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Ethical Issues on AI Equipped Combat ROBOTS

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Abstract

Purpose: The Purpose of this research is to propose the ethical issues on AI equipped combat robot. AI equipped combat robot is called as Lethal Autonomous Weapons System, which means guard and attack enemies in autonomous way. Via this mission, human soldiers of both friendly and enemy armies could be harmed by AI combat robots. The most fundamental principles of common sense is that the robots should not hostile to human being, and this research tried to show some examples of ethical issues connected with the use of combat robots.

Method: This research tries to find the way of regarding combat robot as a moral agent, which means combat robot does not only acts like a killing machine, but also holds moral responsibility. This code of action could also guide the human designer of AI structure of combat robot. This research extracted the core theme of debates on AI combat robot with analyzing current issues on AI and military technology reported on the media and internet. This research also used some materials published by institute under the Government depart of defense.

Results: Combat robots has been evolved toward minimizing the intervention of human soldiers in recognize and evaluation of the battle situation. The introduction of such combat robots leads to changes in the aspect of war due to the introduction of autonomous weapons of destruction. The introduction of combat robots raises the issue of the formation of the judgment mechanism of the combat robot and the issue of responsibility as a subject of action execution in terms of individual judgment subjects.

Conclusion: In terms of international relations, there could be problems related to the principle of proportionality, the problem of distinguishing between combatants and noncombatants, and problems of arms control. These problems brings up the request for an ethical approach aimed at expanding the reasoning intelligence beyond just the cognitive judgment function of combat robots and reinforcing metacognition.

[Keywords] Combat Robot, Artificial Intelligence, Moral Reasoning, Moral Agent, Reasoning Intelligence

1. Future War and Combat Robots from a Military Perspective

War has been understood as a hostile struggle by an armed force between ethnic nations, states, rulers or parties within nearby territory[1]. Thus such notion of war refers to organized violence between political units. It encompasses the activities of a wide range of actors including not only the state but also armed non-state groups. This warfare or armed conflict has a number of individual combats, skirmish, and small engagement comprises[2]. And there are combatants who perform and experience various activities that make up the whole of this battle.

In the aspect of future war, Irregular Warfare and the development of Weapons of Mass Destruction has been predicted. However, a changing concept of military science & technology and that of warfare has occurred in connection with the advancement of knowledge and information technology. Therefore, the aspects of mass destruction and consumption war by itself have been changed to the aspect of war that focuses on precise destruction for respect of human life, minimization of destruction, and effect-oriented warfare.

The convergence of AI and robot technology has met the fore in this change in war patterns. Robot warfare is a kind of war that represents future warfare, and means performing war missions using robots of various sizes from reconnaissance and surveillance missions to attack missions[3]. Such robot warfare begins with unmanned main weapon systems. The emergence of micro-reconnaissance robots and combat robots using the characteristics of some kinds of living organizations, as a complete system of C4ISR(Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance) and PGM(Precision Guided Munitions) combined with various kinds of combat robots has been expected.

In this future war, functioning combat robots are actually used as Autonomous Weapons of Destruction System. And The Levels of Autonomy starts from inert via automated and to Semi and Full Autonomous[4]. Therefore, a combat robot is basically composed of a structure of judgment in relation with autonomy and a robot mechanism that physically drives the result of the judgment. These combat robots mean that not only the improvement of resource management for the smart operation system of the future war[5], but also mean the military evolves in the form of separating intelligence from the human body and migrating it into combat equipment as a physical mechanical device[6].

On the other hand, since these combat robots are premised on military use, they exist within the range of predictions in the context of defense technology. Drone Defense System against drone threats are one of the leading edge of these kinds of technological advance[7]. These ranges to exist in two dimensions, one can predict the associated technology to meet the weapons and skills required by the group, which imposes a demand-pull-type prediction to predict the direction of progress that takes into account the development trend. The other is technology-driven prediction as a creative prediction that searches for new technologies that can lead a new concept weapon system[8].

Combat robots will make progress based on these predictions of technology in the field of defense. The mechanical mechanisms of combat robots that are currently being implemented have not been achieved to the level of humanoids that almost resemble humans. However, because it has a shape similar to that of other living things, Unmanned Aerial Vehicles in a form in which human boarding is excluded from the existing weapon system, together with an unmanned robot used for EOD(Explosive Ordnance Disposal) and the armor style auxiliary equipment that strengthen physical body power of human infantry. Thus combat robots are emerging in a wide variety of aspects, ranging from exoskeleton type robots that increase their ability to help them gain faster speed, stronger strength and endurance[9].

In the development of technology related to combat robots, the part currently being studied is directly connected to cognitive judgment of combat robots. And these things need to adopt some ethical and legal issues, e. g. military use of war machines and international law[10]. Combat robots that have been made up to now have developed in various forms in terms of their external form. But in common, decisions in combat take the form of decisions made by the human officer who operates the robot. However, in order for the combat robot to be utilized in the ultimate aspect, it is necessary for the combat robot as an entity to autonomously determine the situation and make decisions, thereby performing combat related missions.

The fact that these combat robots autonomously judge the situation and make decisions means that they need to be subject to ethical discipline. For humans, ethics means order in relationships, and it means taking responsibility for the consequences of decisions based on autonomy and actions taken accordingly. If so, giving a combat robot the ability to make decisions and act accordingly means that the combat robot can also be the subject of responsibility. Therefore, if such a combat robot itself becomes the subject of ethical responsibility, it logically concludes that the ethical discussion of the combat robot must be developed accordingly.

If we search for ethical issues related to combat robots based on such a sense of problem, we can approach them in following two areas of individual subjectivity and international relations. Thus, this study reviews such two themes. The first theme is that formation of judgment mechanisms and responsibility as a subject of action execution held by combat robots, which is regarded as the subject of individual judgments and actions. The Second theme is that prohibition of overreaction, distinction between combatants and noncombatants, and the risk of abuse of autonomous weapons of destruction and arms control that has relation to combat robots in view of international relations.

2. Ethical Issues Regarding Combat Robots as Agent for Making Decision

As the technology related to combat robots develops, it is expected that major changes would be made in the subject and method of performing warfare. With the development of autonomous judgment mechanisms and engineering mechanisms related to combat robots, it is predicted that human soldiers will first play a role in the management and operation of robotic weapons in terms of the subject of war. In addition, the introduction of new operational algorithms related to the operation of unmanned combat robots is predicted in terms of how warfare is executed[11]. This means that the human-centered notion and paradigm of war will be transformed.

In the case of combat robots, it is possible to understand their autonomy in relation to the mechanisms executed during the operation of the weapon system. This is expressed in the term OODA, which refers to the stages of Observation, Orient, Decide, and Act. This OODA is to show the significance of the mission in the battle, in the course that its mission is related to how the human intervention and control carried out in any way. Specifically, this is the partial autonomy in which human intervention and control is exercised at certain stages of OODA, the loose autonomy that human soldiers intervene in case of malfunction or system failure, although autonomous weapons and machines operate independently. It can be divided into three types of complete autonomy corresponding to the level, from the level of human control via coexistence of external regulation and autonomy to complete self- management of battle situation.

The autonomy at this time means the autonomy in which cognitive judgment is intervened beyond the level of simply performing automatic response. From this perspective, it can be said that the autonomy of the combat robot is related as an individual judgment subject. Ethical issues occurs in this point that cognitive autonomy of combat robots as individuals can be embodied in a wide variety of forms, but it can be said that the most fundamental position is related to the establishment of a mechanism for autonomous judgment. This perspective raises the issues on the robot's responsibility as a moral subject. Robot as a moral agent means that people regarding a robot as a moral agent. Traditionally, moral agency is assigned only to those who can be held responsible for their actions. So robot as a moral agent is a robot who has the ability to discern right from wrong and to be held accountable for its own actions. Thus, robots as a moral agent have a moral responsibility not to cause unjustified harm. Sometimes this notion could cause conflict with some kinds of robot's mission.

