DOI Number: 10.5958/0974-1283.2019.00073.2

Effect of Science and Technology on Quality of Life Perceived by College Student

Byung-Man Kim[1], Mi-Seung Yun[2], Jeongjin Yoon[3], Jungin Kim[4], Migyung Cho[5]

[1]Early Childhood Education, Kyungnam University, Kyungnamdaehak-ro, Masanhappo-gu, Gyeongsangnam-do, Korea; [2]Dept. of Early Childhood Education, Kyungsung University, 309, Suyeong-ro, Nam-gu, Busan, Korea; [3]Dept. of Early Childhood Education, [4]Dept. of Computer Engineering, [5]Dept. of Game Engineering, Tongmyong University, 428, Sinseon-ro, Nam-gu, Busan, Korea

ABSTRACT

Background/Objectives: We examined the perceptions of how science technology can change quality of life. We wanted to analyze what kind of images students have about science technology and quality of life.

Method/Statistical Analysis: A total of 144 students attending liberal arts classes were asked to describe the impact of science and technology on quality of life. All students were divided into small groups and activities were conducted among the groups. Two experiments were conducted to investigate whether the science technology have a positive or negative impact on quality of life. In addition, we analyzed the factors that lead to positive or negative views.

Findings: We could classify students' images about science and technology and quality of life as mental factors, Socio-economic factors, technical factors and environmental factors. Socio-economic factors accounted for 63% of the total image frequency. The second most common factor was technical factors, accounting for 27% of the total. From the technical point of view, there are many positive factors that can improve the quality of life. Third, mental factors accounted for about 6%. Students thought that science and technology would negatively affect human mental factors. Finally, the image of the environmental factor was 3.7%, indicating that science technology would cause environmental problems such as air pollution and water pollution. The results of the chi-squared analysis showed that the four factors were discriminative factors that showed differences in opinion about how science technology affects quality of life in the future.

Improvements/Applications: In order to improve the quality of life through the development of science and technology, socio-economic, mental factors and environmental factors derived from this study can be reflected in the policy.

Keywords: *Science and technology, future society, quality of life, Perception of university students, chi square analysis*

Introduction

People think differently about how science and technology will affect the quality of human life. To address these problems, some researches have been conducted on how science and technology can affect the quality of life of humans [1-5]. Some people are worried that the development of science and technology led by global corporations can not improve the quality of life of individuals and lead to a dystopian future due to indiscreet development. Some people worry that the development of robotic technology will lose human jobs. But some people think that science and technology in various fields are improving the quality of our lives. It is hoped that science and technology will help the lives of the underprivileged and be very useful for health and welfare, thus improving the quality of human life. They believe that the development of technology to predict and

Corresponding Author:
Migyung Cho
Professor, Dept. of Game Engineering,
Tongmyong University, Korea
Email: mgcho@tu.ac.kr

respond to natural disasters such as floods and typhoons has ensured a safer life for mankind. Especially, science and technology are directly connects with the economy of the country and have a great impact on the lives of the people.

Quality of life generally refers to the level of mental life, and we tend to regard subjective happiness as the quality of life [6-7]. Quality of life is known not only to economic conditions but also to non-economic factors such as social relations, social psychological factors, institutional factors, environmental factors, and physical factors. The economic condition and the quality of life are known to be less correlated if the economic level exceeds a certain level. If annual GDP is more than $ 10,000 the rate of increase in subjective well-being with income increases tends to decrease [8]. The impact of income on life satisfaction is maximized in a set of annual income less than $ 15,000. When income is above a certain level, non-economic variables determine the quality of life [9].The WHO Quality of Life Groups defines the quality of life as a personal perception of one's own situation in the context of his or her own cultural and value system and his/her goals, expectations, norms and interests [10].UN defined the quality of life from a subjective perspective by defining quality of life as the concept of human welfare measured by social indicators rather than quantitative measures such as income or production [11].

Cho et al. investigated how science and technology affect the quality of lives of the socially underprivileged, and they reported that science and technology have a very positive effect on the quality of life of people with disabilities and the elderly [1]. Through hearing aids, hearing impaired people perceive sounds, perceive their surroundings, communicate with people, and express their opinions. Therefore, hearing aids are very closely related to emotional well-being and satisfaction, interpersonal relations, self-determination and choice, and rights. They said that the quality of life for people with mobility impairments due to electric wheelchairs is greatly improved. Science and technology can contribute to meet social demand and increase social value. When the quality of life and the promotion of welfare are linked with technological innovation, the related industrial base is formed and the development of the industry can create employment and added value. Therefore, they said that it is necessary to promote the technological innovation, the technology acquisition, and the policy and the linkage between them in order to increase the quality of life in the public area [1].

