

IRSTI: 14.07.01

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IMPACT OF HUMAN VALUES ON PHYSICS LESSONS FOR HIGH SCHOOL STUDENTS

Abstract. Human values serve as the foundation for ethical conduct that every individual considers important. Human Values' importance lies in fostering positive social dynamics, enhancing personal well-being, and upholding principles of ethical living. This study examined how high school students understood human values in physics classes and how they related to academic subjects. The values examined were responsibility, friendship, peace, respect, honesty, and tolerance. 150 students from two private and two private high schools in various Kazakhstani cities participated in the study during the 2023–2024 academic year. 57% (f=86) of the participants were female, and 43% (f=64) of the participants were male students. The "Human Values Scale" created by Dilmac (2007) was used to collect the data for this study and the percentage, frequency, correlation, and independent samples-t test were used to examine the data. Based on the computations, it was determined that there was no significant difference in the human values subscale scores of responsibility, friendship, peace, tolerance, honesty, and respect between the male and female participants. Findings suggest that incorporating discussions on underlined values within the Physics curriculum can enhance student motivation, comprehension, and overall academic success. Additionally, a direct association was observed between success in the Physics course and the aspect of Responsibility within the values scale. Conversely, no notable correlations were detected between academic achievement and the sub-dimensions of human values.

Key words: Human values; physics achievements, high school.

Introduction

In today's world, the advancement of technology relies heavily on the progress made in the field of physics. The level of influence wielded by leading nations correlates directly with their technological advancements. Individuals with a strong background in physics possess the capability to comprehend various technological innovations and can apply principles of physics to overcome challenges in their everyday lives. Essentially, physics serves as a facilitator, enhancing the quality of our daily experiences. Nonetheless, numerous studies revealed that daily progress in physics science is decreasing. (Council, 2001;). Studies carried out in the last few decades have repeatedly shown that physics draws fewer students than other sciences such as mathematics, chemistry, and biology. As a result, fewer students are enrolled in undergraduate physics programs (Zohar, 2005).

The article sets out on an empirical inquiry that examines the multifaceted connection between human principles and high school students' involvement in physics classes in light of these academic ideas. In the context of physics education, we aim to shine a light on the mechanisms via which values influence students' attitudes, actions, and learning outcomes by applying theoretical frameworks from the fields of educational psychology, sociology, and moral education.

This study aims to provide empirical evidence that informs policymakers and educational practitioners on the importance of implementing values-based approaches into physics curriculum and classroom instruction. It does this through the use of qualitative and quantitative research methods. We are interested in expanding the conversation on good pedagogy, student involvement, and holistic education in high school settings by clarifying the influence of human values on students' experiences in physics courses.

The purpose of the research is to look into high school students' human values about two things:

gender and physics achievement. Thus, the aim of this research was to ascertain the human values held by high school students and ascertain whether gender influences each of these principles. Nonetheless, the goal was to ascertain the relationship between the subdimensions of human values and the physics accomplishments of high school pupils.

Methods and materials

The general scanning model was used among the scanning models in this study. The goal of research techniques like scanning models is to completely describe a situation that has happened in the past or is currently in existence. (2009, Karasar). Students in high school were asked to compare their human values using the gender variable. It has been looked at whether or not student opinions on the gender variable differ significantly from one another. This research also employs a relational questionnaire paradigm because of its gender component (Erkuş, 2005). One kind of research model that is used to determine the relationship between two or more variables is the relational survey, which looks for signs of cause-and-effect interactions (Karasar, 2009).

Participants

150 students from three private high schools in three different Kazakhstani cities participated in the research during the 2023–2024 academic year. Upon analyzing the demographic parameters of the participants, it was observed that 43% ($f = 64$) of the students were male, and 57% ($f = 86$) were female. Table 1 provides the specific information pertaining to the research sample.

	Variables	Frequency	Percentage(%)
Gender	Male	64	43
	Female	86	57
	Total	150	100
Grade	9 th Grade	62	41.3
	10 th Grade	88	58.7
	Total	150	100

Table 1 demonstrates that the research sample comprises 88 (58.7%) and 62 (41.3%) students in the 10th and 9th grades.

Data Collection Tools Human Values Scale (HVS)

The "Human Values Scale (HVS)," developed by Dilmaç (2007) for high school students, was used to identify the human values of the pupils. The 42 items on the scale are divided into six subscales: Honesty, Respect, Responsibility, Friendship, Peaceful, and Tolerance.

