for controlling SHW (solid household waste) provide a range of opportunities to influence the same processes, both direct and indirect. The most important among these possibilities is the ability to save energy, concentrated in the waste, due to their recycling. A quarter of greenhouse gas emissions occur over the life cycle of materials. Any satisfaction of the demand for raw materials through the reuse of waste materials and rejected products provides significant energy savings and reduced emissions [5].

Nearly every city with a population of 1 million people annually produces up to two million cubic meters of solid household waste. That is, every 15–20 years, a dump of 30-40 hectares is formed around each city of the millionaire. Waste, occupying large areas, serve as a source of air and water pollution; especially since not all places of organized waste disposal comply with the current standards. Spread of dust by wind is noted within a radius of more than 10 km, exerting a direct impact on the soil cover. Some dumps often spontaneously ignite and smoke, polluting the atmosphere [6].

The most common and least efficient way to dump wastes is their disposal in landfills. As a result of waste fermentation, the landfill gas forms in the body of the landfill, which is the result of the vital activity of anaerobic organisms. The main composition of landfill gas is methane (40–75%) and carbon dioxide (30–45%). These gases are greenhouse gases. In addition, landfill gas contains a large amount of toxic organic compounds, which are the source of an unpleasant odor. Each year, 4 to 5 m³ of landfill gas is generated from one ton of SHW. [7].

Waste at landfills can be tens and thousands of years and their number only accumulates. At the same time, shortly after storage, the emission of gases from the waste begins, which reaches a maximum after 25-30 years, but it does not cease and is released about fifty years. Many of the gases, such as hydrogen sulfide, ammonia, mercaptans, volatile amines, have an extremely unpleasant odor, and methane is a greenhouse gas with a

greenhouse effect that is 30 times more than carbon dioxide. The concentration of methane can reach the industrial values. In addition, gases are released that present a fire hazard.

The total amount of accumulated solid waste in Kazakhstan is currently about 100 million tons. About 5-6 million tons of garbage are generated annually, by 2025 this figure could grow to 8 million tons.

Domestic waste in urban areas is 330 kilograms per inhabitant per year.

There is a soil pollution, reproduction of disease carriers, groundwater and surface water poisoning, smoke and air poisoning from frequent spontaneous combustion, unpleasant odor, and increased environmental hazard, deterioration of sanitary and epidemiological situation in the places with huge amounts of garbage concentration.

In many places, the most primitive ways to destroy household and street garbage are used: burning in a natural environment on the streets and courtyards without any technical equipment, which leads to dangerous pollution of the atmosphere of residential areas. Incineration leads to an increase in the amount of greenhouse gases that cause climate change.

Increasing waste everywhere threatens the state of ecological equilibrium: groundwater is degrading, which, due to landfills, are "enriched" with residues of decaying organic matter, iron, lead, zinc, dyes, detergents, drugs, etc.

Thus, it can be stated that the existing waste management of production and consumption makes a significant contribution to the problem of global climate change.

Burning waste instead of recycling and composting releases a lot of gases that cause the greenhouse effect to the atmosphere. Removal of organic waste to landfills is also a very significant problem. Landfills are responsible for 34% of methane emissions associated with human activities, and methane retains 23 times more heat than carbon dioxide.

Using words such as "waste to energy", waste incineration companies have gained access to subsidies under some national and international renewable energy programs. In fact, incinerators emit more CO₂ per unit of electricity produced than coal-fired power plants, and landfills are a significant source of methane emissions.

The incineration or disposal of waste is based on the destruction of resources that can be recycled or composted, such as paper, food waste, plastic and aluminum, and also undermines efforts to reduce waste. However, compared to the energy that can be saved by reducing waste and recycling, these plants produce very little energy. For example, recycling mixed types of paper instead of burning it saves 9 times more energy. Burning plastic generates about 3 times more carbon dioxide than recycling it. Reducing the number of computers saves 1700 times more energy than can be obtained by burning a similar amount of computer waste.

Having limited resources to cope with a colossal climate problem, we cannot afford to spend them on incinerators and landfills. Climate change requires that we reduce the amount of waste, increase the degree of their reuse, recycling and composting as a means of reducing greenhouse gas emissions.

Ways to reduce greenhouse gas emissions from waste management are as follows:

- Reducing emissions from incinerators. Incineration plants pollute the atmosphere as a result of greenhouse gas emissions. As shown by a recent European study, if we take into account all the emissions of hydrocarbons from incinerators, incinerators emit significantly more greenhouse gases that cause the greenhouse effect for each kW of generated energy than coal-fired power plants.

- Reducing methane emissions from landfills. If organic waste is separated for composting, methane will not be generated at landfills.

- Reducing energy usage. In the manufacture of products from recycled materials, much less energy is expended than in the production from the original natural raw materials.

- Reducing the process of deforestation. Deforestation is responsible for 25% of carbon emissions worldwide, and the pulp and paper industry add another 10% of all greenhouse gas emissions. Reducing paper consumption and recycling will conserve more trees and undisturbed forest ecosystems (which trap large amounts of carbon).

Climate change requires supporting and strengthening the "Zero Waste" initiative as a key strategy for reducing greenhouse gas emissions within local, national and international policies and programs. Landfills and incinerators harm public health and the environment, and at the same time are very far from solving the problem of the greenhouse effect and creating clean and renewable energy.

The volume of new industrial waste is growing. In connection with the development of the mining industry, the processing industry and heavy industry, Kazakhstan produces significant amounts of industrial waste, which must be managed in accordance with international best practice.

Man-made mineral formations (TMF) (tailings and overburden residues) make up 8.9 billion tons, which form vast technogenic landscapes in the country. Weathering and washing away of the surface layers of TMF lead to the degradation of adjacent ecosystems. Systemic reclamation of historical TMF is practically absent. Throughout the world, TMF is used for the secondary extraction of minerals, the "dry residue" is recultivated into parks and attractive landscapes [7].

Industrial waste is mainly transported to landfills, where it is stored. At the same time, the regulatory and methodological requirements for the arrangement of landfills do not meet international standards. The existing industrial waste disposal system damages groundwater reserves, the environment and public health. For example, the excess of the limiting

concentration (LC) of lead in the ground and in water in the south of Kazakhstan leads to a delay in the mental development of children, a decrease in reproductive function. Exceeding the limiting concentration of phosphorus in the cities of Shymkent and Taraz leads to irreversible damage to the liver and renal stone disease.

Toxic wastes and persistent organic pollutants (POPs) are particularly dangerous. In terms of accumulated waste containing POPs (250 thousand tons), Kazakhstan ranks second in the region of Eastern Europe and the CIS after the Russian Federation. Given the restrictions on the export of such waste for processing abroad, as well as the requirements of the Stockholm Convention on their disposal, Kazakhstan should organize its own processing facilities inside the country and get rid of POPs until 2028. POPs are a serious threat to public health. Their content in soil and water leads to the appearance of cancer, especially in women. [7].

The first thing to follow in the policy of management of production and consumption wastes is the achievement of two goals: minimizing the amount of waste generated and reducing environmental pollution. These goals that the economically developed countries pursue in their waste management policies with mandatory state support.

In order to implement the principles of a green economy in the treatment of industrial waste, it is necessary, first of all, to form a new system. The formation of this system should be implemented using the following approaches:

- a) the creation of an agreed waste management system with the provision of a full range of services and comprehensive landscape protection;

- b) reducing the number of landfills with the transition to the widespread use of recycling and re-using, as well as the extraction of useful substances and materials, obtaining fuel through waste disposal;

- c) development of a closed-cycle economy with multi-turn use of products both within and outside the value chain;

- d) improvement of the ecological situation and reduction of anthropogenic impact on the environment [9].

To minimize the volume of industrial waste, the following measures should be taken:

- 1) conduct an inventory of all large landfills of these wastes for the content of useful substances, as well as for compliance with environmental safety standards of 100% waste;

- 2) revise the Rules for classifying these wastes and bringing them into line with European standards to reflect the actual amount of waste and the state of landfill sites.

- 3) conduct the feasibility studies on all large landfills with these wastes to determine the economic feasibility of their processing, as well as to determine the necessary investments to bring them into compliance with the standards.

4) identify the options for processing / disposal of hazardous and toxic waste for 100% of waste.

5) on the basis of an assessment of the economic and environmental effect, prioritize these wastes for further processing and identify the necessary sources of financing and appropriate incentives for the project's implementation on the processing and safe storage of 100% enrichment waste.

6) form the infrastructure and enterprises for the processing of industrial waste and the introduction of incentives for their sustainable operation.

7) elaborate a clear mechanism of interaction between various ministries and departments for the development of policies and the implementation of industrial waste supervision.

8) improve the legislative mechanisms for the regulation of chemicals, to harmonize legislation in the field of health, safety and labor protection, industrial safety, environmental protection, including with regard to the register of chemical products, with the requirements of the Law "On chemical safety".

9) ensure the introduction of environmentally friendly technologies and processes, including technologies for the destruction of wastes containing persistent organic pollutants and other hazardous wastes.

10) introduce an international system of classification and labeling of chemicals.

11) improve the system of statistical reporting and accounting of chemicals at the state level with the formation of emission registers and transfer of chemicals at the regional and national levels.

12) provide material and technical equipment of territorial analytical laboratories for obtaining reliable operational data on the pollution of surface and groundwater, soil and atmospheric air [10].

In Kazakhstan, there are enormous opportunities for running a "green" business in the recycling sector. The country has accumulated more than 30 billion tons of waste. About 700 million tons of industrial and 3.5 million tons of household waste are re-generated annually. More than 92 million tons of animal waste pollutes the environment. The use of these wastes for the production of biogas and organic fertilizers is one of the tasks of greening the industry. The share of utilization of ash and slag waste in Kazakhstan (with an annual generation of about 300 million tons) does not exceed 1%, whereas in the European Union this figure reaches 60%. Due to the undeveloped infrastructure for separate collection and disposal of municipal waste, less than 0.2% is subject to reuse. For comparison, in the EU, the share of recycling is 60%, in Japan - 90%.

Currently, new environmental technologies allow us to recycle almost all types of waste with a profit. At the same time, the profitability of recycling in Europe reaches 50%.

Thus, one of the most important areas of material-saving activities of production structures is working with the resulting waste. This work, in turn, has a lot of aspects and includes a whole set of measures for predicting and preventing waste generation, as well as finding and implementing opportunities for their more efficient use. The rational use of waste products allows us to solve many economic and environmental problems, including expanding the raw material base of the economy, increasing production volumes, reducing the cost of economic management, and preventing environmental pollution.

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4.4. The Problem of Waste Management in the Transition to Green Economy

Rimma T. Turekeldieva

candidate of biological sciences, associate professor of the department "Ecology". M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Marina V. Novozhilova

candidate of philology, associate professor, head of the department "Foreign languages". M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Assel E. Tolenova

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Rakhima A. Baisalbayeva

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Assel R. Jigitekova

master student of M.Kh. Dulaty Taraz State University (Taraz, Kazakhstan)

Eco-design of the economy involves the ensuring sustainable ecologically safe environmental management and preserving the resource-ecological balance through reducing the environmental capacity of production and reducing the impact of the economy on the biosphere metabolic and energy metabolism.

For green economy implementation, it is necessary to develop the resource-saving technologies and reduce the share of environmentally "dirty" industries, introduce the environmental conditions and requirements into all developed state, regional and sectoral programs by improving economic mechanisms for environmental management, state environmental monitoring, environmental monitoring and statistics, and optimization the environmental management and environmental impact assessment.