Kang said that quality of life includes value judgment, but science technology itself can be assumed to be value-neutral [2]. Therefore, it is easy to understand how to connect with each other through variables of science and technology utilization rather than directly associating quality of life with science and technology. No matter how wonderful science and technology are, if the use of science and technology plays a negative role in the quality of life, science and technology will greatly deteriorate the quality of life. On the other hand, even if science technology is a little lacking, the quality of life is improved if utilization of science technology plays a positive role in quality of life. A rich life due to the driving force of economic development, a healthy life due to advanced medical equipment, a safe life due to weather forecasts, a convenient life to utilize rehabilitation aids, and so on. However, environmental destruction could lead to global warming, the depletion of energy resources and excessive waste, which could reduce quality of life. He argued that the current use of science and technology should seriously analyze and predict the impact on future quality of life.

Kim claimed that the functions of science and technology should be changed in terms of the quality of life and the role of science and technology [3]. Science and technology should be able to provide meaning for sustainability and concrete measures for achieving it. In order to do this, it is necessary to make efforts for continuous research and information acquisition under global cooperation, and to provide national support for this. Kim suggested that the quality of life can be divided into objective dimension and subjective dimension in the improvement of future life quality and the development of science and technology [4]. The objective dimension is something that can be identified as an objective indicator of physical components such as clothing, health, income and working environment. And the subjective dimension is the cognitive state in which subjective evaluation such as satisfaction, independence, sense of achievement, cultural affluence, safety, and stress works. It is argued that science and technology that promote communication and relationship together will be needed when considering the Korean people's strong desire for competition and expectation.

Cho et al. focused on the impact of science and technology development on quality of life in that science and technology development is aimed at improving the quality of human life [5]. He studied to identify perceptions of quality of life in specific areas. He examined how science and technology affected human economic life quality, healthy life quality, safe life quality, convenient life quality, pleasant life quality, socio-cultural life quality. In addition, research on the sustainability and quality of life of science and technology has confirmed that both agree that science and technology will help improve the quality of life. The results that science and technology can improve the quality of life showed a very positive response overall, and it was confirmed that future generations perceived more positively than current generations. The impact of science and technology on the quality of economic life and the quality of life is more positive for future generations than for generations. The question on safety, education, environment, and society was that the average response of the current generation was higher.

We investigated the perception of college students about the impact of science and technology on the quality of life in the future. Our research team saw a science fiction film about a future society that could come from science and technology. We looked at movies with students over three weeks and looked at college students' perceptions through small-group discussions and mini-essay tests. Students enrolled in liberal arts classes vary from grade 1 to grade 4, with majors in science and arts, and men and women. We analyzed students 'opinions and responses to the effects of science and technology on future students' lives after class. We look at how similar the views of college students are with previous studies. And we want to see if college students have a positive or negative view of science and technology and why they had such a view.

Materials and Method

After the liberal arts class using movies, we conducted mini-essay tests asking students about their personal opinion on the impact of science and technology on quality of life in the future. We asked our students a personal opinion on whether they think science and technology will improve the quality of life in the future or that they will decrease the quality of life. We had asked them to describe three or more freely why they think so. We wanted to know the views on the relationship between science and technology and quality of life. In addition, we wanted to see what images they have about future science and technology.

Test Subjects: The subjects participating in this study are 144 people as shown in Table 1.There are 40 students in science and engineering major and 104 students with major in humanities. The genders participated in the experiment were similar, and 87% of the lower grades were more than two grades. In the first week, students watched the film and in the second week, they lectured on modern genetic engineering techniques that became the background of the movie "Gattaca". In the third week, small groups were discussed about how science and technology would affect future society. In order to analyze their perception and image of science and technology in detail, a mini essay test was conducted.

Table 1: Test subjects

Kinds		Number	Ratio
Grade	Freshman	84	0.583
	Sophomore	43	0.299
	Junior	11	0.0764
	Senior	6	0.0417
Gender	Female	71	0.493
	Male	73	0.507
Major	Science and engineering	40	0.278
	humanities	104	0.722

Research Method: Movie "Gattaca" was released in 1997 and is a science fiction film about how future science and technology can change human life. The film deals with the destruction of human life by science and technology in the future. Those who are born with genetic engineering to remove the recessive factors form the upper echelons of society. However, people born with traditional marital relationships are born with inferior factors. So they are treated as inferior humans and pushed to the bottom of society. The film deals deeply with the negative views that may arise from the development of science and technology. We thought that because of this movie theme, students could have more negative thoughts about science and technology, and that this prejudice could affect the mini essay test.