From a military perspective, strategies related to the operation of a large number of small-scale autonomous weapons are described in terms of the Swarming strategy. This means that individual units participating in the battle perform self-organized decisions and actions through decentralization of control and communication. The importance of such a swarming strategy is to standardize operations and tactics using combat robots with artificial intelligence algorithms for each situation and scenario, and use them on the battlefield. This is based on real-time collection, processing, and utilization of battlefield information, and further includes identification, judgment, and attack in combat. This refers to the process of reorganizing the traditional form

of war. Former understanding of the combat actions, the mental and physical abilities of human soldiers on the battlefield are the key factor of successful mission. But for the combat robots, which are autonomous weapons, it does not affect.

On the other hand, the problem of corresponding responsibility arises in the execution of the actions of the combat robot. If a combat robot is hacked, there is a risk of damage to allies. In addition, if a problem occurs in the autonomous judgment mechanism of the combat robot during the execution of the operation, or if a failure to coordinate the interaction occurs, an unintended expansion of war may occur. However, above all, in the process of designing and applying the action mechanism of the combat robot, if the design of how to understand the situation is not made in an appropriate form, the mechanism itself and the responsibility of its designer may arise. Responsibility for these issues is not just a level of responsibility for technical issues, but an ethical issue in that the results return to humans with a fatal impact.

3. Ethical Issues Regarding Combat Robots in Terms of International Relations

Early discussions related to killer robots began in terms of software engineering or computer ethics[12]. However, later discussions tend to diversify, such as claims that the ethics of a killer robot is necessary[13] and that a separate robot ethics is not needed[14], and it is developed from the viewpoint of autonomous weapons systems and human dignity[15]. And some researches are focusing on integrating robot ethics and machine morality[16].

It can be said that deploying combat robots in war, which is a conflict between nations, brings significant benefits in terms of military strategy. The reason is that it can lead to changes in the level of reorganization and strategy and operation of the military personnel structure. In particular, in terms of military operations and tactics, the benefits of the operation of combat robots can be said to be very large. There is no physical pain and psychological fear that human soldiers feel, and since they are not affected by the horrible circumstances that occur on the battlefield, there is no need to consider the mental aspect. In particular, it can be said that the great advantage is that it can reduce the casualties of soldiers, which are the most burdensome for politicians in democratic countries.

However, the development and proliferation of combat robots equipped with such autonomous functions can pose a serious risk and crisis situation to the international security order. If a large number of military robots are mobilized, the casualties are considerably reduced, which can lead to an exhausting large-scale battle, and there is a risk that the citizens of the country will not pay attention to the war and make efforts to stop it. On the other hand, there is a concern that non-governmental military or terrorist organizations may participate in war or terrorism using combat robots without having a large army[17]. In this way, problems related to warfare by mobilizing combat robots can be understood in terms of international relations because the other countries affected by the action exist.

The mobilization of combat robots can be understood in terms of prohibition of excessive measures or the principle of proportion. In the context of war, this principle refers to the limits of the state's action in terms of international law, such that counterattacks should only be carried out against assaulted or damaged. It must be justified according to objectivity, must fit in the means, and the infringement must be minimized, and contains information that should be made to that balance between harm and benefit. However, these principles could be based on the political perspective.

Meanwhile, there is also a problem related to the distinction between combatants and non-combatants. With international humanitarian law, international armed conflict or direct eligible

to participate in the battle in the war for personnel engaged in combat combatants which referred to as. At this time, combatants are allowed to legally carry out hostilities, which is understood to mean an army that has the right to engage since modern times. However, when a war involving combat robots unfolds, it becomes a question whether the person who maintains these combat robots or designs the mechanisms of combat robots can be included as combatants or noncombatants. If they are understood as combatants, they can become legitimate targets of attack by the enemy, and to what extent their work can be recognized in relation to combat is also a subject of discussion. In addition, the risk of abuse of autonomous weapons and the issue of arms control also need to be considered. The design of the autonomy of combat robots and the scope of assignments to combat robots is related to international armament issues. For example, whether to focus on defensive aspects such as explosive dismantling and security work for combat robots, or to design autonomy mechanisms to perform offensive missions is a key discussion of ethical issues related to combat robots.

These discussions are based on how far is the relationship between humans and robots. If there is a boundary, such kinds of inquires as how should it be formed the relationship between intelligent robots and humans, what moral code should we implant in robots and physically humans using robots, and so on. Attempts could be made to answer ethical questions in relation with the level of violence that is acceptable to manage it [18].

4. The Necessity of Strengthening the Reasoning Intelligence and Metacognition of Combat Robots

Currently, the development of artificial intelligence-related technologies is converging toward deep learning. These deep learning technologies show a pattern that continues to evolve together with the development of computing power and big data corresponding to hardware technologies. The reason is that deep learning technology itself occupies the most important weight in the discussion of artificial intelligence. This deep learning is a study of learning and reasoning in deep networks. The main development directions of this deep learning technology are unfolding in the following two ways. One is an optimization study on how to quickly and effectively learn a large-scale model or a method to reduce the size of a model, and the other is a study on improving performance by modifying and applying a neural network structure to suit various cases [19].

The development of technologies related to deep learning started with a focus mainly on learning of automated rules or logic. And it began to be constructed in a form that mimics the human visual system. Subsequently, interest in research continues to be related to the aspect of language processing, and studies of deep learning are being conducted in the aspect of reasoning intelligence. It is the key ideas that the machine learning algorithms which uses multiple layers to progressively extract higher level features from the raw input, and such is the core of reasoning intelligence.

Reasoning intelligence refers to intelligence that performs the function of logically guessing based on given data. This reasoning is particularly important to have a tendency to be treated in the moral area, it is called a moral reasoning. This moral reasoning means making judgments on the basis of moral principles, which is an important factor in the development of human morality, and has a staged and comprehensive characteristic. On the other hand, reasoning itself is also the ability to derive new intellectual conclusions from known knowledge. Although reasoning intelligence may exist independently, it is also a property of other intelligence modules. This reasoning intelligence can be understood in the same context as the advanced development of language intelligence as it processes specialized knowledge. Therefore, the development of artificial intelligence converges with predictive intelligence and reasoning intelligence that can

predict something through patterns[20].

The metacognition roughly covers reasoning intelligence. The metacognition means the ability to transfer such knowledge to take advantage of the meta-patterned skills and some knowledge of the patterns of any capture characterized the pattern in other areas. This metacognition refers to the creation of higher-level characteristics of an object, and plays an important role in the expansion of self-contained internal thinking as well as interaction with the external environment. Since this metacognition means thinking toward the outside, it has the characteristic of allowing you to see the world from the other person's point of view and to predict the other person's mind through it. Organizing human thinking hierarchically and allowing the technology of artificial intelligence to be deployed to understand phenomena through metacognition. The metacognition is the way of thinking at the upper layers, and which guides the development of intelligence toward imitating the human brain cognitive system or implementing a meta system.

Such reasoning intelligence and metacognition are considered to be the ultimate goal of improving the autonomy of combat robots. When combat robots perform battles on the battlefield, the task of inferring war and combat situations from a moral point of view should be done first. And evaluating the results of the action and in view of moral responsibility should be followed. Based on this, when encountering an enemy as a human, not as a robot, it is necessary to make a comprehensive judgment about the opponent and the situation and apply the rules of engagement to be carried out accordingly. At this time, if information is acquired only in the cognitive aspect and evaluated based on only the logical and rational aspects, the application of the result will appear to express the ruthless inhumanity of the combat robot, which will cause serious social controversy. To prevent this problem, AI reasoning circuit should be designed to have self-identity of combat robot as a moral agent.

In the end, even if combat robots in the form of artificial intelligence are created to engage with each other, the ethical issue of combat robots can be considered that of human soldiers because the basis for judgment of the person who inputs the algorithm cannot be different from that of the soldier. Combat robots, like human moral reasoning, can receive moral justification for their mission when they exercise reasoning intelligence. In addition, when a combat robot judges the situation on the battlefield based on meta-cognition and responds accordingly, the criticism that the robot's autonomy is nothing more than an instrumental reason can be overcome and the true goal of military action can be pursued. These factors are working for regarding combat robot as a moral agent, which means combat robot does not only acts like a killing machine, but also holds moral responsibility. This code of action could also guide the human designer of AI structure of combat robot.