The problem of waste management is one of the most pressing in the world, including the Republic of Kazakhstan. Every year, more than 2 billion tons of waste, including hazardous waste, is generated in the European Union (EU) member states, and this figure is steadily increasing. Waste management is a complex issue. Waste storage is not a reliable solution, and their destruction leads to emissions and the formation of highly concentrated polluting residual materials. Waste management is one of the key issues for the environment and sustainable management of natural resources. The optimal solution is to prevent the generation of waste, re-including them in the production cycle by recycling their components in cases where there are environmentally and economically reasonable methods for this [1].

One of the main directions of Kazakhstan's transition to a "green" economy is the improvement of the waste management system. In this issue, there is considerable experience in international practice.

The best examples of waste management show the European Union countries where even now the waste management system can be called green.

The first waste management strategy in the EU was published in 1989. Already in 1996, it was reworked to take into account the conditions prevailing in the EU member states by the end of the 20th century. Its main provisions are preserved in the Sixth Ecological-Political Program of Action:

- the occurrence of waste and especially hazardous waste must be prevented, in particular through the introduction of resource-saving and clean technologies;
- the link between economic growth and waste generation must be broken;
- reuse of substances and materials should be encouraged through benefits, financial support, public awareness, etc.;

- the reuse of substances recovered from waste is usually a priority compared to the use of energy resources (incineration and reuse of the received energy);

- waste disposal should occur without creating a hazard to humans and the environment, and, if possible, as close as possible to the place of origin of the waste.

The EU has established a clear hierarchy of waste management methods in building waste management policies and developing a regulatory framework. The hierarchy establishes priority directions for the development of technologies with regard to sustainable development. Building waste management systems cannot be based on managing the flow of waste generation only at the disposal stage, so the waste management system as a whole moves towards more integrated approaches to addressing the issue. The hierarchy of waste management technologies was first introduced in the Waste Framework Directive (75/442 / EEC) and is currently a component of all major waste management directives.

The introduction of the feasibility of certain technologies is determined on the basis of the choice of the best technologies from the point of view of ecology and from economically viable technologies, taking into account both economic and social aspects.

Preventing or minimizing waste generation ranks the first place in the hierarchy of methods. This approach saves money on waste management activities, and also leads to increased productivity and reduced specific use of resources. Reducing the amount of waste can be achieved by reorienting production and consumption to products and packaging, leading to less waste (for example, promoting repeated use of products, motivating manufacturers to reduce packaging, etc.).

Green waste management in the EU is currently aimed at reducing waste and ensuring that waste generated is used and disposed of in ways that do not lead to environmental degradation.

The basis of the waste management system in the EU is the Concept of Waste Management and the principles of sustainable development proclaimed in it in relation to SWM. The concept is outlined in the EU Waste Management Strategy.

Two EU directives establish the legal framework: a waste directive and a hazardous waste directive. There are also directives governing the handling of certain types of waste: packaging, waste oils, waste treatment plants, batteries, disused vehicles, electronics waste, as well as guidelines for the disposal and incineration of waste. EU directives set targets for waste management to be achieved by EU member states and prescribe requirements for creating conditions for achieving goals in countries.

For waste management, it is planned to create an international network of specialized enterprises using efficient and safe technologies for processing and recycling waste. These enterprises may have different forms of ownership, and, belong to private owners, but all of them must receive

permission for waste management from the relevant national or international organizations.

In accordance with the directive, the costs of waste disposal must be borne by persons or organizations that produce this waste, putting into practice the principle of "the polluter pays".

One of the most common tools for minimizing the formation of solid household waste is the "Pay as much as you throw out" scheme. This scheme is used when working with households, as well as with other producers of solid household waste. It provides for the payment of services to companies involved in the removal and disposal of waste, in accordance with the weight of the waste.

The next very common tool is various taxes on the disposal, recycling and / or transportation of waste. In this case, taxes have a fixed rate. In Europe, such a tax has been introduced in 10 countries. The highest - in three Scandinavian countries and the Netherlands - from 20 to 50 Euros per ton; in other countries it is between 5 and 20 Euros per ton. In addition, there is a waste incineration tax in Denmark, Norway and the Netherlands.

Another economic incentive to reduce waste is to reimburse / reduce the tax rate on waste disposal and / or removal in the amount spent by the household or other business entity on processing / minimizing waste at the source (for example, composting using a special facility) [2].

A relatively new concept in the field of waste management has become the so-called. Product certificates or product environmental permits. This tool came from the practice of environmental policy and represents a permit for a certain amount (quota) of certain types of waste. If a consumer produces less waste, he can sell his quota to other consumers. Currently, such certificates are widely used only in the UK, mainly when working with packaging waste and biodegradable waste.

The most common types of waste sorting involve the separation of hazardous and non-hazardous waste.

Hazardous waste should be collected separately and delivered to special collection points, from where they are sent for recycling to specialized companies. Individuals usually deliver hazardous waste to collection points on their own; for industrial enterprises, the abstraction can be organized directly from production.

For certain types of waste (for example, batteries), recycling companies can organize collection points in public places, for example, in supermarkets. To attract the attention of the population, collection containers are colorfully decorated; next to them can be placed stands with information on the treatment of relevant types of waste [3].

From the remaining non-hazardous waste emit large-sized waste: household and office equipment; construction garbage; furniture, etc.

This waste is usually transported to specialized collection points, where hazardous items are removed from them (for example, freon gas from refrigerators), and then specialized companies carry out their further

processing and / or recycling. Another collection scheme is the collection of such waste directly from households on certain days of the week / month.

The remaining waste is sorted into the following main components: paper and / or cardboard; glass; plastic; clothes, shoes; metal (packaging, cans, etc.), organic waste (food waste, waste from garden plots, sawdust, etc.); residual garbage (those species that cannot be attributed to the above, or mixed waste that can no longer be separated).

Depending on the requirements for sorting household waste in a particular country and even in a particular region of the country, the accuracy of sorting waste may vary. For example, in the western regions of Denmark, paper needs to be sorted into newsprint and the rest; in Germany, Denmark and Finland glass is divided by color; in some cities in Sweden, even food waste is sorted (for example, paper filters for coffee makers and the coffee itself must be disposed of separately). At the same time, in Germany, cellophane, cellulose, plastic, tin and aluminum beverage cans and plastic packaging from dairy products are collected together. In one of the Finnish regions, residents should sort small non-hazardous household waste into organic and biodegradable components and other types of waste. These two fractions are collected in plastic bags of different colors, then these bags are automatically sorted at landfills using a photocell system, and the organic component is used for composting, and the inorganic component is disposed of.

Different types of non-hazardous domestic waste are collected in special separate containers - plastic bags (of different colors, according to the type of waste) or in plastic containers (of different colors, or with appropriate inscriptions). Containers can be individual (for families living in separate houses) or common (for apartment buildings, condominiums, institutions, public spaces, industrial enterprises, etc.). For certain types of waste, special collection points may also be organized in public places. For example, in Finland, in large supermarkets there are special devices for glass bottles and aluminum beverage cans. In these devices, the glass containers are sorted by the types of drinks and the color of the glass. Some types of bottles (for example, wine) are immediately crushed and are recycled; some species (for example, beer) are washed and reused. At the same time, for the last type of glassware, buyers can either receive money directly from the vending machine, or a discount coupon when buying goods in a supermarket. [4].

In general, in European countries, the volume of recycled packaging materials (plastic, paper, glass and metal) is increasing. The main ways of recycling waste are the manufacture of new packaging from them (more intensively, for example, in Germany and Austria) and incineration for energy production (the method is widely used in Denmark and the Netherlands). According to the changes made to the directive on packaging waste in 2004, in the future, EU countries will have to significantly reduce the amount of incinerated waste and increase the part that is being recycled.

A number of studies have shown that recycling can save 3 to 5 times more energy than can be obtained by burning them.

In almost all European countries, technologies for composting biodegradable organic waste have become widespread. In total, 1/5 of all waste is composted in the EU. The main impetus for the development of such technologies was the adoption of directives on waste disposal. By 2006, the directive prescribed a 75% reduction in biodegradable waste sent to landfills compared to 1995. To achieve this goal, EU countries have developed appropriate plans to reduce landfill biodegradable waste. To reduce the volume of these wastes, various alternative technologies are used, including composting

Composting of organic waste can occur both directly in households and centrally. Directly in households, composting occurs either simply in compost pits or in using special composting apparatuses. With centralized composting, consumers provide a separate collection of organic matter, which is then transported to specially equipped sites or to silos, where the compost is laid. Subsequently, this compost is used for agricultural purposes.

The highest level of composting of biodegradable wastes was reached in the Netherlands, Belgium, Austria and Germany (more than 50%); the lowest is in the UK and Ireland (less than 5%) [5].

To comply with the directives on waste disposal and reduce the amount of organic matter in landfills in most EU countries, the export of biodegradable waste to landfills is prohibited.

EU legislation (in particular, the directive on waste incineration) imposes strict restrictions on the level of harmful emissions in waste incineration plants; therefore, their construction technologies imply efficient wastewater treatment plants. Despite the fact that the construction of such plants is quite expensive, they often compete with the disposal of waste at landfills. The reason for this is the introduction of high taxes on disposal.

Regarding the environmental safety of such facilities, the experience of Sweden shows that, despite the growth in the volume of household waste in recent years, the emission of dioxins into the atmosphere from incinerators is only 5–6% of all emissions, i.e. as much as in previous fires at landfills.

Among the EU countries, five - Sweden, Denmark, Holland, Belgium, Austria, and Switzerland, burn more than 30% of all waste for the production of electricity and heat. Modern combustion technologies allow using 80% of the energy contained in the waste.

The least incineration technologies are used in Finland, Great Britain, Iceland, Ireland, Spain, Italy, Greece and Portugal (less than 15% of waste is incinerated). Nevertheless, in Finland in recent years, there is an active development of waste incineration technologies for the production of energy and heat - the so-called gasification of waste and the relevant facilities are already functioning.

The most active "incinerator" is Germany (60 plants annually destroy about 16.6 million tons, which is about 50% of the total waste produced in the country). The resulting energy mainly serves to generate heat; a small part goes to the production of electricity. France has 120 incineration plants with a capacity of 12 million tons per year. One such plant has Luxembourg and Finland. There are 34 of them in Denmark, only 4 in Norway. In Sweden, about 40% of all private garbage is burned: 2 million tons per year at 26 plants. In general, in the EU, 1/5 of the total waste is burned at factories [3].

In a number of countries, special facilities are used at landfills for the collection and disposal of methane. The collected gas is also used to produce heat / hot water and electricity. This method is not yet widely used due to the high cost of equipment.

One of the least attractive alternatives in waste management is their disposal in landfills. According to Eurostat, only four countries in Europe - Denmark, Belgium, the Netherlands and Switzerland - buried less than 20% of their waste at landfills using other processing technologies. On average, the EU is buried in landfills about 2/3 of all waste.

Land filling at landfills involves not only the loss of valuable resources, but also causes the following problems:

- Emission of greenhouse gases (in particular methane) into the atmosphere, as well as penetration of hazardous liquid substances into groundwater, since many landfills are not equipped with systems for collecting such substances;

- Reduction of polygon capacities. According to Eurostat, landfill potential in 8 EU countries will be exhausted in less than 10 years.