It can be provided individually or in groups and is a five-point Likert scale (A: Never, B: Rarely, C: Sometimes, D: Frequently, E: Always). The scores for the items were as follows: A:1, B:2, C:3, D:4, E: 5.

Data Analysis

In order to analyze the data for the study and draw the required conclusions, parameters such as frequency, mean, independent samples t-test, and Pearson correlation analysis were employed.

Evaluation of the collected research data was done using the SPSS 20 program.

Results

In this part, Tables 2–6 describe the research findings. The participants' average physics achievement results are displayed in Table 2.

Table 2. The physics achievements mean of the participants

Gender	Frequency	Physics Achievement Mean
Male	64	3.52 out of 5
Female	86	3.74 out of 5
Total	150	3.63

Table 2 shows that male students have a mean physics success score of 3.52, while female

students have a mean value of 3.74. The average student accomplishment score in physics is 3.63 points. The data extracted from the "Human Values Scale (HVS)" is given in Table 3 below.

Table 3. The data collected from the "Human Values Scale (HVS)" for high school students

№	Items	Never	Rarely	Sometimes	Frequently	Always
1	I take responsibility for what I do.	8	2	10	68	62
2	I am really close to my friends.	12	3	16	44	75
3	I would rather live in harmony with everyone on the planet.	18	19	36	33	44
4	I value my ties with other people..	3	8	13	71	60
5	I don't hold back when speaking the truth, regardless of the outcome.	8	11	47	44	40
6	People around me make "small mistakes," but I don't care.	13	13	44	46	34
7	I don't complete school assignments until they are required of me.	19	33	26	36	36
8	Friendship is really important to me.	5	1	10	50	84
9	I find peaceful solutions to my issues rather than using force.	8	1	42	56	33
10	I think that everyone on the planet is created equal.	27	18	19	20	66
11	When I need assistance from my friends, we get together.	81	33	16	8	12
12	I have no qualms with listening to my friends' problems.	6	3	16	42	83
13	I don't shy away from the obligations that I think I can handle.	5	1	20	38	86
14	In bad times, I want my friends to be by my side.	10	8	16	38	78
15	When I grant my requests, I don't think about the others in the community.	36	42	33	23	16
16	I try to be a model in terms of respect for others around me.	4	8	34	57	47
17	I do not expect a response while helping people.	5	5	21	62	57
18	I don't correct my wrong-doing friend.	33	43	39	20	15
19	I make an effort to complete the assignments on time.	5	4	29	51	61
20	I want my friends to be with me at all times.	8	5	19	47	71
21	I don't watch any violent television.	40	34	41	17	18
22	I can respect everyone's viewpoint.	23	22	54	23	28
23	I'm thrilled when I get money that I deserve.	15	2	6	22	115
24	I think that it's important to avoid people.	16	35	47	22	30
25	I willingly accept the responsibilities given to me by the school.	31	29	45	28	17
26	Because of my friends, I am able to get over my challenges.	23	23	38	50	16
27	I try to use conversation to resolve the issues.	10	26	51	39	24
28	I consistently caution my friends against lying.	22	28	43	29	28
29	If I know something negative will happen, I won't tell the truth.	34	26	36	22	32

30	I don't think much of how someone looks. how someone looks.	12	11	43	49	35
31	My friends are always hearing my warnings about not doing their part.	12	17	47	37	37
32	I am able to do everything for my friends.	11	11	25	45	58
33	I am unhappy because of all the wars in the world.	8	8	34	49	51
34	It is significant, I tell others around me.	9	13	43	57	28
35	Even when it means upsetting my friends' relationships, I make an effort to be honest.	21	29	36	31	33
36	I pardon all errors made against me.	31	19	45	26	29
37	I fulfill my obligations both inside and outside of school, so I never run out of work.	14	9	30	48	49
38	I give my friends my whole attention.	11	12	36	49	42
39	I think talking to people will help me deal with my issues.	7	7	42	55	39
40	In my life, I have always respected others.	6	8	15	45	76
41	Everything is not right to say anywhere.	11	13	49	30	47
42	I do not welcome my friends' mistakes.	4	10	72	51	12

Upon careful examination of each sub-dimension's items, the lowest and highest frequencies for each sub-dimension are discovered; for example, item 25 has the lowest frequency and item 1 has the highest frequency for the responsibility sub-dimension. In the friendship subdimension, item 8 has the greatest rating and item 26 the lowest. According to the peaceful sub-dimension, item 21 is the lowest and item 33 is the highest. Regarding the respect sub- dimension, item 4 is the highest and item 22 is the lowest. The honesty sub- dimension is ranked lowest for item 11 and highest for item 23. According to Table 3, item 12 has the highest tolerance sub-dimension while item 18 has the lowest.