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6. Contribution

6.1. Authors contribution

	Initial name	Contribution
Lead Author	HSK	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/>
Corresponding Author*	GYP	<ul style="list-style-type: none"> -Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Virtue for Post COVID-19 and AI Technology

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Abstract

Purpose: In 2020, a sudden epidemic swept the world. After the outbreak, whether it is the country, researchers, or citizens, they have made different choices in different environments. Some practices have enabled the epidemic to control effectively, while others have been counterproductive. This article tried to show the virtue approach to handle COVID-19 situation in an ethical way to solve social issues with each human being's desirable character. After that, to convert human virtue to social value of living and add some new virtues on them.

Method: This article analyzes the country, researchers, and residents through four parts: transparency, trust, endurance, and prudence. Furthermore, humans need new virtues in the post-COVID-19 era. With this division, this article tries to explain the connections and differences between each parts as a virtue in detail. Each virtues are explained in view of policy makers, researchers, citizens. After that, comprehensive evaluation on each virtues itself and the relationships among each participants.

Results: This article explains the impact and effect of transparency, trust, endurance, and prudence on the country, researchers, and citizens through four parts. It finds that transparency, trust, endurance, and prudence are human virtues. In the period before the epidemic is over, both the country and the people need four virtues. Moreover, these virtues have some implications for application AI technology.

Conclusion: When a country possesses the four virtues, it will guarantee the rights to life and health of its people as a prerequisite. And these four virtues could also apply to the field of artificial intelligence under the epidemic. First, users of smart robots need to accept various terms before they can use it. Second, humans and robots need to establish mutual trust. Third, Designers should not add violent algorithms to robotics to turn them into killing machines.

[Keywords] Virtue, Transparency, Trust, Endurance, Prudence

1. Introduction

The Covid-19 has become the most significant global epidemic in the 21st century. At the end of June 2020, more than 15 million people infected worldwide, and the death toll has exceeded 600,000[1]. Facing the epidemic, people all over the world have taken corresponding measures. Over time, the epidemic in some countries has a controller effectively. However, in other countries, people begin to suspect the effectiveness of national decision-making. Why has the epidemic in some countries been effectively controlled? What happened in those countries that were gradually out of control? What should human beings do to tide over difficulties? This article analyzes the country, researchers, and residents through four parts: transparency, trust, endurance, and prudence. Furthermore, humans need new virtues in the post-COVID-19 era[2].

There are six parts to the paper. The second to fifth parts clarify the role of transparency, trust,

* This paper is a revised version of the original form which was presented at the Songshan forum - Dialogue between Chinese and World Civilizations Annual Conference, Zhengzhou, China, 18th-20th Sep. 2020.

endurance, and prudence in the country, researchers, and citizens. And the relationship between the three objects in different dimensions. The sixth part is a summary.

2. Transparency

The transparency of information is of considerable significance to the state, researchers, and citizens. In the epidemic, the information transparency of the country, researchers, and citizens have an individual impact on the other two. The following will accurately analyze the connections and differences between the three in terms of transparency.

2.1. Policy maker

After the outbreak of the epidemic, the country's transparency is mainly displayed in two aspects: public information and national decision-making. First of all, the country information in the epidemic includes necessary epidemic data, progress in epidemic prevention and fighting, and current domestic and international conditions. Before July 2020, the world generally believed that China discovered the COVID-19 virus in December 2019. However, according to Xinhuanet.com, on July 8th, 2020, discovering the new crown pneumonia virus in many countries worldwide has been advanced. For example, in Spain, before July, the Spanish government announced the discovery time on February 25th, 2019. Nevertheless, now the earliest time of discovery recognized by the Spanish government is March 2019. If we compare the timeline of the epidemic in Spain with China, it is not difficult to find that the transparency of government information has a significant impact on human survival.

Second, government information transparency is mainly manifest in people's understanding of the primary decision-making process. If the masses do not understand the content of significant decisions and making them at all, then politics is opaque. Conversely, it is a high degree of political transparency. After the outbreak, China adopted a large-scale quarantine policy. The government accepts the advance of researchers when they make a decision. Furthermore, it introduces the intention of the decision to the public. As a result, the people in China did not question the government but instead trusted and supported the government's measures. The transparency of information and decision-making of the Chinese government has played a functional role in preventing the epidemic. With covid-19, we can benchmarking similar kinds of disease like influenza information[3].

2.2. Researcher

In the epidemic, researchers refer to those medical workers. The transparency of researchers reflects on the validity of research results and the integrity of researchers. On the one hand, researchers should report the epidemic situation to their institutions or regional governments when there is an outbreak of an epidemic. When an epidemic discovered, they will conduct in-depth research on the virus and draw corresponding conclusions. However, most researchers will publish their research results in journals or magazines first. Then inform their government based on the actual situation. From the invalidity of the results, it is precise that the research results have a lagging effect on epidemic prevention and control. For example, in some countries, researchers have detected Covid-19 in wastewater since the second half of 2019, but these countries have not issued an early warning. As a result, these countries did not take effective prevention and control measures at the beginning of the outbreak. Two factors affect the result. One is that the published journals have a profound influence. The second other is that the connection between research institutions and the government is weak, making research results appear less transparent to the government.

On the other hand, the transparency of researchers depends on personal integrity. In other

words, when they publish real results in journals, they cannot tell the public about their research results. It not only makes the government have a severe lag of formulating and implementing policies, but it is also a hazard to the public. It is an expression of irresponsibility to life. The integrity of researchers can say to be their professional ethics. Benevolence comes from traditional Confucianism. 'Benevolence' ranks first in the Confucian Five Permanence Thoughts, meaning 'benevolence' and 'benevolent governance.' Sun Simiao, the founder of traditional Chinese medical ethics, put forward 'exquisite medical skills, kindness, and compassion' in the sincerity of great doctors. It means that doctors need to respect life and be ethical requirements based on 'benevolence'[4].

2.3. Citizens

Some part of preventing efforts are approached in some personal way, e.g. keep cough etiquette[5] or hand washing practice[6][7]. Although citizens, as the enforcers of national policies, are the most direct carriers for verifying national policies. The performance of citizens in transparency is personal integrity. Different from the integrity performance of researchers, the integrity of citizens in the epidemic manifests in the transparency of personal whereabouts. When some people are infected, they are unwilling to disclose their whereabouts to the government and medical institutions for different purposes. It resulted in a substantial increase in the number of infected people and made it more challenging to prevent and control the epidemic. In March 2020, there have been many cases of people returning from overseas epidemic areas that did not comply with the epidemic prevention and control regulations. The main manifestations were hiding their whereabouts, not quarantining, and intentionally going to densely populated places. These behaviors can reflect the following problems. First, the actions of these people are illegal and need to be punished by law. Secondly, their behavior is dishonest. They need to be restricted by the integrity system and condemned by society. Third, their behavior is a behavior that lacks respect for others. Charles Taylor believes that self-discipline plays a crucial role in people's understanding of respect[8]. Therefore, the behavior of neglecting policies for personal purposes during the epidemic can regard as a lack of self-discipline and dishonesty.

2.4. Discussion

In the post-epidemic era, transparency should become the new virtue of human society. First of all, for the country, political transparency includes transparency in information and decision-making. Transparent government information can increase the government's credibility in society, and its people 100% believe that the government will adequately handle the problems encountered. In the process of government decision-making, researchers have a certain degree of participation. It will put forward useful suggestions and measures for the government. At the same time, their people can fully understand the purpose and importance of government decision-making. Make people live in a more democratic society. Secondly, research transparency includes the validity of research results and the researcher's professional ethics. If the researcher only published the results on a journal and ignored government contact, they lost timeliness of research results and moral responsibility.

On the other hand, no matter which industry has a corresponding moral system. Morality is not merely 'right' and 'wrong,' but 'appropriate' and 'inappropriate' displayed under different circumstances. For example, when a medical researcher concluded that a specific disease is highly contagious, he chose to publish the research results in a journal for the first time and neglected to report such research results to the government. Then in the field of morality, people will think his behavior is inappropriate. However, if what he got is only the result of the virus form, perhaps people do not think his behavior is immoral. Third, the transparency of citizens manifests in personal integrity. The essence of honesty is not only respect for oneself, but also respect for personality. Respect for personality includes respect for people's moral self-disci-

pline. However, if we follow the development of the post-romantic concept of individual differences, then people will develop according to their own needs, even if they are inconsistent with their morals or even social morals. In fact, in a modern moral society, people will not agree with this view. As mentioned earlier, self-discipline is the foundation of respect and integrity. In other words, transparent integrity is self-disciplined individuals who know how to respect the self-discipline of others.