In accordance with the instructions of the directive, EU countries are developing their national strategies to reduce the amount of disposed biodegradable municipal waste [3].

Thus, the world community has a sufficient number of technologies for industrial recycling of paper, tire covers, rubber, scrap metal, broken glass, wood, polymers, etc. It is important to choose the right environmentally safe technology and organize effective flows of production and consumption waste.

The waste management system should be directed towards the processing and extraction of secondary resources, which is clearly shown by economically developed countries and what needs to be implemented in waste management in the Republic of Kazakhstan.

In the Concept on the transition of the Republic of Kazakhstan to a "green" economy, approved by Decree of the President of the Republic of Kazakhstan dated May 30, 2014 No. 577, improving the management of solid household waste is among main areas.

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4.5. Выбросы из Атырауского НПЗ и воздействие вредных веществ на атмосферу

Нурсауле Рауловна Тауова

Атырауский государственный университет им. Х. Досмухамедова,
магистр естественных наук, старший преподаватель
(г. Атырау, Казахстан)

Бегимана Абсултановна Карарова

студентка 2 курса, специальности 5В060800 - Экология
Атырауский государственный университет им. Х. Досмухамедова
(г. Атырау, Казахстан)

Основными загрязняющими атмосферу веществами при проведении строительных работ будут вещества, выделяемые при работе двигателей строительной техники и транспорта, а также пыль, образуемая при их движении и при осуществлении земляных работ. Строительная техника и транспорт, которые будут использовать Подрядчик при проведении строительных работ, является основным источником неорганизованных выбросов. [1, с. 75].

Таблица 1 - Перечень и характеристика загрязняющих веществ от стационарных и передвижных источников при проведении строительных работ

№	Наименование вещества	ПДК м.р., ОБУВ, мг/м ³	ПДК с.с.	Класс опасности
1.	Оксид углерода	5,0	3,0	4
2.	Оксид азота	0,4	0,06	3
3.	Углеводороды	200 (ОБУВ)	-	4
4.	Бенз(а)пирен	-	10 ⁻⁶	1
5.	Сернистый ангидрид	0,5	0,05	3
6.	Сажа	0,15	0,05	3
7.	Пыль неорганическая: выше 70% двуокись кремния (Динас и др.)	0,15	0,05	3

№	Наименование вещества	ПДК м.р., ОБУВ, мг/м ³	ПДК с.с.	Класс опасности
8.	Сварочная аэрозоль,	0,5	0,15	3
9.	в т.ч. оксиды марганца	0,01	0,001	2
10.	в т.ч. оксиды железа	-	0,040	3
11.	в т.ч. неорганическая пыль	0,3	0,1	3

Расчет выбросов загрязняющих веществ в атмосферу

Расчеты выбросов вредных веществ в атмосферу произведены в соответствии с требованиями: «Правила инвентаризации выбросов вредных веществ в атмосферный воздух» (№ 217-п от 04.08.05 г.).

Расчет выбросов загрязняющих веществ в атмосферу произведен согласно:

- «Методическим указаниям по расчету выбросов загрязняющих веществ в атмосферу предприятиями строительной индустрии», Алматы, 2007 г.;

- «Методическому пособию по расчету выбросов от неорганизованных источников в промышленности строительных материалов», Новороссийск, 2006 г.

Расчет рассеивания вредных веществ в атмосферу

В соответствии с нормативными документами для оценки влияния выбросов вредных веществ на качество атмосферного воздуха проектируемого объекта используется математическое моделирование. Расчет содержания вредных веществ в атмосферном воздухе должен проводиться в соответствии с требованиями «Методики расчета концентраций в атмосферном воздухе вредных веществ, содержащихся в выбросах предприятий» РНД 211.2.01.01-97.

Данная методика предназначена для расчета приземных концентраций в двухметровом слое над поверхностью земли. При этом «степень опасности загрязнения атмосферного воздуха характеризуется наибольшим рассчитанным значением концентрации, соответствующим неблагоприятным метеорологическим параметрам, в том числе опасной скорости ветра. Так как основной источник выбросов передвижного характера, а также учитывая кратковременный период работ, проведение расчета рассеивания приземных концентраций не целесообразно. [2, с. 101].

Обоснование размера санитарно-защитной зоны

В соответствии с «Санитарными правилами и нормами по гигиене труда в промышленности» (1.06.061-94) размеры санитарно-защитной зоны (СЗЗ) вновь строящихся предприятий, в том числе временных, зависят от типа технологических процессов и используемого оборудования. Нормативной размер санитарно-защитной зоны в период производства строительных работ согласно СНППО 1.01.001-94 установлен равным 300 м. Вокруг территории проведения работ

санитарно-защитная зона должна приниматься шириной 300 м. [3, с. 45]. *Предложения по установлению ПДВ*

Ввиду кратковременности проведения работ и незначительным количеством валовых выбросов вредных веществ в атмосферу, расчетные значения выбросов загрязняющих веществ от стационарных источников можно принять как предельно-допустимые выбросы.

Таблица 2 - Перечень предельно-допустимых выбросов вредных веществ в атмосферу от передвижных источников при сжигании дизельного топлива

Код вещества	Наименование загрязняющих веществ	Класс опасности	ПДК максимально-разовые, мг/м ³	ПДК среднесуточные, мг/м ³	Выбросы вредных веществ	
					г/с	тонн / период
0304	Оксиды азота	3	0,4	0,06	0,0395	0,00841
0337	Оксид углерода	4	5	3	1,6252	0,1141
0330	Сернистый ангидрид	3	0,5	0,05	0,0369	0,01612
0402	Углеводороды (бутан)	4	200	-	1,0317	0,0472
0328	Сажа	3	0,15	0,05	0,0254	0,012135
0703	Бенз(а)пирен	1	-	10 ⁻⁶	2,4*10 ⁻⁶	2,5*10 ⁻⁷
Всего:						0,19796525

Таблица 3 - Перечень предельно-допустимых выбросов вредных веществ в атмосферу от стационарных источников

Код вещества	Наименование загрязняющих веществ	Класс опасности	ПДК максимально-разовые, мг/м ³	ПДК среднесуточные, мг/м ³	Выбросы вредных веществ, тонн / период
2907	Пыль неорганическая: выше 70% двуокись кремния (Динас и др.)	3	0,15	0,05	1,06695
2902	Сварочная аэрозоль,	3	0,5	0,15	0,0034
0143	в т.ч. оксиды марганца	2	0,01	0,001	0,00032
0123	в т.ч. оксиды железа	3	-	0,040	0,003
2908	в т.ч. неорганическая пыль	3	0,3	0,1	0,000079
Всего:					1,07035

Организация контроля за выбросами

Контроль за соблюдением нормативов ПДВ должен осуществляться в соответствии с рекомендациями РНД 211.2.02.02-97 и РНД 211.3.01.06-97. Ответственность за организацию контроля и своевременную отчетность возлагается на подрядчика строительных работ.

Ввиду того, что в данном случае имеются только неорганизованные источники выбросов, действующие периодически (строительная техника и транспорт), контроль сводится к поддержанию исправного технического состояния используемых строительных машин с обязательной проверкой на токсичность выбросов. [4, с. 82].

Мероприятия по снижению выбросов ВВ в атмосферу

Производство работ по строительству здания лаборатории связано с выделением токсичных газов при работе двигателей

строительной техники и транспорта, а также пылеобразование при их движении и при осуществлении земляных работ.

С целью охраны окружающей природной среды и обеспечения нормальных условий работы обслуживающего персонала необходимо принять меры по уменьшению выбросов загрязняющих веществ.

Основными мероприятиями по уменьшению выбросов загрязняющих веществ в атмосферу являются:

- организация движения транспорта;
- исправное техническое состояние используемой строительной техники и транспорта;
- использование поливомоечных машин для подавления пыли;
- разработка технологического регламента на период НМУ;
- обучение персонала реагированию на аварийные ситуации;
- соблюдение норм и правил противопожарной безопасности;
- не допускать разлива ГСМ;
- хранить производственные отходы в строго определенных местах. [5, с. 92].

Платежи за выбросы загрязняющих веществ в воздушную среду

Стимулирование природопользователей в проведении природоохранных мероприятий, рациональном использовании всего природно-ресурсного потенциала осуществляется с помощью экономического механизма природопользования, предусматривающего систему экологических платежей.

Здесь рассмотрены виды платежей за фактическое загрязнение природной среды, т.е. такие природоохранные платежи, как плата за выбросы, которые могут рассматриваться как форма компенсации ухудшения состояния среды и, соответственно, как стоимостное выражение ущерба, пропорциональное интенсивности оказываемого воздействия. [6, с. 25].

Этот вид платежей можно отнести к регулярным природоохранным платежам, которые устанавливаются на стадии проектирования. Исходя из обзора планируемой деятельности, воздействие на окружающую среду при штатных работах (облагающееся регулярными платежами) будет включать:

- выбросы загрязняющих веществ в воздушную среду;

Расчет платежей за выбросы в атмосферный воздух от стационарных источников, в процессе которых происходит выброс вредных веществ.

Платежи за нормативные выбросы в атмосферный воздух рассчитывались по следующей формуле:

$P_n = P * M_{n1/4}$, где:

P_n - размер платежей предприятия за нормативные выбросы загрязняющих веществ, тенге;

P - региональный норматив платы за выбросы, тенге / условная тонна;

$M_{н1/4}$ - приведенный годовой нормативный объем выбросов (условных тонн).

Приведенный объем рассчитывается по формуле:

n

$$M_{н1/4} = \sum_{i=1} M_{н1/4} * K_i, \text{ где:}$$

$M_{н1/4}$ - норматив i -го загрязняющего вещества в натуральном выражении, тонн;

n - количество загрязняющих веществ;

i - вид загрязняющего вещества;

K_i - коэффициент приведения, учитывающий относительную опасность i -го загрязняющего вещества, рассчитанный по формуле:

$$K_i = 1/ПДК_i, \text{ где:}$$

ПДК _{i} - предельно-допустимая концентрация i -го загрязняющего вещества (мг/м³, г/м³).

Расчет платежей за выбросы в атмосферный воздух с передвижных источников, при сжигании дизельного топлива и бензина.

$$П_{ф} = V_{ф} * P_{н}, \text{ где:}$$

$П_{ф}$ - сумма платежей за расчетный период, тенге;

$V_{ф}$ - объем автотоплива, тонны;

$P_{н}$ - норматив платы за выбросы загрязняющих веществ передвижными источниками, тенге/физическая тонна, ежегодно устанавливаемый региональными властями. [7, с. 71].

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4.6. Аналитический контроль химического состава питьевой воды по г. Экибастузу

Александра Игоревна Ержанова

магистрант. Инновационный Евразийский университет
(г. Павлодар, Казахстан)

Проблема качества питьевой воды затрагивает многие аспекты жизни человеческого общества на протяжении всей его истории. В настоящее время питьевая вода является социальной, политической, медицинской, географической, а также инженерно-экономической проблемой. Понятие «питьевая вода» сформировалось сравнительно недавно и его можно найти в санитарных нормативах и правовых актах о питьевом водоснабжении [1].

Питьевая вода - вода, которая соответствует своему качеству в естественном состоянии или после обработки (очистки, дезинфекции) установленных нормативных требований и предназначена для питьевых и бытовых нужд человека или для производства пищевых продуктов. Речь идет о требованиях к сочетанию свойств и состава воды, при которых она не оказывает вредного влияния на здоровье человека, как при приеме внутрь, так и при использовании в гигиенических целях, а также при производстве продуктов питания.