Table 4. The values of the participants' sub-dimensions and the items that make up the "Human Values Scale" sub-dimensions

Sub-dimensions	Items	Total Point	Mean Value
Responsibility	1,7,13,19,25,31,37	1.28	0.18
Friendship	2,8,14,20,26,32,38	1.35	0.19
Peaceful	3,9,15,21,27,33,39	1.16	0.16
Respect	4,10,16,22,28,34,40	1.27	0.18
Honesty	5,11,17,23,29,35,41	1.20	0.17
Tolerance	6,12,18,24,30,36,42	1.17	0.16

As was previously said, seven components make up each of the "Human Values Scale" sub-dimensions of the data in Table 3. Table 4 displays the participants' mean and total point values for these six sub-dimensions.

The comparison of sub-dimensions with the gender variable reveals that there is no significant difference between male and female students' mean scores on the subscales assessing tolerance, honesty, peace, respect, friendship, and responsibility.

The comparison results between high school students' sub-dimensions and their performance in physics classes are shown in Table 5.

Table 5. The sub-dimensions compare findings with the high school physics achievements.

№	Sub-dimensions	Physics Achievements
1	Responsibility	.15**
2	Friendship	.022
3	Peaceful	.02
4	Respect	.03
5	Honesty	.08
6	Tolerance	.03

** $p < .01$

Examining Table 5, it can be observed that the responsibility sub-dimension and the physics lesson's achievement have a positive correlation ($r = .15$, $p < .01$). However, no meaningful difference was discovered between the sub-dimensions of tolerance, honesty, friendship, peace, and respect.

Conclusion and Discussion

The human values (responsibility, friendship, peace, respect, honesty, and tolerance) variable was used in the study to compare the physics achievement of students in three distinct high schools.

The average physics achievement score for each participant was 3.63 points, as indicated by Table 2's results. It was possible to conclude that the participants' physics achievement was roughly average and that the male and female students' physics achievement (3.52 and 3.74, respectively) was somewhat close to one another.

Based analysis of the results from "Human Scale Values" (Table 3). It turned out that certain items, including item 25—"I willingly accept the responsibilities given to me by the school."—have extremely low ratings. When asked this question, 29.8% of all participants said they answered it regularly or always. This means that the majority of participants accept the tasks given to them voluntarily at the school. Item 26: "Because of my friends, I am able to get over my challenges." Responses to this question were given by 44.3% of all participants as frequently or always. It's a successful outcome. As a result, it was determined that around half of the sample supports one another. Item 21: "I don't watch any violent television." 24.19 percent of all participants indicated that they answered "frequently" or "always." It can be inferred from this finding that 75% of the sample watches violent television. This is not a good sign for pupils in high school because these kinds of programs could lead to issues at school. Item 22: "I can respect everyone's viewpoint." 33.83 percent of the participants indicated that they answered "frequently" or "always." Based on this finding, the majority of individuals lacked sufficient tolerance. This demonstrates the effects of viewing violent television.

Item 11: "When I need assistance from my friends, we get together." Thirteen percent of individuals said that they answered "frequently" or "always." According to the results, friendship is significant to the majority of participants. "I don't correct my wrong-doing friend." item 18. 23.2% of participants overall indicated that they answered this question "frequently" or "always." This demonstrates that despite watching violent television, the study's participants have sufficient tolerance for one another.

As a result, students who take responsibility for their education, friends, family, and teachers, complete their assignments with attention and reliability, respect school policies, keep their word when they make commitments, etc. As a result, the administration of the school needs to assist the pupils in understanding their duties. It is the responsibility of educators, parents, and program developers to take action to enhance kids' accountability. The results presented in Table 5 indicate that by teaching our students about their responsibilities and their significance, we may enhance their performance in other subjects as well as physics.