3. Trust

Trust is an abstract and complex concept. Trust can regard as a kind of interdependent relationship, which exists between people, people and communities, and communities and communities. Interdependence means that there is an exchange relationship between the two parties. Regardless of the exchange content, both parties have at least a certain degree of interest related, and the other party must realize their other party's interests. Trust can also be considered a firm belief. It is the overall expectation of one person or community's promise and statement of trustworthiness to another person or community. This expectation regarded as social stability and social shared value.

3.1. Policy maker

At the national level, trust is reflected between countries and between countries and people. People here refer to researchers. Since March 2020, new coronary pneumonia has gradually broken out all over the world. What follows is the need for sharing medical information, medical resources, and epidemic prevention and control. Covid-19 has not only affected the fate of a country. It has affected the life and death of all humankind. All humanity needs to work together to overcome the epidemic. However, when the epidemic broke out, some countries gave up trust between countries for political reasons. With the development of the global epidemic, there is a severe shortage of medical resources in various countries. Germany, as a transit point for the European region in international trade, the German government has openly snatched medical supplies from other countries. From within the country, this may be a manifestation of a democratic government because it distributes looted materials to his people. On the other hand, for countries that belong to the European Union, this is nothing more than a robbery behavior.

Second, countries need to believe that the opinions and suggestions put forward by their researchers are objective. The researchers' research results will help countries around the world fight the epidemic while also saving more lives. As mentioned earlier, when a country formulates an epidemic prevention policy, it must fully listen to researchers' opinions and suggestions. If a country does not trust researchers, it will have catastrophic consequences because trust is mutual. Zhao Guoping, an academican of the Chinese Academy of Sciences, said in an interview with the media that at the beginning of a new epidemic, many research results were an epidemiological summary of preventive medicine or case summary of clinical medicine. It has direct guidance or reference value for real-time field disease prevention and control, diagnosis, and treatment, and it is indispensable for timely communication[9].

3.2. Researcher

As researchers directly expose to the virus, the results they obtain should be fully trusted. At the same time, they should fully trust the country and citizens. In the implementation of the epidemic prevention policy, the researchers believe that their government will accept their recommendations for the prevention policy. When the epidemic broke out, researchers believed that the state would provide them with sufficient medical supplies and medical conditions for their research. Due to the particularity of infectious diseases, researchers will stay in a closed and isolated experimental area for a long time. It means that they may reduce their care for the

family. Therefore, the state must do an excellent job of logistics support for researchers.

On the other hand, researchers must fully trust the carriers of their research objects, those infected. As we know, trust is mutual. If the trust between the researcher and the infected person is lost, it will be dangerous. The infected person may lose their lives. The trust between the researcher and the researched is essentially the embodiment of good. An internal court consciousness in people's minds is conscience (in front of this court, people's minds blame each other and understand each other). When the infected person surrenders themselves to the researcher, the researcher's treatment plan is a manifestation of goodness. Similarly, this is the trust that citizens place in researchers.

3.3. Citizens

The trust of citizens often comes from a belief in social stability. Specifically, citizens' trust in the country lies in their belief that the country's policies are effective and can maintain the stable development of society. Only when the epidemic effectively controlled can production and life gradually return to normal. However, if citizens do not trust the policies adopted by their country, then this will make the epidemic worse – for example, the Shincheonji Church incident in South Korea. When the epidemic broke out, there were still a large number of believers participating in the assembly. Although the government has taken corresponding measures, it still cannot prevent people from gathering on a large scale. Believers did not accept the state's policies because they were not in the same framework of identity with the state. The earlier identification framework was a framework similar to the law, where people were afraid of punishment for the framework and did not dare to challenge the framework easily. However, over time, people are fickle, and they have more and more interpretations of the framework. Then, in addition to the ancient framework, they established their framework. The believers believe that their people defined by the framework and identity provided by the church. When two frameworks cannot completely overlap, they would rather believe that the church can save their lives than the state's policies. In other words, because the church and the country have different values and positions, their followers will lose trust.

3.4. Discussion

Trust is a mutually dependent relationship between the two or the expectation of social stability. When trust is lost between groups and individuals, it often causes differences in identification boundaries. What follows is that they have differences in value and direction, and the result is that the two will cause an inevitable conflict. Just as in some countries, when the government adopts a quarantine policy, they think that such a measure is ineffective. Therefore, people who oppose the isolation policy will gather to resist the isolation policy.

On the contrary, people who oppose segregation are in a position of opposition to the government in terms of life value and social orientation. The situation of these people is considered a situation of "identity crisis." Identity crisis refers to a form of severe disorientation. People often express it without knowing who they are, but it can also be extreme uncertainty about where they stand. They lack this kind of framework and vision, some of which seem to have appropriate meaning, but more are wrong or shallow. This experience reflects the essential connection between identity and sense of direction. The questions that arise in the moral space are what is right and what is wrong, what is suitable and what is inappropriate, what is right for oneself, and what is not suitable for oneself.

Simply put, the root of the problem lies in what is right. A kind individual can be understood as a self-disciplined individual because morality is the self-discipline of behavior related to will. In other words, it is related to general legislation that comes from the standard of will. Behavior consistent with the will's self-discipline is a permitted behavior; a behavior not consistent with

the self-discipline of the will is a non-permitted behavior. When every individual is a self-disciplined individual, there will be 100% trust between people, people, groups, and groups.

4. Endurance

Endurance is the foundation of human wisdom and virtue that the country needs to promote. When the epidemic broke out, people had to accept the status quo of isolation due to the transmission characteristics of the virus. In order to prevent the rapid spread of the epidemic, many countries have adopted corresponding isolation measures. However, this method is not only a postgraduate entrance examination for human beings but also has a massive impact on the world economy. Both the country and their people will endure for a long time.

4.1. Policy maker

Covid-19 has been going on for half a year since its outbreak, and its impact on the world economy is no less than a global economic crisis. The rapid and colossal impact of the pandemic and the economic shutdown caused by prevention and control measures have plunged the world economy into a severe contraction. According to estimates by the World Bank, the global economy will shrink by 5.2% this year, which will be the deepest recession since World War II [10]. Some countries take isolation measures in order to revive the economy. Nevertheless, such a move seems a bit irrational in the face of the epidemic. Some people believe that when the epidemic has not improved, and they are eager to recover the economy, such an approach is to put people's lives out. In some developed countries, such as the United States, their governments should continue to endure economic regression. Compared to the economy, the lives of their people seem to deserve more attention. On the other hand, in those countries and regions that are more affected by the epidemic and have less developed economies, blindly tolerance will not only lead to the economic recession but may also make the epidemic more severe. Then these countries need to be patient while choosing appropriate ways to save their economies.

4.2. Researcher

For researchers, this will become a long and tormented memory. Researchers all over the world continue to study viruses. Before the epidemic is over, they have to do the same thing over and over again. For human endurance, this may regard as a temper of will. In traditional Confucianism, patience has three attributes: tenacity, restraint, and tolerance [11]. First of all, patience requires a consistent experience. The core of Confucian thought is "benevolence." After countless trials, people eventually become "benevolence." For researchers, they need to experience countless failures before they can make progress. Secondly, Confucian said: "If you cannot bear it, you will be chaotic and dare" [12]. It means that if people cannot tolerate small things, then big things will inevitably be affected. If researchers cannot persevere in their research, relying on human immunity will not defeat Covid-19. Third, humans are social animals, but everyone has different preferences and different ways of doing things. If people cannot tolerate each other well, there will be much unnecessary friction. Research conduct in teams. If researchers cannot maintain a good cooperative relationship, the research progress will significantly slow down. The patience of researchers is one of the hopes for humankind to defeat the virus.