Контроль питьевой воды в больших городах проводится на всем пути движения воды от источников до водозаборов станций водоподготовки, на этапах очистки воды, перед подачей в городскую распределительную сеть и в узловых точках сети. Казалось бы, при наличии такой обширной системы контроля поставлен надежный заслон к проникновению вредных веществ в распределительную сеть. Однако, в последние десятилетия в результате интенсивного антропогенного воздействия химический состав не только поверхностных, но и подземных вод заметно изменился, при этом в пробах обнаруживают свинец, хром, ртуть, медь, цинк и т. д. [2].

Результаты исследований, проведенных в 2018 году на базе химической лаборатории ГКП «Горводоканал» в г. Экибастузе свидетельствуют, что всего по учётным данным в водопроводной сети города, по сравнению с очищенной водой, увеличивается содержание алюминия в 1,7-32,3 раза, железа - 1,2-5,5 раза, цинка - 1,3-116,3 раза, брома - 1,7-5,0 раза, стронция - 1,1-1,4 раза, кадмия - от нулевых концентраций до 0,0004-0,0865 мг/л (Таблица 1).

Таблица 1 - Содержание микроэлементов и тяжелых металлов в водопроводной сети г. Экибастуза

Элемент	Проба 1	Проба 7	Проба 8	Проба 9	Проба 11	Проба 12	Проба 19	Проба 22	Проба 23	Проба 25	Проба 26	Проба 27	Проба 29	Проба 30
Li	0,0037	0,0036	0,0034	0,0032	0,0036	0,0036	0,0033	0,0032	0,0034	0,0037	0,0034	0,0041	0,0044	0,0045
Be	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0,0876	0,1061	0,0798	0,0758	0,0747	0,0832	0,0534	0,0547	0,0787	0,0862	0,0772	0,0943	0,1038	0,0784
Na	19,113	18,425	16,731	18,582	18,307	16,64	16,784	15,68	16,038	17,141	17,432	17,927	18,798	17,296
Mg	7,6799	9,1125	6,7265	8,209	8,1289	6,4634	6,9687	6,0959	6,473	7,5843	8,8108	8,2272	9,5361	8,1927
Al	4,9039	1,2742	1,7539	0,2623	0,8557	0,6727	0,2537	0,3522	0,5955	0,6652	0,7202	0,5066	0,7396	0,4382
Ca	28,031	27,989	24,459	24,941	25,298	24,746	20,698	21,016	24,563	26,654	26,465	27,671	28,404	25,552
П	0,0063	0,0075	0,0043	0,0074	0,0071	0,005	0,0048	0,0043	0,0059	0,0054	0,006	0,0059	0,0055	0,0068
V	0,0023	0,0021	0,0018	0,0022	0,0024	0,0018	0,0014	0,0017	0,0018	0,0025	0,0026	0,0025	0,0026	0,0018
Cr	0,0023	0,0028	0,0029	0,0041	0,0041	0,0033	0,0045	0,0065	0,004	0,0044	0,002	0,0033	0,0036	0,0041
Mn	0,0636	0,0532	0,0979	0,0531	0,0531	0,0281	0,0738	0,0617	0,048	0,0659	0,0647	0,0624	0,054	0,0576
Fe	0,9301	0,7871	1,8126	1,2351	1,2351	0,628	2,4978	1,3724	1,0898	1,4782	1,2912	2,2436	1,2118	1,4962
Co	0,0005	0,0004	0,0003	0,0002	0,0005	0,0003	0,0005	0,0003	0,0005	0,0005	0,0004	0,0006	0,0004	0,0004
Ni	0,0072	0,0009	0	0	0,0024	0,001	0,0175	0	0,0142	0,0091	0	0,0068	0,0014	0,0015
Си	0,0278	0,0489	0,0966	0,0156	0,0518	0,0211	0,0213	0,0183	0,0461	0,0451	0,0244	0,0333	0,0358	0,073
Zn	0,1408	0,1961	0,9351	0,0157	0,0356	0,0627	0,0479	0,014	0,0752	0,0574	0,0154	0,0365	0,0375	0,4424
Ga	0,0015	0,0012	0,001	0,0011	0,0012	0,0011	0,0009	0,0008	0,0014	0,0013	0,0013	0,0012	0,0012	0,001
Ge	0,0019	0,0023	0,0105	0,0004	0,0005	0,0004	0,0006	0,0002	0,0012	0,0009	0,0006	0,0007	0,0006	0,0051
As	0,0005	0,0006	0,0005	0,0002	0,0003	0,0003	0,0002	0,0002	0,0003	0,0003	0,0004	0,0003	0,0004	0,0006
Br	0,0326	0,0694	0,0323	0,059	0,0556	0,0413	0,0641	0,048	0,0344	0,0604	0,064	0,0668	0,0676	0,0457
Rb	0,0013	0,0007	0,0006	0,0007	0,0007	0,0007	0,0006	0,0005	0,0007	0,0009	0,0008	0,0007	0,0007	0,0006
Sr	0,2059	0,2182	0,17	0,2131	0,2198	0,1967	0,1737	0,1914	0,1822	0,2045	0,2217	0,2149	0,22	0,2055

В 15 из 30 отобранных проб питьевой воды содержание алюминия превышает ПДК (1,01-9,8 ПДК), железа - во всех пробах (2,1-10,0 ПДК), цинка - в одной пробе (СТО «Подкова» - 1,3 ПДК), кадмия - в одной пробе (по ул. Ауэзова - 86,5 ПДК).

Повышенное содержание алюминия обнаружено в пробах воды, отобранных в гостинице «Белочка» (9,8 ПДК), городского управления ООЗ (2,5 ПДК), микрорайоне № 31 (3,5 ПДК), микрорайоне № 22 (1,7 ПДК), микрорайоне № 23 (1,3 ПДК), микрорайоне № 15 (1,2 ПДК), микрорайоне № 8 (1,3 ПДК), микрорайоне № 5 (1,4 ПДК), микрорайоне № 4 (1,5 ПДК), микрорайоне № 6 (5,9 ПДК), микрорайоне № 32 (1,6 ПДК), СТО «Подкова» (микрорайон № 29; 1,6 ПДК), микрорайоне № 28 (1,3 ПДК), микрорайоне № 10 (1,2 ПДК), в КСК по ул. Привокзальная, 15 (4,4 ПДК).

В питьевой воде, поступающей к потребителю, происходит накопление большого количества металлов (алюминий, железо, цинк, бром, стронций, кадмий). В большинстве районов города питьевая вода по содержанию в ней железа и алюминия не соответствует требованиям ГОСТ 2874-82.

По данным городского управления охраны общественного здоровья, одним из факторов изменения эпидемиологической ситуации и роста уровня заболеваемости в г. Экибастузе является ухудшение качества питьевой воды, поступающей потребителю по химическим и микробиологическим показателям.

Основной причиной ухудшения качества питьевой воды в города является недостаточная пропускная способность водозаборных очистных сооружений, а также неудовлетворительное техническое состояние водопроводных сетей и подкачивающих сооружений. Кроме того, ввиду большой степени износа водопроводной и канализационной сетей и систематических аварий на водоводах и распределительных устройствах происходит вторичное загрязнение водопроводной сети, в результате качество питьевой воды при транспортировке ее от очистных сооружений до потребителей существенно ухудшается, в ней происходит накопление токсичных элементов и тяжелых металлов.

Вопросам качества питьевой воды в настоящее время уделяется большое внимание, так как оно влияет на жизнедеятельность человеческого организма, его работоспособность и общее самочувствие.

С целью профилактики эндемических заболеваний проводятся специальные мероприятия по обработке питьевой воды. В тех случаях, когда основных способов обработки воды недостаточно, используются специальные методы очистки, позволяющие снизить риск возникновения эндемических заболеваний и предупредить эпидемические болезни [3].

Если требуется очистка воды, используются несколько типов фильтров и систем, в частности:

1. Механические фильтры являются простейшими фильтрующими устройствами. При такой фильтрации механически задерживаются частицы, твердые вещества, взвешенные в воде или находящиеся на ее поверхности. В любой системе очистки механический фильтр является первоначальным устройством.

2. Ионообменные фильтры удерживают нежелательные примеси, находящиеся в воде в виде ионов. Различают анионообменные и катионо-обменные фильтрующие материалы. Последние предназначены для удаления металлов, в том числе и тяжелых металлов.

3. Сорбционные фильтры, предназначенные для устранения растворенных газов и разнообразных органических примесей. Наиболее распространенным материалом для этого метода является активированный уголь.

4. Системы очистки воды обратным осмосом.

Чаще всего при водоочистке используется сразу целый комплекс систем фильтрации, что повышает эффективность очищения [4].

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SECTION V / СЕКЦИЯ V

LANGUAGE, CULTURE AND CONTEMPORARY GLOBAL CHALLENGES / ЯЗЫК, КУЛЬТУРА И СОВРЕМЕННЫЕ ГЛОБАЛЬНЫЕ ВЫЗОВЫ

5.1. Personal Pronouns and Demonstratives in the Kazakh Language and Their Deictic Meanings

Shynar A. Ospankulova

PhD student, Al-Farabi Kazakh National University (Almaty, Kazakhstan)

Kazakh is an agglutinative and highly inflected language which belongs to the South Kipchak group of the Turkic languages (Kirchner, 1998:318). It is the official state language of Kazakhstan and a mother tongue for more than 10 million people all around the world. However, up until the early 90's of the 20th century, due to historical events the Kazakh language was not spoken by the majority of its population, Russian was the predominant language both in spoken and written communication. This fact in turn caused the problem of underrepresentation of Kazakh language in various fields such as science, politics, official documentation, etc. Only after gaining independence a proper attention is paid to the study of the Kazakh language. Problems of indexicality and deictic expressions in the Kazakh language haven't also been studied and represented on scientific basis as required.

A deictic expression or deixis is a word or phrase that are interpreted with respect to the three dimensions **time**, **place** and **person** (Stukenbrock, 2014:73). Deixis is expressed by personal pronouns, demonstratives, adverbs, articles and tense, etc. The Kazakh language has a good number of words and expressions to indicate the person, time and space of the speech, there are also grammatical categories used to individuate referential objects (tense, number, affixes, etc.). As Levinson states:

- deixis belongs to the area of pragmatics because it directly involves the relationship between the structure of language and the context in which it is used (Levinson, 1983:55),

- so, this paper is going to analyse the use of personal pronouns and demonstratives in the Kazakh language as the means of conveying indexicality from the pragmatic and cultural points of view.

There are eight forms of the personal pronouns in the Kazakh language. The main feature of Kazakh personal pronouns is that all of them (except *men*) are pluralised by adding plural endings (See Table 1). Although the plural form of the 1st person *biz* means more than two persons, sometimes in order to add emphasis on the speakers it is doubly pluralised: *Bizder mektepke keldik* (We came to the school).

Table 1. Personal pronouns.