In summary, to make physics science and courses more interesting, physics lecturers should persuade students that physics is a part of their lives. Therefore, physics educators must dedicate more effort to locating real-world examples of physics applications and demonstrating how people may relate physical principles to their everyday lives. However, to boost their students' physics achievement and attitudes concerning the subject, physics teachers should also work to enhance their students' human values.

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ЖОҒАРЫ МЕКТЕП ОҚУШЫЛАРЫНА АРНАЛҒАН ФИЗИКА САБАҒЫНДА АДАМ ҚҰНДЫЛЫҚТАРЫНЫҢ ӘСЕРІ

Аңдатпа. Адами құндылықтар әрбір адам маңызды деп санайтын этикалық мінез-құлықтың негізі болып табылады. Адами құндылықтардың маңыздылығы оң әлеуметтік динамикаға жәрдемдесуде, жеке әл-ауқатты жақсартуда және этикалық өмір сүруде. Бұл зерттеу жоғары сынып оқушыларының физика сабағында адами құндылықтарды (жауапкершілік, достық, татулық, сыйластық, адалдық және төзімділік) зерттеу және оқу пәндерін оқу барысында адами құндылықтарды түсіну мақсатында жүргізілді. Зерттеуге 2023-2024 оқу жылында Қазақстанның әртүрлі қалаларындағы екі жекеменшік мектеп пен екі мемлекеттік емес лицейден 150 оқушы қатысты. Қатысушылардың 43% (f=64) ер студенттер, 57% (f=86) әйелдер болды. Бұл зерттеудің деректері Дилмак (2007) әзірлеген

«Адамдық құндылықтар шкаласы» арқылы алынды. деректер пайыздық, жиілік, корреляциялық және тәуелсіз үлгілер t-тестінің көмегімен талданды. Есептеу нәтижелері ерлер мен әйелдердің жауапкершілік, достық, татулық, сыйластық, төзімділік және адалдық сияқты адами құндылықтар бойынша алған ұпайлары арасында айтарлықтай айырмашылық жоқ екенін көрсетті. Нәтижелер физиканың оқу бағдарламасына негізгі құндылықтарды талқылауды енгізу студенттердің мотивациясын, түсінігін және жалпы үлгерімін жақсартатынын көрсетеді. Сонымен қатар, физика курсына жетістік пен құндылық шкаласының жауапкершілік аспектісі арасында тікелей байланыс анықталды. Керісінше, оқу жетістіктері мен адами құндылықтардың кіші өлшемдері арасында маңызды корреляция табылмады.

Түйін сөздер: Адами құндылықтар, физика жетістіктері, орта мектеп.

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ВЛИЯНИЕ ЧЕЛОВЕЧЕСКИХ ЦЕННОСТЕЙ НА УРОКИ ФИЗИКИ ДЛЯ СТАРШИХ ШКОЛЬНИКОВ

Аннотация. Общечеловеческие ценности служат основой этического поведения, которое каждый человек считает важным. Важность общечеловеческих ценностей заключается в содействии позитивной социальной динамике, повышении личного благополучия и соблюдении принципов этической жизни. Это исследование было проведено с целью изучения

общечеловеческих ценностей (ответственность, дружба, мир, уважение, честность и терпимость) у старшеклассников на уроках физики и понимания общечеловеческих ценностей в ходе изучения академических предметов. В исследовании приняли участие 150 студентов из двух частных школ и двух негосударственных лицеев в разных городах Казахстана в 2023-2024 учебном году. 43% (f=64) участников были студентами мужского пола, а 57% (f=86) - женского. Данные этого исследования были получены с помощью "Шкалы человеческих ценностей", разработанной компанией Dilmac (2007). данные были проанализированы с помощью процентного соотношения, частоты встречаемости, корреляции и независимых выборок - t-критерия. Результаты расчетов показали, что не было существенной разницы между показателями участников мужского и женского пола по таким человеческим ценностям, как ответственность, дружба, мир, уважение, терпимость и честность. Полученные результаты свидетельствуют о том, что включение обсуждения основных ценностей в учебную программу по физике может повысить мотивацию учащихся, их понимание и общую успеваемость. Кроме того, была обнаружена прямая связь между успехами в изучении курса физики и аспектом ответственности в рамках шкалы ценностей. И наоборот, не было обнаружено заметной корреляции между академическими достижениями и подрастерностями общечеловеческих ценностей.

Ключевые слова: Человеческие ценности, достижения в области физики, средняя школа.

Received 29 January 2024