4.3. Citizens

The citizens are the largest group that needs patience. Citizens' endurance directly affects the development of the epidemic. Since COVID-19 spread through the air, many countries adopted quarantine policies at the beginning of the epidemic. Nevertheless, long-term isolation is painful

for initially free individuals. Moreover, the differences in social systems implement isolation policies in different countries differently. For example, in China, the isolation policy is implemented as a law. When someone violates the isolation policy, they will commit punishable by law. At the same time, under the influence of traditional Confucianism, China has shown higher tolerance in isolation than Western countries. However, in most Western countries, people have reservations about the isolation policy. The poor implementation of the quarantine policy has directly led to a substantial increase in the number of infected people. Since December 2019, Covid-19 has almost swept the world. The epidemic that has lasted for more than eight months does not mean to stop, which has caused some people to no longer tolerate life in isolation.

While they yearn for freedom, they also stand on the opposite side of their government. For example, in Serbia, due to the rebound of the epidemic, the government decided some cities to re-enter quarantine. Their residents gave up their patience, hoping to regain their freedom through demonstrations. However, this has made the epidemic in Serbia even more severe. Patience and impatience are opposites. The impatience caused by the epidemic has two roots. The first reason is that people's interest in the goal they are pursuing is often excessive. It has become a dominant force to dominate people, which will push rationality aside. The second reason is that people should wait for a goal they can hope to achieve, but for various reasons, they fail to achieve it on time, and people begin to become irritable.

4.4. Discussion

From ancient times to the present, patience has been a virtue in any culture. In Eastern philosophy, traditional Confucianism believes that "small and unbearable will lead to chaos." In Western philosophy, Smith believes that patience is the ability to wait for a long time without complaining, and to endure all suffering calmly [13]. The epidemic is not over yet, and humanity needs a long wait to overcome the epidemic. Therefore, patience is a virtue that everyone, every group, and every country should possess. First of all, patience is the best way to hone a person's will. As mentioned earlier, when people's patience reaches the limit, they will choose to give up patience. In other words, their tenacity is no longer sufficient to support their tolerance limits. Secondly, pursuing freedom and rejecting isolation is an expression of the inability to suppress one's desires. Through self-restrained patience, people gradually become more rational. Plato believed that when reason is dominant, we are good, and when our desires control us, we are evil. Self-control lies in conscious control of desires, and self-control is the opposite of being controlled by people's hobbies and feelings. Third, tolerance is respect and understanding of others. The tolerance of patience is shown through the initiative of the individual to treat others. The individual's cognition of oneself and the perception of conscience make the individual show an active attitude towards others. It is a manifestation of personal kindness.

5. Prudence

The COVID-19 virus epidemic and the outbreak of the epidemic are public events caused by an epidemic. In the face of public events, both the country and the people need to make careful judgments and choices. The country attitude in formulating policies determines the effectiveness of epidemic prevention and control. For researchers, careful research can lay a solid foundation for epidemic prevention and control and disease treatment. For the people, the new crown pneumonia virus challenges human rights to life and health. People need to make careful choices in all aspects, which are related to their own lives.

5.1. Policy maker

When the epidemic broke out, various countries took corresponding prevention and control measures against the virus. Nevertheless, not every country's policies are effective. For example,

in the United Kingdom, when the virus broke out, their government declared that the Covid-19 virus was not terrible and only needed herd immunity to defeat it. The blind decision made Britain fall in a short time. Without suitable anti-epidemic measures, their number of infections has increased rapidly, but the cure rate is shallow. What is even more frightening is that the meager cure rate corresponds to a higher mortality rate. As a result, shortly after the promulgation of this policy, the British government reissued epidemic prevention measures. They paid the price for blind decision-making. The cautiousness of national decision-making affects the prevention and control of the epidemic within the country and affects international morality. When the United States imposed economic sanctions on Iran out of its interests, it ignored the Iranian epidemic would affect all humankind.

On the one hand, economic sanctions can help the United States dominate the US-Iran war. Relieve military pressure through sanctions. On the other hand, global medical resources are scarce, and Iran needs to purchase medical supplies through the international market to ensure that the epidemic effectively controlled. The US approach makes Iran need to face more enormous challenges in the prevention and control of the epidemic. When a global epidemic breaks out, developed countries and regions should take the initiative to help backward areas fight the epidemic. Only when countries all over the world defeat the virus can this plague become history.

5.2. Researcher

Researchers need to present research results objectively and fairly. Overly individual results may lead to deviations in the entire research. The researcher's voice will influence the formulation of national policies and the goals that people follow. Careful research and experimentation are useful measures to fight the epidemic. In the early stage of the outbreak, due to poor understanding of the virus and insufficient early protection measures, many medical researchers were infected. Simultaneously, the lack of medical resources and the collapsed medical system have significantly increased the number of infections among these researchers. Besides, researchers in politics, economics, and culture need to be cautious in presenting their views. Researchers need to provide reasonable suggestions for economic development and construction during the epidemic. Otherwise, things will reverse.

5.3. Citizens

Citizens' caution mainly includes two aspects. The first is the caution from survival and health. According to epidemiological investigations, the main route of transmission of the new crown pneumonia virus is respiratory droplets and contact infection [14]. People are social animals. Whether they live or work, they need to be in contact with other people. During the epidemic, traditional contact methods have significantly increased the spread of the virus. The traditional ways of contact are mainly handshake, hug, and kiss. In regular communication, if people cannot do adequate protection, they will not be able to resist the spread of the virus. In China, due to how the virus spreads, the government requires people to wear masks and wash their hands frequently to protect themselves from the virus. However, in some Western countries, the government has not made precise requirements for the people to wear masks, coupled with greetings in the form of kisses and hugs, making the epidemic spread rapidly in these countries. People do not pay attention to precautions; they are not rigorous about life and health. They did not realize that adequate protection can increase the probability of survival.

The second is the prudence of pursuit; in other words, the prudence of pursuing freedom. In the face of the epidemic, China adopted a large-scale quarantine policy followed by criticism from the US government. They believe that the Chinese government's actions violated the people's right to freedom. Therefore, the US government adopted partial isolation measures after the outbreak, but this has attracted protests and demonstrations from the American people. The people are not cautious in their pursuit of freedom.

On the one hand, freedom does not mean unconstrained. Complete freedom is equivalent to anarchy. Raphael believes that freedom in political society is not freedom of will or freedom of choice, but the freedom to perform what people choose to do [15]. On the other hand, people should carefully choose the freedom they seek. When a country decides to isolate, its people should first achieve liberalization within this measure's scope. Freedom beyond reasonable limits is unreasonable freedom. The virus will not stop spreading because people think such measures are unreasonable. Large-scale protests and demonstrations during the epidemic will only exacerbate the spread of the virus.

5.4. Discussion

Under the epidemic, the country must safeguard not only national interests but also fulfill international morality. From an ethical point of view, its basis on the dilemma between the two. Rawls, the representative of social contract theory, appears very cautious about this issue. He believes that we must limit social and economic processes within the scope of appropriate political and legislative systems. Without proper arrangements for these background systems, the outcome of the distribution process will be unjust. The justice of the background is scarce [16]. In other words, the principles of justice they support should be adopted and implemented within a bordered political community. Our fundamental duty of justice is for our fellow citizens, not for humanity [17]. From this point of view, there is nothing wrong with merely safeguarding national interests. However, utilitarian do not think so. They believe that the rich must help the poor to reduce their suffering. The two viewpoints are at the opposite ends of the balance. Utilitarian thinking is like the freedom that people pursue. It should not be unlimited. Purely safeguarding national interests and purely fulfilling international morality are both undesirable. Therefore, the country should assist within its capacity to the international community while safeguarding its interests. It is a manifestation of social justice. In this epidemic, a country must help countries in the international community that lacks medical resources on the premise of ensuring that it has sufficient medical resources.

On the other hand, the dilemma faced by researchers and the public is to reduce the problem of the country. Simply put, this dilemma is the contradictory relationship between personal interests and social good. If the state's prudence embodied in civil justice, then the caution of researchers and the public is embodied in moral value. Whether a thing is worth doing for a person depends on the person's value judgment. For example, people think that home isolation can prevent them from being infected by the virus, so they choose not to participate in the parade. It seems to be a choice of moral value, but in essence, not participating in the parade is to fear being infected by the virus. The real moral value should not be the purpose of action. Kant believes that in order to have moral value, an action must complete from an obligation. However, the action completed by obligation does not hide its moral value from the purpose, but the moral value derived from the "determined" standard. Therefore, the obligation is the inevitability of action following the law [18]. The meaning is that if people choose not to participate in the demonstration, it is because they believe that such an approach is an obligation based on national policy. Then their choice reflects moral value.