Person	Singular	Plural
1st	<i>men</i>	<i>biz</i>
2nd informal	<i>sen</i>	<i>sen + der</i> (plural ending)
2nd formal	<i>siz</i>	<i>siz + der</i> (plural ending)
3rd	<i>ol</i>	<i>o+lar</i> (plural ending)

Another distinctive feature of Kazakh pronouns (from English) is that there are two forms: formal and informal forms of the 2nd person. The formal form of the second person is used when i) an interlocutor is older than a speaker; ii) there is some distance between them, they don't know each other very well; iii) in formal situations. In the deictic field suggested by K. Buhler (Buhler, 1990) Kazakh personal pronouns may also have other additional meanings. For example, let's take a situation where a speaker who usually used to use the informal form of the 2nd person addresses an interlocutor by using 2nd formal form: It means that the speaker wants to set some distance between them because of certain reasons. There is only one form 'ol' for the singular form of the 3rd person and it is used as the demonstrative pointing to an object which is not seen but exists/existed/will exist. The use of anaphoric reference to an elderly person 'ol' is an offensive and impolite manner, Kazakh people use 'ol (demonstrative) + kisi' (that man) or their names, instead.

Personal pronouns in the Kazakh language are declined as nouns (See Table 2).

Table 2. Declension of pronouns.

Nom	<i>men</i>	<i>sen</i>	<i>siz</i>	<i>ol</i>	<i>biz</i>	<i>sender</i>	<i>sizder</i>	<i>olar</i>
Acc	<i>meni</i>	<i>seni</i>	<i>sizdi</i>	<i>ony</i>	<i>bizdi</i>	<i>senderdi</i>	<i>sizderdi</i>	<i>olardy</i>
Gen	<i>meniń</i>	<i>seniń</i>	<i>sizdiń</i>	<i>onyń</i>	<i>bizdiń</i>	<i>senderdiń</i>	<i>sizderdiń</i>	<i>olardyn</i>
Dat	<i>mağan</i>	<i>sağan</i>	<i>sizge</i>	<i>oğan</i>	<i>bizge</i>	<i>senderge</i>	<i>sizderge</i>	<i>olarğa</i>
Loc	<i>mende</i>	<i>sende</i>	<i>sizde</i>	<i>onda</i>	<i>bizde</i>	<i>senderde</i>	<i>sizderde</i>	<i>olarda</i>
Abl	<i>menen</i>	<i>senen</i>	<i>sizden</i>	<i>odan</i>	<i>bizden</i>	<i>senderden</i>	<i>sizderden</i>	<i>olardan</i>
Inst	<i>menimen</i>	<i>senimen</i>	<i>sizben</i>	<i>onymen</i>	<i>bizben</i>	<i>sendermen</i>	<i>sizdermen</i>	<i>olarmen</i>

There are the examples for the singular form of the 1st person *men*:

Men keldim. – I came.

Ol *meni* shaqyrdy. – He invited *me*. *Meniń* kitabym – My book.

Ol *magan* kitap berdi. – He gave *me* a book.

Mende kitap bar. – I have got the book.

Ol *menen* kitap aldy. – He took a book *from me*. Ol *menimen* okidy. – He studies *with me*.

In sentences verbs are conjugated when they are used with the certain type of the personal pronoun. E.g. *Men keldi+m* (I came). *Sen keldi+ń*. (You came). In colloquial speech, the subject of the sentence is usually dropped, until it is emphasized. In such cases the addressee understands its meaning

by the grammatical categories of the verb used in it. For example, in the following sentences (*Men*) *Kirsem bolady ma?* - May (I) come in? (*Biz*) *Kirsek bolady ma?* - May (we) come in? the subjects' *men* (*I*) and *biz* (*we*) which refer to the speaker are dropped. Due two different verb forms: *kirsem*, *kirsek* the addressee decodes the number of the speakers. In narrative texts personal pronouns may have exophoric meaning. In the sentence "- Mǎngǔrtsiń, sen!" (- Mankurt, you are!) the personal pronoun addresses not only the character it is said to directly, but the whole young people of that period who were becoming mankurt (mankurt is a term that originates from an old Central-Asian legend, where the term is given to a slave taken among the colonized and tortured so severely that he forgets his past (Ims, 1980:208).

The modern Kazakh language offers four-way distinction among demonstratives: *bǫl*, *sol*, *osy* and *ol*. If we take into account the Lyons's person-oriented system,

- 1) *bǫl* refers to the thing close to the speaker;
- 2) *sol* - to the thing close to the addressee;
- 3) *osy* – close to both the speaker and addressee; and
- 4) *ol* – invisible and away from both the speaker and addressee.

N.K. Dmitrijev divided demonstrative pronouns into two substantial groups. According to him, historically Kazakh demonstrative pronouns were divided into *bǫl* (a visible object) and *ol* (an invisible object but participants of the communicative act know that it exists) to indicate distance and proximity spatially and temporally. Such demonstratives like *bǫl*, *mynau*, *osy*, *osynau* and *ol*, *sol*, *sonau*, *anau*, *ana* were derived from these groups (Nazarova, 2011:83).

To conclude, this paper is the author's attempt to demonstrate the use of personal pronouns and demonstratives in the Kazakh language as the means of expressing indexicality.

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5.2. Роман "Never Let Me Go" («Не отпускай меня») Кадзуо Исигуро в переводе на русский язык

Эльмира Викторовна Крыкпаева

магистрант Евразийского национального университета
им. Л.Н. Гумилева (г. Астана, Казахстан)

Аннотация

В статье рассматривается перевод произведения британского писателя Кадзуо Исигуро "Never Let Me Go". Отмечаются языковые и культурные особенности данного произведения, создающие сложности в интерпретации оригинального текста переводчиком.

Ключевые слова: Кадзуо Исигуро, перевод, переводчик, роман, антиутопия, Леонид Мотылев, трудности перевода, антропонимы, фразеологизмы.

Кадзуо Исигуро - известный британский писатель японского происхождения, лауреат Нобелевской премии по литературе 2017 года, автор восьми книг, переведенных более чем на 40 языков. Его творчество находится на границе двух культур.

Роман «Не отпускай меня» по праву считается одной из вершин творчества Исигуро. Роман номинировался на Букеровскую премию 2005 года и включен в 100 лучших англоязычных романов с 1923 года по версии журнала «Тайм» и был дважды экранизирован: в 2010 г. в Великобритании режиссером Марком Романек, где главные роли исполнили Кэри Маллиган, Эндрю Гарфилд и Кира Найтли, и в 2016 г. в Японии в формате мини-сериала.

Книга «Не отпускай меня» была издана в 2005 году. В 2006 году на русский язык книгу перевел известный литературный переводчик Леонид Мотылев.

В романе "Never Let Me Go" («Не оставляй меня», 2005) Кадзуо Исигуро создал параллельный реальному мир клонов-доноров, чьи органы предназначены для спасения людей, чья жизнь коротка и трагична, чьи мечты безыскусны, но несбыточны.

Многое в восприятии творчества Исигуро определяется этнокультурной принадлежностью писателя: японец, пишущий на английском языке, неизбежно воспринимается как носитель мультикультурного сознания.

Критики и журналисты неоднократно задавали ему вопрос о той литературной традиции, к которой он себя причисляет. На что Исигуро ответил: «Я считаю, что принадлежу к западной литературной традиции. И меня очень удивляет, что критики так часто упоминают о том, что я японец, и пытаются вспомнить двух-трех писателей, о которых они слышали, сравнивая меня с Мисимой или еще с кем-нибудь. Мне кажется, это не уместно. Я вырос на западной литературе: Достоевский, Чехов, Шарлотта Бронте, Диккенс» [1]. Он изучал английский язык и философию в Университете Кента, потом работал в приюте для бездомных детей, затем учился писательскому мастерству в Университете Восточной Англии в Норидже, где его наставниками были известные литераторы – Анджела Картер и Малколм Брэдбери. Его литературная карьера началась в 1981 году, когда в британской антологии, представляющей молодых авторов, «Introduction: Stories by New Writers» были опубликованы три его рассказа. В 1983 году имя Исигуро вошло в список 20 лучших молодых британских авторов журнала Granta, одного из самых авторитетных изданий в литературном мире (рейтинг составляется раз в 10 лет).

Его первый роман «Там, где в дымке холмы» ("A Pale View of Hills") вышел в свет в 1982 году и был отмечен национальной литературной премией. Второй роман «Художник зыбкого мира» ("An Artist of the Floating World", 1986) получил Уитбредовскую премию в номинации «Книга года». Третий роман «Остаток дня» ("The Remains of the Day", 1989) был удостоен Букеровской премии.

Исигуро написал 7 романов: в 1995 году «Безутешные» ("The Unconsoled"), в 2000-м «Когда мы были сиротами» ("When we were Orphans"), в 2015-м – «Погребенный Великан» ("The Buried Giant"). В 2009 году вышел сборник рассказов писателя – «Ноктюрны» ("Nocturnes: Five Stories of Music and Nightfall"). За роман 1989 года "Остаток дня" Исигуро был удостоен престижной Букеровской премии.

Книги Исигуро переведены более чем на 30 языков, включая русский (в том числе "Остаток дня", "Когда мы были сиротами", "Не отпускай меня", "Там, где в дымке холмы").

5 октября 2017 года Шведская академия присудила Нобелевскую премию по литературе Кадзуо Исигуро. Наградой он отмечен за "раскрытие в романах большой эмоциональной силы бездны, скрывающейся за нашим иллюзорным чувством связи с миром" [2].

Кадзуо Исигуро часто называет себя международным писателем, цель которого — создавать международные романы.

«Не отпускай меня» - фантастичный по форме и меланхоличный роман о жизни клонов, повествует о проблемах человечности, любви,

одинокости и памяти. При внешней простоте языка в нем поднимаются острейшие проблемы современности, связанные с ответственностью человека и общества в целом перед будущим.

Действие разворачивается в альтернативной современной реальности - в антиутопической Великобритании 90-х годов, где достижения науки позволили создать людей исключительно для использования их органов с целью медицинских пожертвований, которые принесут пользу другим обычным людям.

Клоны в романе изображены как скоротечная составляющая реальности. У клонов обычные английские имена: Kathy, Ruth, Tommy, но нет настоящих фамилий, только начальные буквы после имени: Kathy H., Jenny B.

Мир, который представляет роман, поразительно похож на тот, который мы знаем, за исключением зловещих последствий и факта, что клоны также являются его частью.

Роман описывает жизни трех хороших друзей, Кэти, Рут и Томми, начиная с их раннего детства до самого неизбежного и преждевременного конца их жизни. «Донорам», как их называют, разрешено достигать зрелости, но, в конечном итоге, они должны пожертвовать своими жизненно важными органами и умереть. Никто из них не знает о своем истинном предназначении, находясь в среде, которая сознательно изолирована от окружающего мира.

Повествование ведется от лица главной героини, Кэти Ш.: "My name is Kathy H. I'm thirty-one years old, and I've been a carer for over eleven years" [3, с. 3]. Отсутствие фамилии здесь намеренно скрыто, потому что это подчеркивает анонимность персонажей, в то время как использование имени поддерживает некоторый уровень знакомства с читателем. Кэти часто обращается к читателю напрямую: "I don't know how it was where you were", тем самым вынуждая читателя участвовать в повествовательном мире в той же роли, что и она сама. Другими словами, читателю предлагается самостоятельно представить события, обстоятельства и возможности жизни Кэти [4].

Роман «Не отпускай меня» — это книга о воспоминаниях молодой женщины Кэти Ш., о ее детстве в школе Хейлшем, дружбе с Рут и Томми, любви, взрослой жизни, о постоянном поиске ответов и обреченности. Сочетая в себе признаки романа - антиутопии и серьезного реалистического повествования с элементами притчи, читатель сталкивается с несколькими временными и пространственными пластами.