The subjects of the mini-essay test conducted for the recognition survey of college students were

as follows." Some people dream of a future where all people live happily with the development of brilliant science and technology. However, there are people who pessimistically anticipate the future in which individuals can not enjoy human life because of the side effects of science and technology. Movie "Gattaca" we saw belongs to the latter. Predict whether one thinks science and technology development will improve the quality of life for the future or whether it will decrease it. Explain three or more concrete examples that you can predict and prove your argument in detail.

We categorized the words that students expressed freely about science technology and future quality of life. We could classify all of the students' words into mental factors, social boundary factors, technical factors, and environmental factors. The perception of the students we classify is based on the existing studies that the quality of life is influenced not only by economic conditions but also by non-economic factors such as social, psychosocial, institutional, environmental, and physical factors. However, students' perceptions differed from those of previous studies that showed positive views on existing science and technology. We conducted a chi-square analysis to see if the four factors that were categorized had an effect on students' views and perceptions.

Results and Discussion

Table 2 shows the words related to the image of the science technology described by the students on the quality of life. There were 23 images described by students. We divided them into themes and classified them into mental factors, socio-economic factors, technical factors, and environmental factors. As shown in Table 2, the areas described by the majority of students with the most factors are socio-economic factors. This showed that science and technology have the greatest impact on human socio-economic factors in the students' perception.

Table 2: Students' image on the impact of science and technology on quality of life

Territory	Contents (Frequency/Ratio)
Mental factors	Life satisfaction (1/0.32), Loss of humanity (1/0.32), Depression (2/0.64), Loss of dream (1/0.32), Loss of emotion (1/0.32), Loss of will (6/1.93), Machine dependence (6/1.93).
Socio-economic factor	War(4/1.29), political participation(1.0.32), lack of interpersonal relationship(7/2.26),aging(2/0.64), telecommuting(1/0.32), abundant life(16/5.16), convenient life(13/4.19), welfare system(1/0.32), social unrest(2/0.64), polarization of wealth(32/10.3), job problem(29/9.35), social control(5/1.61), leisure life(17/5.48), alienation(1/0.32), suicide rate(1/0.32), misuse of the technique(14/4.52), monopoly of the technique(25/8.06), ignore life(16/5.16)
Technical factors	treatment of incurable diseases(15/4.84), transportation(7/2.26), robot(7/2.26), artificial intelligence(2/0.64), genetic engineering(4/1.29), space travel(3/0.96), virtual reality(2/0.64), life extension(4/1.29), personal information leak(3/0.96)
Environmental factors	overcoming environmental pollution(2/0.64), environmental pollution(7/2.26), depletion of resources(2/0.64)

Socio-economic factors accounted for 63% of the total image frequency, with 18 factors. The majority of socioeconomic factors were wealth polarization, job problems, monopoly of science and technology, abundant life and leisure life. Positive and negative views were found to be compatible, with a slightly less negative view. The word most often mentioned by students was the polarization of the rich. Students thought that science and technology would encourage the polarization of the poor in the future. Next, students considered their job problems to be serious and human jobs were threatened by high-level robotic engineering. In addition, they believed that the monopoly of science and technology and the abuse of science and technology of a global company or a specific country had a negative impact on humanity. In a positive view, students expected that the development of science and technology would enable them to enjoy leisure life, abundant life and convenient life, and increase human life span. Unusual among negative views, they thought that life-shortening phenomena would appear. This was close to 5%, which seems to be the influence of the film "Gattaca". There was also a lack of interpersonal relationships. We have not found anything different from previous studies in socio-economic factors.

The second most common factor was technical factors with 9 factors, accounting for 27% of the total. In the technical factor, there were many positive views that science and technology can improve the quality of life. The development of artificial intelligence, transportation and robotic technology was expected to make human life more convenient. In addition, medical technology due to genetic engineering was developed, and it was expected that it would be possible to treat incurable disease and give them a healthier life. He also thought that the development of robots would replace dangerous and difficult things that humans should do. On the other hand, a small number of students worried that the information would be collected and leaked by science and technology, which would affect the individual's life negatively.