6. Conclusion and Some Implications for Application AI Technology

In today's epidemic era, transparency, trust, endurance, and prudence can regard as virtues that all humankind needs today. First of all, transparency is the intuitive manifestation of a country's democratic government fighting the epidemic, the professional ethics that researchers should have, and the foundation of public integrity. Second, trust is a bridge for communication between the state, researchers, and people. The trust between countries is the embodiment of international morality. Moreover, the trust between researchers and people is the recognition

of the value and the good of society. Third, the patience of the country is a game between people's security and national interests. The patience of researchers and the public is a process of self-cultivation. Fourth, a cautious attitude is an intuitive manifestation of fighting the epidemic at all levels. It is a necessary condition for realizing social justice and moral values.

To sum up, when a country possesses the four virtues, it will guarantee the rights to life and health of its people as a prerequisite. After that, it protects its interests while providing help to the world. For researchers, in the process of cultivating "benevolence" in an external laboratory, only good professional ethics can achieve the "goodness" of society. For the people, patience is the practice of self-discipline, and honesty is the embodiment of self-discipline. People will transform from human beings into real "benevolence" when they have strong moral values and social values.

Similarly, these four virtues also apply to the field of artificial intelligence under the epidemic. First of all, users of smart robots need to accept various terms before they can use it. In these terms, there is some opaque information. For example, in the vast majority of software use, users must accept the robot's location service. Otherwise, they will not use the software. However, the agreement does not clearly explain the purpose of the robot after obtaining positioning. When artificial intelligence provides services to its users, it needs to explain the use of users' private information in detail.

Second, humans and robots need to establish mutual trust. Nevertheless, the trust between man and machine is unilateral. The nursing robot is a good example. In some countries, nursing robots are considered the best choice for caring for the elderly. Over time, older people gradually become dependent on and over-trust robots. Little do they know that robots are collecting information from older adults. It may lead to the disclosure of personal information of the elderly. Trust is mutual, and robots should keep secrets for their users.

Third, patience is a manifestation of self-control. Designers should not add violent algorithms to robotics to turn them into killing machines. Anything that breaks the peace will resist. Fourth, the AI Wisdom Network and service robots are connected to form an AI wisdom network society. It can effectively help policymakers adopt effective prevention and control strategies. AI at this stage has not reached accurate intelligence, and they cannot think for themselves. In the future, humans need to optimize the symbiosis order through artificial intelligence.

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8. Contribution

8.1. Authors contribution

	Initial name	Contribution
Lead Author	GYP	-Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/>
Corresponding Author*	YL	-Final approval of the paper <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Co-Author	HSK	-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Rubrics and Schoolwide Approach to the Character Education and Some Implications to AI-Based Character Education

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Abstract

Purpose: The Character Education Promotion Act was introduced in Korea, and after that many kinds of high qualified school character education programs have been made in Korea. Then now, it is time to pay attention to research for effective program implementation. The purpose of this article is reviewing former developed tools for evaluation for character education in wide range, and suggesting some ideas of the rubrics and schoolwide approach to the character education.

Method: This article give efforts to develop some suggestions of a rubric for effective character education implementation by analyzing prior researches. To extract the rubric, this article reviewed CASEL's Implementing Rubrics, GTO Accountability Questions, and Character Education Framework Guidance in UK. In using this comparative research method, this article extracts the core ideas of each rubrics and synthesizes the main frame of the rubrics to develop rubrics model.

Results: The three former developed rubrics has each steps of questions. And they are composed on the basis of schoolwide approach and help teacher or practitioner check what he/she to do and concern easily. In order for a program to be effective, schools should take all stakeholders in school into account, make a democratic atmosphere, and divide roles appropriately. The extracted rubric can guide the implementation process will not only reduce teachers' burn-outs but also enhance the effectiveness of the program, by making it easier to implement.

Conclusion: If the implementation of an effective program performed in a low quality way, it rather cause negative impact on program effects. In the same context, It is important to take into account how reduce teacher's burden. And it need also provide effective character education program cases and information on supporting organization. As Korean society gradually shifts to the AI-based society, decisions on school policy will also be made based on data. For this, it is essential to establish procedures for how data is used.

[Keywords] Korean Character Education, Schoolwide Approach, Effective Implementation, Rubrics, Education

1. Time to Consider Next Strategy

Korean Character(In-seong) education is often translated to character education. But 'In-seong' is a concept that cannot be replaced by American character. Traditionally, 'In-seong(人性)' has the meaning of nature of a good person who deserve as a human. According to the studies on 'In-seong', In Korea, it is rooted in the 'theory of mind(心性論)' of Confucianism, Buddhism and Taoism, In particular, in Korea, Neo-Confucianism and Buddhism have had a great influence on way of thinking. According to the studies, humans are supposed to represent good nature through studying and training(修養). That is why it is important in Korea to try to be a good person and to be polite to others.

Character education's history in the United States goes back to the beginning of public schools.

The emphasis and profile has waxed and waned, frequently with political trends[1]. In the 1980s, the character education was spotlighted in the United States to solve child and youth behavior problem such as violence, crime, drug abuse and sexual violence. There are some unique and remarkable researches in comparing current trends of character education nearby Korean situation. In China, the gap between moral teacher and immoral school environment is also illuminated by some unique researchers[2]. In Japan, Character education tends to connect with Social Behavior[3]. There are some comparative view between east Asia and England on Character education in view of convergence on Policy Goals[4].

On the other hand, character education has been constantly emphasized in Korea because of students' egoism and rudeness. But, in 2011, as bullying has become a social issue, there were increasing requirement for character education. As a result, in 2015, 'the Character Education Promotion Act' was introduced. At this time, Korean researchers defined the character as a comprehensive concept that includes not only morality but also self-management and social skills[5]. Therefore, the character education in Korea covers every effort related to changing students' character.

There have been many basic studies necessary to promote character education and there are some earlier attempts to evaluate the achievement of character education[6]. And over the past five years, - studies on concepts of character, setting goals, building supporting systems, and discovering and designing programs. Thus the range of Character education is widely expanded, such as Prevention of Juvenile Delinquency from Multicultural Families[7], Sexual Violence CRIME Via IOT-Based Smart Devices[8] and Webhard Monitoring System against Cyber Sexual Violence[9], connecting AI ethics with Concern-Based Acceptance Model for Character Education[10], and so on.

Together with this, It's time to pay attention to research for effective program implementation. Schools should plan intervention with well-planned character education program. It can help promote moral development and mental well-being, prevent behavior problem and disruption. But without well-designed plan to implement the program effectively, it is likely to fail. So, how can such a plan be made? Therefore, this research starts with an overview of prior researches on well-implemented intervention to school. Then this study will extract and list the factors, and suggest a process that make character education program implementation effective.

2. Theoretical Review of Schoolwide Approach

There is now clear evidence that high-quality implementation is strongly associated with positive program outcomes. When it comes to SEL(Social and Emotional Learning – school intervention program), students who involved in well-implemented SEL programs gain twice more academic achievement than those in poorly implemented SEL programs[11]. we should not think of programs by themselves as being effective. it is the well-implemented programs that are effective.

As above, Durlack summarized examples of factors that influence quality of implementation. Those comprise community-level factors, characteristics of staff delivering the program, features of the program to be offered, features of the host school and its operating systems and features of professional development. Although all factors are important for well-implementing. This research focuses on the features of the host school. In this article, <Figure 1> lists examples of those features.

Figure 1. Examples of features of host school and its operating systems.