Романам Исигуро свойственна недоговоренность, выражающаяся в недомолвках, умолчаниях, пропусках. Мотив тайны того, что «говорят и не говорят» опекуны постепенно трансформируется в философский вопрос о сущности их пребывания в этом мире. Выбирая такую нетипичную для своего творчества жанровую форму, автор говорит все

о тех же проблемах: место человека в истории, роль памяти и прошлого в жизни человека.

Структура романа состоит из трех частей, каждая из которых представляет определенный этап в жизни трех героев. Первая часть напоминает об их детстве и раннем подростковом возрасте, а также других мальчиков и девочек, которые живут с ними. Быть воспитанником Хейлшема считается «привилегией» и гордостью на протяжении всей их жизни, а также поводом для зависти со стороны студентов за ее пределами. Вторая - пребывание в Коттеджах, и, наконец, третья – взрослый период разъездов по стране, от одного реабилитационного центра к другому. Кроме того, существует «верхний» временной пласт – настоящее, в котором ведет свое повествование Кэти – оба пласта соединятся в финале.

Хейлшем воспринимается его воспитанниками и клонами из других интернатов как некое идеальное место для взросления и подготовки к «жизни» в реальном мире, туда стремятся вернуться, но он недоступен, исчезает, как мираж: «I might pass the corner of a misty field, or see part of a large house in the distance as I come down the side of a valley, even a particular arrangement of poplar trees up on a hillside, and I'll think: «Maybe that's it! I've found it! This actually is Hailsham!» Then I see it's impossible and I go on driving, my thoughts drifting on elsewhere. In particular, there are those pavilions. I spot them all over the country, standing on the far side of playing fields, little white prefab buildings with a row of windows unnaturally high up, tucked almost under the eaves» [5, с. 6].

В романе достаточно реалистично отражены пространственные и временные параметры: узнаваемая Англия последнего десятилетия прошлого века, маленькие, как на фотографиях, городки, школы, где учебные предметы и занятия спортом занимают одинаковое место в программах, где работают лишь строгие и безгласные воспитатели и учителя. Пространство романа организовано вокруг центра – школы Хейлшем – и постепенно расширяется, теряя четкость и пространственную определенность.

Дети воспитываются в школе-интернате, затем становятся подростками. Но, в силу обстоятельств, эти дети «другого мира», которые отличаются от обычных, жизнь этих детей будет довольно короткой, то есть они уже станут взрослыми по их образу жизни. В основном, их жизнь должна окончиться раньше, во взрослом, но молодом возрасте.

Многих критиков и читателей заинтересовал вопрос о том, почему герои не борются, не бегут от такой злосчастной судьбы, когда для этого есть все возможности, а просто безропотно смиряются со своей судьбой. Понятие долга нашло здесь свое отражение, характерное для японской культуры. Кэти считает крайне важным «хорошо ты справляешься или нет»: «Согласна, сейчас уже, наверно, хвастаюсь. Но это очень много для меня значит — ощущение, что я хорошо делаю

свое дело, особенно ту его часть, что должна помочь донору оставаться в категории «спокойных», или «Так что я не ради хвастовства говорю». Сам автор признал, что книга задумывалась как обобщенная метафора человеческой жизни. Очевидно, роман производит такое пронзительное впечатление, вызывает наше сочувствие именно потому, что ни сюжет, ни философский подтекст не делают героев «другими», не похожими на нас самих [6].

В этом романе К. Исигуро показывает метафору детской жертвы: мир требует от них жертв, он раскрадывает, растаскивает их по кускам — ради того, чтобы продлить свое нынешнее существование, в котором больше нет будущего [7].

И этот авторский замысел удалось передать переводчику Леониду Юльевичу Мотылеву.

Мотылев Леонид Юльевич (родился в 1955 году) - переводчик англоязычной прозы, лауреат премий «Инолит» (1999), «Единорог и лев» (2007) [8].

Леонид Мотылев - переводчик романа Джона Уильямса «Стоунер», также в его переводах вышли книги «Завещание Оскара Уайльда» П. Акройда («The Last Testament of Oscar Wilde», 1993), «Неестественные причины» Филлис Дороти Джеймс («Unnatural Causes», 1994), «Гарри Поттер и Орден Феникса» Дж. К. Роулинг («Harry Potter and the Order of the Phoenix», 2004), «22:04» Бен Лернер (2015, роман), «Стоунер» Джона Уильямса («Stoner», 2015) и другие.

Из последних переведенных книг — «Двенадцать ночей» Э. Зерчера («Twelve Nights», 2019), «Добрее одиночества» Июнь Ли («Kinder Than Solitude», 2018), «Останется при мне» Уоллеса Стегнера («Crossing to Safety», 2017), «Безгрешность» Д. Франзена («Purity», 2016) и другие.

В интервью ток-шоу «Культуротека» с Игорем Поповым, Мотылев подробно рассказал о своем происхождении, выборе профессии и о некоторых переведенных им книгах.

Леонид Мотылев родом из советской интеллигентской семьи, в 1971 году окончил Московскую школу. Благодаря занятиям в школе он осознает интерес к литературе. Его отец советовал ему ни в коем случае не идти в гуманитарии, имея в виду, что быть гуманитарием в советское время — это значит подчиняться идеологическим требованиям, не быть свободным. Поэтому Л. Мотылев поступил на факультет прикладной математики, защитил диссертацию и стал кандидатом физико-математических наук.

Леонид Мотылев начал переводить прозу, когда ему было уже за 30. Огромную роль он отводит Ю.Я. Яхниной и И.М. Бернштейн, которые повлияли на становление им переводчиком. До перевода прозы первые переводками были стихи немецкоязычного поэта Райнера Рильке.

Первая переведенная книга была документальная о русской миграции в 30-е годы. Вторая – роман, основанный на материале биографии Оскара Уайльда, - «Завещание Оскара Уайльда» Питера Акройда («The Last Testament of Oscar Wilde»), опубликованная в 1993 году. «Роман этот был довольно трудный, он был труден с точки зрения интонации, где нужно было имитировать интонацию Уайльда. Вторая трудность заключалась в том, что нужно было изучить позднюю викторианскую эпоху, ее культурные явления и черты», - поясняет Леонид Юльевич в одном из интервью.

В интервью с Е. Калашниковой, Л. Мотылев заметил, что в романе «Не отпускай меня» кое-где чувствуются элементы японской ненавязчивой поэтики, предоставляющей читателю самому сопоставить образы и что-то понять или почувствовать. Так или иначе, национальное — только один из уровней его прозы. То, что он стремится выразить, носит общечеловеческий характер. Одной из специфических трудностей с переложением этого романа на русский он считает передачу специфической тональности. Одна из конкретных трудностей – это перевод слова «donation».

«Акт донорства» – слишком тяжеловесно и торжественно, «пожертвование» звучит даже несколько издевательски. Слово должно быть простым, обиходным. Я остановился на «выемке», понимая, что пропала грамматическая связь с «донором» и ушел элемент добровольности. Думаю, однако, что это решение было правильным и потеря невелика: о донорстве в книге и без того говорится достаточно. Это тот нередкий случай, когда идеального переводческого решения не видно и твоя задача — минимизировать потери», - поясняет Л. Мотылев.

Рассмотрим лексико-семантические особенности перевода произведения Кадзуо Исигуро «Не отпускай меня».

Имя собственное — всегда реалия. В речи оно называет действительно существующий или выдуманный объект мысли, лицо или место, единственные в своем роде и неповторимые. В каждом таком имени обычно содержится информация о локальной и национальной, принадлежности обозначаемого им объекта. Антропони́мы произведения могут классифицироваться по ономастическим разрядам: личные имена, топонимы, хрононимы.

Анализ имен собственных «Never Let Me Go» выявил тот факт, что в переводе произведения на русский язык присутствует четкая закономерность передачи английских букв или звуков. Взяв за основу типологию ономастических типов соответствий в переводе, предложенную Д. И. Ермоловичем, были выделены следующие методы формирования и типы соответствий в переводах «Never Let Me Go» на русский язык: прямой графический перенос (англ.: Glenmorgan – рус.: Гленморган), транскрипция аллофоническая, фонематическая, «практическая» (англ.: Mr Roger, Jenny C. – рус.: Мистер Роджер,

Дженни С.), транслитерация (англ.: Moira, Keffers – рус.: Мойра, Кефферс), морфограмматическая модификация (англ.: Miss Geraldine, Annete B. – рус. Мисс Джеральдина, Аннетта Б.).

Еще один антропоним - Crow Face (Клювастая) – так звучит в русском переводе прозвище суровой медсестры Триши, которое дали ей воспитанники. "Crow" в переводе с английского означает «ворона», в данном контексте «Клювастая» дает полное представление и описание того, что хотел передать переводчик, ассоциируя эту женщину с вороной.

В рамках данного произведения топонимы несут на себе заметно выраженную смысловую нагрузку, имеют необычный звуковой облик, обладают скрытым ассоциативным фоном. Например, Nailsham, интернат, где воспитывались клоны, (топоним - композит, состоящий из существительных hail - град, приветствие и sham - притворство), расположенный в идиллической сельской Англии, явно показывает авторский замысел [9, с. 169]. Это место, где тебе рады и всегда приветствуют, но при этом все это не по – настоящему.

Norfolk (Норфолк), место, куда отправились главные герои, Кэти назвала «краем потерь» во время диалога с Томми. Автор не зря выбрал именно это графство на востоке Англии. С этим местом связано исчезновение Норфолкского полка во время нападения турков. Название этого места несет в себе скрытый ассоциативный фон, поэтому Кэти его так называет. "People going north and south"—she moved the pointer up and down — "they bypass it altogether. For that reason, it's a peaceful corner of England, rather nice. But it's also something of a lost corner", - так рассказывала мисс Эмили об этом графстве Англии.

Derbyshire (Дербишир), еще одно из графств, о котором рассказывала мисс Эмили, относится к топониму – композиту и означает следующее: «derby» происходит от норвежского Djúra-bý, записанное на англо-саксонском как Deoraby (оленья деревня); «shire» в переводе означает «округ, графство».

Dover (Дувр) - город и порт в Великобритании, в английском графстве Кент, расположен при впадении в Па-де-Кале реки Дувр и получил название по гидрониму. Упоминается в IV в. как Dubris. В основе гидронима «кельт, dobran, dwfr (дувр) – «вода, река». Болото, куда герои отправились посмотреть на старую рыбацкую лодку, находилось в часе езды от Дувра. Замысел автора здесь ассоциативный и несет в себе японский контекст. Водная стихия всегда занимала важное место в жизни японцев, они придавали огромное значение небольшим источникам воды, как вместилищу неведомого и опасного.

Учитывая повествование Кэти о жизни в школе Хейлшем, где существовала своя социальная группа, в тексте произведения присутствуют жаргонизмы. Например, "tokens controversy" Л. Мотылев

перевел как «жетонные дебаты» - средства, которые заменяли детям деньги на Ярмарке. Или тема с «расстёгиванием» (“unzipping”), когда воспитанники «расстёгивали у себя какое-то место и вываливали почку в ладонь», для них это был способ портить друг другу аппетит. «Unzip, slip out, dump» в тексте перевода звучит как «вывалиться», а расстёгивание – unzipping.