Third, the mental factor had seven images and was about 6%. They thought that science and technology would negatively affect human mental factors. They thought that when science was highly developed, the dependence on machines increased and humans might fall into a loss of motivation, loss of dream and loss of emotion. They also recognized that human alienation could occur in the future. Finally, the overall image of environmental factors was 3.7%. In environmental factors, very few students thought that environmental pollution would be overcome, but most students thought that science and technology would cause environmental pollution problems such as air pollution or water pollution and depletion of resources, which would reduce the quality of life. There was no significant difference between the factors in the existing studies that have studied the impact of science and technology on quality of life and the image of students' science and technology.

Table 3 shows the chi-square analysis of the students' answers to their positive or negative opinions for four categories of the science and technology. In order to investigate the difference of image perception between positive and negative viewpoints of college students on the impact of science and technology on quality of life, we classified the cognitive contents into mental, socio-economic, technical and environmental factors and then conducted a Kai test. As a result of the analysis, there were statistically significant differences in the image recognition of positive and negative opinions ($\chi 2$ = 28.02, p <.001).

Table 3: Difference between positive and negative views (N = 297)

Item Contents	University students					χ^2
	MF	SEF	TF	EF	Total	
Utopia	1 (1.0)	49 (51.0)	44 (45.8)	2 (2.1)	96 (100.0)	28.02***, df=3
dystopia	17 (8.5)	138 (68.7)	37 (18.4)	9 (4.5)	201 (100.0)	
Total	18 (6.1)	187 (63.0)	81 (27.3)	11 (3.7)	297 (100.0)	
***p < .001., MF: Mental factors, SEF: Socio-economic factors, TF: Technical factors, EF: Environmental factors						

Conclusion

We examined perceptions of the science and technology of college students on the quality of human life through liberal arts classes using movies. We have classified students' images of science and technology into mental, socio-economic, technological, and environmental factors. Students thought that the development of science and technology had the greatest impact on socioeconomic factors among the categories of quality of life. And the number of students who perceived that they would improve their quality of life and the number of students who perceived that they could degrade were similar. On the other hand, students had the perception that technical factors would improve the quality of life. For mental factors, they perceived that science and technology would reduce the quality of life. We conducted a Kai test to see if the four factors have a significant effect on predicting whether to improve or deteriorate the quality of future life. The result showed that there was statistically significant difference in image recognition for the two opposing views of the four factors.

Acknowledgment

This work was supported by the Ministry of Education of the Republic of Korea and National Research Foundation of Korea (NRF-2017S1A5B6067046)

Ethical Clearance: Not required

Source of Funding: National Research Foundation of Korea (NRF-2017S1A5B6067046).

Conflict of Interest: Nil

REFERENCES

1. Cho, HH, Seo JY, Byung RJ, Hee KK. Technological Innovation and Quality of Life: Focusing on the Social Abbreviation. Conference of Korea Association of science and technology studies.2006. 99-117. Available from: http://www.dbpia.co.kr/Article/NODE01211615
2. Kang, HJ. Quality of life and science and technology. Science &Technology Policy: 166.2007.58-70. Available from: http://www.dbpia.co.kr/Article/NODE02474514
3. Kim, YB. Thequality of life and the role of science and technology. Busan Development Forum: 92. 2005. 7-13.Available from: http://www.dbpia.co.kr/Article/NODE02096997
4. Kim SW. Improvement of future `quality of life` and development of science and technology. FUTURE HORIZON. 2010. 6. 12-13.
5. Cho, KH,Yoo, MY.The Influence of Sustainable Development on the Quality of Life. KOREAN POLICY SCIENCES REVIEW 2017.6. 21(2). 1-28. Available from:http://www.dbpia.co.kr/Article/NODE07208143
6. Shin, D. C., Ahn, C. S., Kim, K. D., and Lee, H. K. Environmental effects on perceptions of life quality in Korea. Social Indicator Research.1983.12(4).
7. Myers, D. G. and Diener, E. Who is Happy?. Psychological Science. 1995. 6(10).
8. Diener, E., Sandvik, E., Seidlitz, L. &Diener, M.The Relationship Between Income and Subjective Well-being: Relative or Absolute?. Social Indicator Research.1993. 28.
9. Frey, D. S. and Stutzer, A. Happiness & Economics, Princeton and Oxford: Princeton University Press.2002.
10. WHO Quality of Life Groups. The World Health Organization Quality of Life Assessment (WHOQOL): Position Paper From the World Health Organization. Social Science and Medicine.1995. 41(10). 1403-1409.
11. UN. Glossary of Environment Statistics, Studies in Methods. Series F.1997.No. 67. NewYork.