-
- Positive work climate
 - Organizational norms related to openness to change
 - How well the program fits with usual school practices
 - Shared decision making and supporting collaboration among stakeholders
 - Working partnerships with other agencies
 - Effective communication practices
 - Effective formulation of work groups and tasks
 - Strong leadership
 - A program champion advocating for the program
 - Administrator support
-

These features remind us the importance of ecological system. In order for a program to be effective, schools should take all stakeholders in school into account. Furthermore, they should consider all the groups that support the implementation of a program. It is also important to have a democratic atmosphere that includes optimism, openness, communication, decision-making and cooperation. Finally, an appropriate division of roles and champion's leadership are needed to promote a program. After all, effective implementation of a school intervention program calls for a change through schoolwide.

Moreover, students' behavior and mental problems have clear link with school climate, academic achievement, parent involvement and supporting from family/district/government. Schools can serve as ideal settings to organize efforts to the promoting students' character development. However, rather than promoting positive school climate, many school practices which tend to put an overemphasis on detecting or punishing individual student who has problematic characteristic, and apply naive and unproven solutions to resolve problems. Such schools usually include unconcern to teach positive interpersonal and self-management skills, unclear expectations regarding appropriate behavior, and absence of a teacher in charge regarding students' character development.

Complex and interconnecting factors affect the climate of schools and student attitude against schools. Therefore, if we really want to change them, we should manage the issue with school-wide approach.

For this reason, nowadays, many school interventions designed their programs based on schoolwide approach called PBIS - Positive Behavior Intervention and Supports. PBIS is an evidence-based three-tiered framework to improve and integrate all of the data, systems, and practices affecting student outcomes everyday. PBIS creates schools where all students succeed [12]. Schools may face different demands and situations regarding the development of students' character. Therefore, it is important to create an appropriate system for a school intervention program to work.

Durlak emphasized effective implementation does not occur naturally or spontaneously but require the use of systematic methods specifically designed to increase the odds of program success. Mentioning Daschroder and Hagedorn's argument, he tried to define that "the implementation occurs through the use of effective change strategies."

3. Past Researches

Based on this insight, some education institutes which study on school intervention programs have developed systemic processes or rubrics as strategies which guide effective implementation. This research focuses on three prior examples – 'CASEL', 'GTO' and 'Character Education Framework in UK'. They offer systemic guides that help address key questions for teachers who want to implement a intervention for students' development, including "what are our students

and parents’ needs?”; “which program is appropriate to our school?; “What do we should do first?”. These kinds of system can be used across content areas.

First, The CASEL homepage offer a rubric dashboard. Each focus area of it comprise from 3 to 11 items, which ask about ‘who you are?(teacher or principal?)’, ‘which position are you standing at?’. Using this rubric, teacher(or anybody who wants to implement SEL) can identify what should do easily (see <Table 1>).

Table 1. CASEL’s implementing rubrics list[13].

Focus Area	Rationale
Build awareness, commitment, and ownership	Build foundational support by establishing an SEL team, fostering SEL awareness, and developing a shared vision
Create a plan	Assess needs and resources to develop an SEL implementation plan with clear goals, action steps, and assigned ownership.
Strengthen adult SEL	Cultivate a community of adults who engage in their own social and emotional learning, collaborate on strategies for promoting SEL, and model SEL throughout the school.
Promote SEL for students	Develop a coordinated approach for supporting students’ social and emotional learning across the school, classrooms, homes, and communities.
Practice continuous improvement	Establish a structured, ongoing process to collect, reflect on, and use implementation and outcome data to inform school-level decisions and drive improvements to SEL implementation.

Second, Getting To Outcomes(GTO) approach supports school/school district, through accountability questions. These questions make all factors orient to desired outcomes(see <Figure 2>).

Figure 2. GTO accountability questions[14].

1. Needs Resources: What are the underlying needs and conditions in the community(district/school)?
2. Goals: What are the goals, target populations, and objectives(i.e., desired outcomes)?
3. Best Practices: Which evidence-based models and best practices: Which evidence-based models and best practice programs can be useful in reaching the goals?
4. Fit: What actions need to be taken so the selected program “fits” the community context?
5. Capacities: What organizational capacities are needed to implement the plan?
6. Plan: That is the plan for this program?
7. Implementation and Process Evaluation: How will the quality of program implementation be monitored and assessed?
8. Outcome Evaluation: How well did the program work?
9. CQI: How will continuous quality improvement strategies be incorporated?
10. Sustain: If the program is successful, how will it be sustained?

Finally, the Character Education Framework Guidance offers six benchmarks. These benchmarks summarize the most important features of good provision for character education and are intended to assist schools in evaluating their own work and planning for development(see <Figure 3>).

Figure 3. GTO Accountability Questions[15].

Issue to consider
A. In which kind of school are we?
B. What are our expectations of behaviour towards each other?
C. How well do our curriculum and teaching develop resilience and confidence?
D. How good is our co-curriculum?
E. How well do we promote the value of volunteering and service to others?
F. How do we ensure that all our pupils benefit equally from what we offer?

4. Extracting the Rubric for Effective Implementation

Currently, Korean Plans Character Education Promotion(2016~2020) comprehensively includes elements essential to the development of students' character, but it does not guide the process for effective implementation. Teacher who implement a character education program usually be likely to burn out. There are usually so many ongoing competing priorities, limited resources and need to show the result. In public school settings, teachers become overwhelmed with changing demands or skeptical about the utility of investing their efforts in that mission. Therefore, guiding the implementation process will not only reduce teachers' burn-outs but also enhance the effectiveness of the program, by making it easier to implement.

This research reflected on the above three cases to extract the common important steps or questions, and then modified it to fit Korean educational situation. Then, this suggests a rubric for effective character education implementation. At same time, this assumes that this rubric is included in the official document of Korean moral subject. Because, first of all, moral subject organizes character education as stated in the curriculum, and teachers of moral subjects are not only trained as experts leading character education, but also have a high sense of duty in the development of character of Korean students. In particular, in the Korean education system, the curriculum of teaching is legally compulsory and has a high influence on education. Therefore, guidance on the effective implementation of character education needs to be put into the moral subject curriculum.

In principle, in order to create a procedure, it is necessary to design a process that is expected to be effective and then to test it in field settings, and modify it. Therefore, it is necessary to collect effective character education program implementing cases and extract their procedures. However, in Korea, most character education programs have been implemented temporarily and to show the expected outcomes. Moreover, there are many cases in which content are comprised that are vaguely expected to work, rather than a program based on theory. As a result, it is difficult to inductively identify effective implementing procedures through case studies. Therefore, this research extracted effective school intervention program procedures from the previous cases in other countries(CASEL, GTO and Character Education Framework in UK) and modified them to suit the situation and conditions of Korea. Therefore, to ensure that this rubric is working well, it should be applied to the field to verify its validity.

The rubric for effective character education implementation consists of accountability questions, or “steps”. which is starting with step 1 and ending with step 8. These steps can be illustrated by listing some of the questions that should be answered at each step. This research illustrate how the rubric system can be integrated with resources which support school character education implementation.

4.1. Do you have co-worker?

Without cooperation and support from fellow teachers, it would not be easy to promote a character education program. And the teacher may give up easily. You need a team to change

school. In Korean school conditions, teachers who want to implement character education can form a professional learning community and push it forward.

4.2. what are the needs and resources?

Needs and resources assessments offer information about a school's most salient needs, and usable resources.

4.3. What are the goals and desired outcomes?

Taking populations into account, teachers should make goals and desired outcomes with clear statement. The goals can have objectives which are concrete statements about what will get as a result of the program.

4.4. What/which program can be useful in reaching our goals and outcomes?

Teacher(s) can design creative and fit character education program by her/himself. But, There is also the Character Education Center, which provide quality source of program information. At this step, Teacher should determine the key components and coordinate to fit his/her school context and students' features. if the teacher just select a program instead of designing a program. he/she should modify the program to fit his/her school.

4.5. What is the plan for implementing the program?

The focus of step 5 is on creating an specific and realistic implementation plan. The plan should include time line, implementation tasks, and activities to develop students' character.

4.6. How will the program implementation be monitored and accessed?

This question helps to ensure that the program is being implemented as planned and identify which correction may be needed. In this way, feedback mechanism promotes increase probability of achieving the goal and better outcomes.

4.7. which outcomes have you gotten from the program?

Teacher should collect data to determine how much the students changed by participate in the program. The Korean Character Education Enter offer a software program to measure change on students' character. So teacher can use it easily.