Учитывая жанр и современность произведения, в нем встречается много вульгаризмов. В качестве примеров можно привести: rubbish - дрянь, shit - какашки, potty - чокнутая, prostitutes - проститутки, gutter - помойка, toilet - толчок, cow pats – коровьи лепешки, sticking bottoms out – выставившие зад. Почему Л. Мотылев перевел на русский язык, подобрав именно такие слова? Ведь можно было вместо «какашки» употребить «дерьмо», а вместо «толчок» просто «туалет»? Это связано с тем, что героиня по-детски повествует о событиях, и поэтому необходимо было употребить такие слова, которые бы показывали молодежный сленг и непосредственность, но вместе с тем и некую мудрость героини и остальных персонажей.

Как известно, фразеологизмы являются важнейшими стилистическими средствами для выражения красоты языка и культуры народа. В переводе Леонида Мотылева встречаются метод эквивалентного перевода фразеологизмов и метод фразеологического аналога. Несмотря на трудность перевода фразеологической единицы в тексте англоязычного художественного произведения, перевод фразеологизмов на русский язык Леонид Мотылев передал эмоционально и в соответствии со стилем романа. Так, в переводе “heart sank” – «сердце падало» был использован метод фразеологического эквивалента; метод фразеологического аналога: “to have someone on” – «морочить голову», “clever way of telling off” – «сделать втык», “not to breathe a word” – «молчать как рыба», “to have enough of someone” – «быть сытым по горло», “feel a blush rising to someone’s cheeks” – «горят щеки». В некоторых случаях переводчиком используется творческий поиск варианта перевода, где он исключает «дословности», интерпретируя их в виде русских фразеологизмов. Например, “if you’re going to play stupid games I can’t be bothered” переведено как «не вешай лапшу на уши», “everyone always listening in” – «все время лишние уши», “and he’ll know you’re not bullshitting about me” – «и не будет думать, что ты пудришь ему мозги», “I can’t rush back into it with Ruth” – «не хочу бросаться сломя голову к Рут».

В силу того, что в романе присутствует некая недосказанность, умолчание, автор использует эвфемизмы. К примеру, модель клона заменяется на «возможное я»; операция по удалению того или иного органа — на «первую, вторую, третью и четвертую выемки»; сиделка — «помощник донора»; умер — на «завершил, поставил точку, кончил» [10].

В ходе исследования нам удалось пообщаться с Леонидом Мотылевым и задать несколько вопросов по роману «Не отпускай меня». На вопрос о том, сложно ли было переводить это произведение, учитывая его специфичность и японский контекст, он ответил: «Переводить всегда непросто, и этот роман не исключение. Не уверен, что можно говорить про японский контекст: контекст здесь общечеловеческий. Скорее можно говорить про следы японской (и, шире, восточной) литературной традиции: какие-то вещи просто ставятся рядом, и читатель сам должен установить между ними связь (как, скажем, между приметами времени года и душевного состояния автора в японских хокку). Нечто подобное у К. Исигуро: зачем герои стремятся увидеть лодку, застрявшую в болоте, не объясняется, читатель сам должен увидеть в этой лодке метафору положения героев. В этом же эпизоде Рут «смотрит на серебристый след дальнего самолета, медленно поднимающегося по небу». Что для нее этот самолет? Образ отлетающей души кого-то из «завершающих» клонов? Читатель сам должен почувствовать, что этот образ не случайно здесь появился, и соотнести его с характером Рут, всегда стремящейся, насколько это вообще дано клонам, выйти за пределы ситуации, в которую она поставлена. И вторая стилистическая особенность (уже не «японская») – это язык рассказчицы. Я давно не заглядывал в английский оригинал, да его и нет у меня сейчас, но, помнится, кто-то называл язык Кэти чуточку «школьным». Я это почувствовал и постарался передать в переводе (не знаю, насколько это получилось). Ее язык, в общем, правильный и выдает образованность, тонкость и ум, но она как бы стесняется слишком уж «литературничать», инстинктивно чувствуя, что ей не положено по статусу клона, идущего на органы, слишком ярко себя выставлять».

Смысл этого произведения Леонид Юльевич Мотылев видит в том, что автор хотел передать более яркую «рельефную» картину жизни, сведя ее к детству, подростковому возрасту и молодости. На фоне этой судьбы разворачивается драма человеческих отношений трех человек, где были дружба, любовь, ревность, уступки, предательство и раскаяние, примирение.

Роман «Never Let Me Go», переведенный на русский язык замечательным переводчиком англоязычной прозы Леонидом Мотылевым, повествует о любви, дружбе, долге и памяти. Несмотря на то, что персонажи романа – клоны, именно это придает значение их жизни. Читатели могут подумать, что клоны менее человечны, не обладают свободой волей или даже душой. Однако, цель романа – показать всю полноту, глубину и своеобразие человеческих отношений путем раскрытия их души, взаимоотношений и эмоций, которые явно отражают их человечность.

Заглавие романа «Не отпускай меня» многие понимают по-разному. В нем кроется «старый мир», более человечный, на смену

которому идет мир более жестокий, оснащенный технологиями, который отдаляет героев друг от друга. Героиня не хочет, чтобы этот «старый мир» уходил и отпускал ее. Эти финальные строки в романе показывают это: «But as I say, I don't go searching for it, and anyway, by the end of the year, I won't be driving around like this anymore. So, the chances are I won't ever come across it now, and on reflection, I'm glad that's the way it'll be. It's like with my memories of Tommy and of Ruth. Once I'm able to have a quieter life, in whichever centre they send me to, I'll have Hailsham with me, safely in my head, and that'll be something no one can take away» [11, с. 281].

Стоит отметить, что сдержанная тональность текста романа объясняется не тем, что в данном произведении прослеживается японский контекст, а тем, что автор хотел прежде всего создать эффект отчужденности для того, чтобы читатель не принимал во внимание факт того, что писатель иностранец.

Роман «Never Let Me Go», определяемый как антиутопия, исследует проблемы человека, ставя под сомнение человеческие отношения с окружающим миром и, как таковой, заслуживает того, чтобы быть прочитанным.

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5.3. Художественные средства языка СМИ

Зайра Галимовна Джакупова

магистрант. Северо-Казахстанский государственный
университет им. М. Козыбаева
(г. Петропавловск, Казахстан)

Татьяна Александровна Морозова

Магистр, старший преподаватель.
Северо-Казахстанский государственный
университет им. М. Козыбаева
(г. Петропавловск, Казахстан)

Аннотация

В работе дана общая характеристика профессиональной лексики, описаны особенности лексики СМИ. Кроме того, выявлено значение языковой игры для лексики СМИ.

Введение

Актуальность. В настоящее время, развитие Интернета, как одного из главных источников получения информации, привело к некому «загрязнению» языка. Связано это во многом с тем, что пишут для Интернет-сайтов не профессиональные лингвисты или журналисты, а люди, часто не имеющие специального образования и, как следствие, достаточного уровня знаний в языковой культуре и лингвистических правилах. Поэтому, очень важно, чтобы профессиональные журналистские тексты были насыщены правильной, но при этом эффективной и интересной лексикой.

Новизна исследования состоит в том, что статье представлен анализ значимости языковой игры для эффективности воздействия лексики СМИ на людей.

Цель исследования: изучение особенностей лексики СМИ.

Задачи:

1. Дать общую характеристику профессиональной лексики;
2. Описать особенности лексики СМИ;
3. Выявить значение языковой игры для лексики СМИ.

Методы: анализ, синтез, описание.

Профессиональная лексика, в общем виде, представляет собой характерную для той или иной профессиональной группы лексику,

используемую в речи людей, которые объединены между собой общей специальностью. Например: «на-гора» в речи шахтеров; «камбуз» – «кухня на судне» в речи моряков; «полоса», «шапка» в речи полиграфистов и журналистов.

Главная специфическая черта профессиональной лексики — это ограниченность ее употребления.

Средства массовой информации — это сфера человеческой деятельности, которая в век информации и информатизации оказывает огромное влияние на всю нашу жизнь, в том числе и на культуру. Чтобы определить, какое место в языке занимают лексические единицы, представляется правомерным остановиться на характеристике самих средств массовой информации и их роли в осуществлении межкультурной коммуникации, так как именно решение коммуникативных задач лежит в основе прагматики.

Профессиональная лексика СМИ является неотъемлемым компонентом культурной компетентности, в состав которой входит специальная лексика, известная неспециалисту в данной области (консубстанциональные термины). Наряду с этой лексикой, представляющей общелитературный пласт языка, в состав рассматриваемой лексики входят также термины и профессиональный жаргон [5, с. 22]

Для того, чтобы сделать лексику СМИ более запоминающейся и эффективной, журналисты используют такой приём, как языковая игра.

Многочисленные лингвистические работы, посвященные различным аспектам изучения феномена языковой игры, свидетельствуют о глубоком исследовательском потенциале данного языкового явления.

В современной научной литературе существуют различные трактовки термина языковая игра, впервые введенного в научный оборот философом Л. Витгенштейном. Так, стилистический энциклопедический словарь русского языка определяет языковую игру как «определенный тип речевого поведения говорящих, основанный на преднамеренном (сознательном, продуманном) нарушении системных отношений языка, т.е. на деструкции речевой нормы, с целью создания неканонических языковых форм и структур, приобретающих в результате этой деструкции экспрессивное значение и способность вызывать у слушателя / читателя эстетический и, в целом, стилистический эффект» [4, с. 57].

В.З. Санников, анализируя семантические, синтаксические и прагматические характеристики языковой игры на различных языковых уровнях, предлагает следующее определение: «Языковая игра - это некоторая неправильность (или необычность), осознаваемая и намеренно допускаемая говорящим или пишущим» [6, с. 54].

Одним из наиболее распространенных элементов языковой игры является образование новых слов из аббревиатур.

Образование производных от аббревиатур – в настоящее время регулярный и продуктивный процесс. Изучение стилистических характеристик отаббревиатурных образований свидетельствует о том, что их стилистический диапазон гораздо шире, чем у производящих аббревиатур. Они не образуют, как аббревиатуры, обособленной группы официально-деловых слов, а используются в различных стилях. Отличительной чертой отаббревиатурных производных является то, что их стилистическая окрашенность создаётся в основном за счёт словообразовательных средств, в отличие от слов неаббревиатурных, стилистическая принадлежность которых может быть выражена лексически.

Особой стилистической выразительностью обладают производные от аббревиатур окказиональные слова. Причины появления окказиональных слов, в том числе и отаббревиатурных, различны и тесно связаны с их функциями в речи. Для отаббревиатурных окказионализмов наиболее характерны экспрессивно-стилистическая и номинативная функции. Экспрессивно-стилистическая функция является основной в таких словах, как тюзянин – «житель ТЮЗа», зритель (по типу: Сургут – сургутянин), фымышонок – ученик ФМШ – физико-математической школы (по типу: мышь – мышонок), бомжеватый – похожий на бомжа (по типу: молодец – молодцеватый), гэбьё – собирает. гэбэшники, сотрудники отдела ГБ (по типу: бабы – бабьё), кагэбэшня – собирает. кагэбэшники, агенты КГБ (по типу: малыш – малышня), Эсэнговия – СНГ (по типу: киргиз – Киргизия), эмтивизация – всеобщее увлечение MTV (по типу: автомобиль – автомобилизация), энтэвэшней (сравнит. степень прилаг.) – в значении «интересней, как на канале НТВ» (по типу: интерес – интересней), эсэнгово (нар.) – в значении «плохо», созвучно – дерьмово (по типу: толковый – толково).

Почти все отаббревиатурные глаголы окказиональны и также выполняют экспрессивно-стилистическую функцию: бомжировать – прочёсывать местность в поисках пустых бутылок, как бомж (по типу: паразит – паразитировать), амикнуться – откликнуться на предложение компании АМик (по типу: ау – аукнуться), орудирован – знаком с основами регулировки уличного движения (ОРУД) (по типу: эрудиция – эрудирован), оэрзеть – болеть ОРЗ (по типу: боль – болеть), экагэкатся – делать ЭКГ (по типу: фото – фотографироваться), релиновать – покрывать релином (по типу: глазурь – глазурировать), свидетели ЕГЭовы – наблюдатели на ЕГЭ (каламбур по созвучию к «свидетели Иеговы»), баба-ЕГЭ – наблюдатель на ЕГЭ (каламбур по созвучию к «Баба-Яга») и т. п. Окказионализмы этого типа не являются единственными наименованиями соответствующих реалий, а представляют собой экспрессивные синонимы к словам узуальным.

Необычность окказионального слова на фоне узуального сообщает ему особую выразительность и даёт возможность автору

точно передать своё мироощущение, своё состояние, дать оценку явлению или факту. Все названные выше окказиональные слова, за исключением каламбурных, произведены по продуктивным типам, но с нарушением условий их образования. Известно, например, что суффикс -анин-(-янин-) присоединяется к основам со значением местности и формирует узуальные слова, обозначающие жителей: северянин, волжанин и т. п. Соединение его с основами иного семантического плана – это нарушение структурно-семантической формулы, собирающее слову новизну и необычность. Словом, тюзяне названы зрители, как жители ТЮЗа: «Спектакль очень понравился тюзянам, они громко и долго аплодировали, провожая актёров» [1].

Классификация С.А. Мироненко включает три разновидности языковой игры – омонимия, омофония и использование прецедентных текстов.

При омонимии совпадает фонетика и графика выражаемых сторон. Здесь наглядно выделяется одна из частей слова или словосочетания. Например, материал о том, что средний рост жителей Мордовии за последние десятилетия стал существенно больше, называется «ПриРост населения». За основу берется выражение, обозначающее увеличение количества людей. Но в нем графически выделяется часть «рост населения», и заголовок приобретает новый смысл, хотя частично сохраняется и старый.

Еще одним примером данного вида каламбура является заголовок материала о трехкратном чемпионе лондонских Параолимпийских игр в беге на дистанциях 100, 200 и 400 метров Евгении Швецове. Текст называется «ЕВгений бега» [2]. Здесь графически выделена часть «гений бега», что символизирует заслуги и феноменальные успехи спортсмена.

Также омонимией является название текста о саранских спекулянтах, продававших втридорога билеты на домашние матчи ФК «Мордовия». Игры саранской команды проходили на стадионе «Старт», поэтому текст имеет заголовок «„Стартовый“ капитал». Здесь известное словосочетание осталось в неизменном виде, но, сохранив старый смысл, приобрело новый.

При омофонии, как и омонимии, фонетика совпадает, зато графическое оформление отличается. Ярким примером второго типа каламбура является заголовок материала о том, что выпускники школ для высоких результатов ЕГЭ нанимают в помощь студентов или преподавателей. Текст называется «И грянул балл». К слову «бал» добавили букву л. Несмотря на фонетическое сходство, выражение приобрело совершенно другое значение.

Еще один пример данного типа языковой игры – заголовок к материалу о покупке пиротехники в преддверии Нового года – «абСАЛЮТный слух». В устойчивом словосочетании «абсолютный слух» изменили одну букву, поэтому внутри образовалось слово

«салют», что вызывает у читателей аналогию с фейерверками, хлопушками и петардами.

Но омонимия и омофония достаточно редко встречаются в заголовках газетных текстов. Самым распространенным видом каламбура в названиях материалов средств массовой информации является использование прецедентных текстов. Это законченный и самодостаточный продукт речемыслительной деятельности. Любому среднему члену лингвокультурного сообщества он хорошо знаком, как и варианты его восприятия.

К таким выражениям человек многократно обращается в процессе коммуникации. Прецедентным текстом может быть название фильма, географическое наименование, фразеологизм, имя известной личности, литературного персонажа или киногероя. За каждым из них стоит своя уникальная система ассоциаций, возникающая в сознании носителей языка. Это и придает силу данному каламбуру.

Изменяя прецедентный текст, автор сохраняет старый смысл и одновременно добавляет новый. Причем сохраняется структура привычного высказывания. Такое перефразирование привлекает внимание читателей своей оригинальностью.

Конкретным примером использования прецедентного теста служит заголовок газеты «Вести» «Сукин Ын» в материале со свидетелем конфликта между Северной и Южной Кореей, а также угрозах Ким Чен Ына применить ядерное оружие [3]. Данный каламбур образован на основе словосочетания «сукин сын». Здесь наглядно прослеживаются функции языковой игры. Во-первых, это комический эффект. Употребление в таком контексте имени лидера КНДР вызывает смех у читателей. Во-вторых, языкотворческая функция. Также каламбур показывает негативное авторское отношение к описываемому событию.

Таким образом, языковая игра — это разновидность лингвистической модернизации слова или выражения, способствующая приданию этому выражению нового, более выразительного смысла. Использование языковой игры делает лексику СМИ более яркой и интересной для читателя.

Заключение

Профессионально-терминологическая лексика является одной из влиятельнейших пластов русского словаря, оказывающим сильное воздействие на развитие и судьбы русского литературного языка, это слова и словосочетания, которые называют предметы и понятия, относящиеся к различным сферам трудовой деятельности и не являющиеся общеупотребительными. В специальную лексику входят термины и профессионализмы;

СМИ являются неотъемлемым компонентом культуры, а, следовательно, и культурной компетентности. Роль СМИ в обществе в

настоящее время чрезвычайно велика, а следовательно, и велика роль профессиональной лексики СМИ;

Граница между терминологической и общеупотребительной лексикой в СМИ нестабильна и имеет не исторический, а функциональный характер, и постоянно происходит как процесс превращения терминов в общеупотребительные слова, так и использование бытовой лексики для формирования терминологий.

Языковая игра как средство передачи мыслей, чувств, эмоций, ощущений, невербализованных идей автора становится все более востребованной в газетах. Основными функциями языковой игры выступают развлекательная – развлечь и привлечь внимание и комическая – создать комический эффект. Иронический контекст вообще характерен для речи носителей современного русского языка. Это связано с действием нескольких факторов: ощущение «все уже сказано»; стремление не выставлять свои чувства, эмоции, переживания напоказ, так как «всем сейчас непросто»; общее ироническое восприятие действительности («Если жаловаться на свою проблему, она становится больше; если над ней посмеяться – она исчезает»). Из-за этого ирония сопровождает сегодня большинство газетных заголовков.

Языковая игра — это разновидность лексической модернизации текста, способствующая приданию этому тексту нового, более выразительного смысла.

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- список научных трудов, с выделением работ, опубликованных после присуждения ученой степени и присвоения ученого (академического) звания;
- оттиски 3 (трех) наиболее значимых опубликованных научных работ (если работы большие, то – первые и последние страницы с выходными данными);
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«За вклад в развитие педагогической науки»

Золотой медалью им. Яна Амоса Коменского «За вклад в развитие педагогической науки» награждаются руководители организаций образования, профессорско-преподавательский состав высших учебных заведений, педагогические работники организаций повышения квалификации педагогических кадров, а также ветераны педагогического труда:

- за заслуги в области педагогической науки;
- за решение важных научно-педагогических задач или разработку новых направлений в педагогике;
- за подготовку высококвалифицированных научно-педагогических кадров (докторов и кандидатов наук, докторов PhD);
- за выдающиеся достижения в научно-педагогической деятельности.

К награждению Золотой медалью им. Яна Амоса Коменского «За вклад в развитие педагогической науки» могут быть представлены авторы значимых научных работ по педагогике:

- статей, опубликованных в сборниках материалов зарубежных международных научно-практических конференций;
- статей, опубликованных в международных рецензируемых научных журналах с ненулевым импакт-фактором (входящих в базы Скопус, Томсон Рейтер);
- монографий, учебников или учебных пособий, изданных в любом отечественном или зарубежном издательстве, или размещенных на постоянной основе в открытом доступе в сети Интернет.



Золотая медаль им. А. Маслоу

«За вклад в развитие гуманитарных наук»

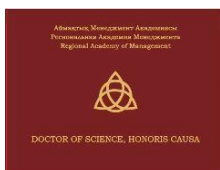
Золотая медаль им. А. Маслоу «За вклад в развитие гуманитарных наук» учреждена в целях признания заслуг ученых в области гуманитарных наук (07.00.00 - исторических, 08.00.00 – экономических, 09.00.00 - философских, 10.00.00 - филологических, 12.00.00 - юридических, 13.00.00 - педагогических, 17.00.00 – искусствоведения, 19.00.00 - психологических, 22.00.00 - социологических, 23.00.00 - политических, 24.00.00 - культурологии). Основными принципами отбора кандидатов для награждения являются: инновационность, профессионализм, общественная репутация, академическая репутация и приверженность идеалам гуманизма.



Золотая медаль им. Н. Тесла

«За вклад в развитие техники и технологии»

Золотая медаль им. Н. Тесла «За вклад в развитие техники и технологии» учреждена в целях поощрения наиболее выдающихся ученых в области инженерно-технических, физико-математических и других точных наук; успешных предпринимателей, внедряющих инновационные производственные технологии; а также передовых руководителей производства, инженеров, изобретателей и рационализаторов-практиков.



Диплом Почётного доктора наук (Doctor of Science, Honoris Causa)

Академическая степень Почётного доктора наук (Doctor of Science, Honoris Causa) присваивается ученым, достигшим больших успехов и получившим известность в какой-либо области научных знаний, без прохождения курса обучения в докторантуре и без защиты докторской диссертации.

Почётные доктора наук привлекаются к научной и преподавательской деятельности и читают лекции в лучших вузах многих стран мира.



Нагрудный знак «Почетный доктор наук (Doctor of Science, Honoris Causa)»

С целью возрождения академических традиций и повышения авторитета ученых и преподавателей, внесших значительный вклад в науку, и удостоенных академической степени Почетного доктора наук (Doctor of Science, Honoris Causa), учрежден нагрудный знак «Почетный доктор наук (Doctor of Science, Honoris Causa)», изготовленный из драгоценных металлов: золота и серебра. Он предназначен для ношения на правой стороне груди.



Нагрудный знак «Профессор»

С целью возрождения университетских традиций и повышения авторитета ученых и преподавателей, имеющих ученые или академические звания ассоциированного профессора (доцента) или профессора, учрежден почётный нагрудный знак «Профессор», изготовленный из драгоценных металлов: золота и серебра. Он предназначен для ношения на правой стороне груди.



Нагрудный знак «Доцент»

С целью возрождения университетских традиций и повышения авторитета ученых и преподавателей, имеющих ученое или академическое звание доцента, учрежден почётный нагрудный знак «Доцент», изготовленный из драгоценного металла: серебра с позолотой. Он предназначен для ношения на правой стороне груди.

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