4.8. How will continuous quality improvement strategies be incorporated?

At the end of the process, Teachers should collect outcome data and carefully reviewed process carefully. And, they can utilize those data to make modifications for next project.

In addition, This rubric has to be written with practitioner-friendly language, be designed to be flexible that can be modified at any school. A step or some steps can be jumped, because the process focus on how teacher plan for and monitor the implementation easily and effectively. Utilizing this rubric, teachers who usually focus only on the result can learn about how it happened, so that they can make it happen better.

5. Conclusion and Some Implications to AI-Based Character Education

This study discussed what kind of approach is required and which strategy is needed in reaching desired character education outcomes. If the implementation of an effective program performed in a low quality way, it rather cause negative impact on program effects(including hostility against character education policy). It is extremely costly to ignore implementation. The money, resources, and staff time spent on poorly implemented programs will be wasted because

such programs are not likely to be successful.

This focused the effective process when a school implement character education. In the same context, It is important to take into account how reduce teacher's burden. If they burn-out, we cannot expect effective implementation. Teachers are likely to be stressed when they lost time for the instructional mission. So, moral subject need to guide to less teacher's burden when they promote character education. For example, It need to provide accessible materials, including practical advice, tools and case studies that school leaders, teachers and other staff can use to address character education issues in their school. It need also provide effective character education program cases and information on supporting organization.

As Korean society gradually shifts to the AI-based society, decisions on school policy will also be made based on data. In order for the numerous data generated in relation to character education to be useful, it is essential to establish procedures for how data is used. The Rubric in this article for the effective implementation of character education can be a systemic frame to use data efficiently.

In conclusion, now it is time for planning schoolwide character education strategies, and making system helping effective implementation. The policy makers and researchers should pay attention to real-world demands.

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7. Contribution

7.1. Authors contribution

	Initial name	Contribution
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Corresponding Author*	GYP	<ul style="list-style-type: none">-Play a decisive role in modification <input checked="" type="checkbox"/>-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/>-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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AI Ethics and Privacy Right

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Abstract

Purpose: The Purpose of this paper is to ensuring AI ethics in view of the privacy rights. With the development of science and technology, artificial intelligence robots have become a part of human life. It can not only help people to complete tedious work, but also improve human work efficiency. In order to provide better services to humans, AI needs to collect and analyze human information. This paper focuses on this point and tried to show the rights and duty of the privacy manager as an AI ethics.

Method: This research reviews from the definition of the privacy right. And focusing on the critical development of privacy right. This paper focuses on the privacy problems and reasons for AI in this point, especially AI robots. This paper analyzes the current AI privacy issues and their causes through domestic robots, available robots, and AI wisdom networks. With this, this paper tries to explain the protection of human privacy through two parts as protection regulations and improved algorithms.

Results: Relying on individuals or groups to achieve privacy protection is difficult and requires strong laws and regulations to restrict it. Privacy protection technology mainly uses data bundling, distributed computing, edge computing, machine learning, and other technologies to protect data security. Protecting privacy requires strong science and technology and a sound legal system, And it also requires the government to establish functional departments to supervise producers, operators, and users.

Conclusion: All the final result is to make AI coexist with humans in the same society. The emergence of artificial intelligence robots has brought convenient services to humans, and at the same time, threatened human privacy. Whether it is a service robot or an AI smart network, they obtain users' private information all the time. In order to ensure privacy, developed countries in the AI field have successively promulgated AI regulation or AI ethics to protect privacy. Together with this, some researchers have improved algorithms to protect users' privacy.

[Keywords] Privacy, Data Collection, Trust, AI Regulation, AI Ethics, AI Algorithm

1. Introduction

Today, human beings are in an era of intelligent transformation. Artificial intelligence has been widely used in all aspects. Because it can provide solutions to many complex human problems, artificial intelligence has become more popular. The research fields on relationship between human being and AI spread widely, e.g. showing ethical tasks of AI in 4th industrial revolution era[1], connecting COVID-19 and extract its implications to AI[2].

On the other hand, privacy issues has become a subject of intense debate in modern society. Sometimes privacy issues could be dealt with the private security industry[3], internet website's security issues on Password and Authentication Policies including privacy[4], And to protect and promote big data utilization including private information with police activities[5], Some parts

of privacy for migrants management in connection with AI's activities to collect, assemble and analyze information[6], and even DNA privacy of some partial issues which handled with AI[7], so on.

For AI to provide more accurate services to humans, it needs to collect more personal information. However, it may cause the user's privacy to leak what the privacy issues of AI are? Why are these reasons? How should humans face these problems? There are four parts to this paper. The second chapter is the definition of privacy rights. The third chapter uses a domestic robot, available robot, and AI wisdom networks to explain some privacy problems and reasons for AI. There are some recommendations for AI in chapter four. Last is a conclusion.

2. The Development of Privacy Right

2.1. Definition of privacy right

At the end of the 19th century, Warren and Brandeis present the definition of privacy. They believe that the right to privacy is the "right not to be disturbed." Legal privacy rights mainly contain two meanings. The first meaning refers to an inviolability right, including the right to keep secrets, the right to keep alone, and the right to protect thoughts, feelings, and creeds from being made public. The second meaning refers to the individual's right to control the information disclosure behavior fully. It means to what extent an individual can disclose his feelings, mood, and thoughts to others[8]. In summary, the legal right to privacy emphasizes the right to make decisions about privacy.

2.2. Development of privacy right

The critical development of the right to privacy appeared in the 1960s. With the advent of computer technology, the right to privacy is no longer just a personal issue. Westin defines the right to privacy in its book "Privacy and Freedom" as individuals, groups, or organizations have the right to make independent decisions about when, what means, and to what extent to pass information related to them to others. The right to privacy is the protection of private status at the core and is the right that people should have to decide for themselves. Suppose that group A is unwilling to disclose their plans for the next year. It is entirely their own business and will not affect by other organizations or individuals. The subject has the right to decide on the information.

On the other hand, Miller believes that the right to privacy should be a right with the individual as the subject. It includes not only privacy itself, but also the control of the circulation of private information[9]. In the same example, if group A wants to communicate the plan to group B, they can only communicate through group C. To a certain extent, group A will restrict by group C, and it may leak information that needs to communicate. For group A, the right to privacy should include the right to control the flow of information. In summary, the two interpretations of the modern right to privacy are not contradictory. They are two parts of the right to privacy. The former is the right to control information, and the latter is the right to restrict information. Modern privacy rights pay more attention to areas other than information.

3. Privacy Problems and Reasons for AI

According to usage, artificial intelligence robots mainly include industrial robots and service robots. In the early days of AI applications, industrial robots made significant contributions to economic growth, production safety, and industrial competitiveness. With the advancement of technology, service robots have gradually become the focus of heated discussions. Whether in

private spaces or public places, service robots provide humans with a new way of life. However, to better serve users, robots are always collecting users' personal information and living habits. What followed is that the privacy of users has threatened. This chapter analyzes the current AI privacy issues and their causes through domestic robots, available robots, and AI wisdom networks.

3.1. Domestic robots

With the development of science and technology, intelligent robots have gradually become part of human life. In China, smart home appliances help humans to complete tedious work and make people's lives easier. In Japan, due to the increasingly severe aging problem, nursing robots have become the main companions for the elderly at home. The ubiquity of household robots also brings some distress to humans. First, the user's personal privacy information becomes no longer secure. Intelligent robots are added with data collection devices when they produce. It can help the robot better sense and collect the user's personal information, lifestyle, and personal preferences. However, at the same time, user information may be leaked. Secondly, due to living together for a long time, humans will have single emotions towards intelligent robots. Humans' over-reliance on robots makes them lose some of the skills they should have. Simultaneously, the excessive trust will cause people to relax their vigilance on the security of personal information. Third, when humans start to use home robots, they must first agree to the user agreement. Users are forced to disclose personal information legally. Domestic robots provide humans with a convenient life, and they also bring privacy threats. Fields that have protected in history have also become accessible [10]. The use of domestic robots helps the government or hackers to enter people's living spaces.

3.2. Public robots

Compared with domestic robots, humans will not rely too much on public robots, such as driverless cars, surveillance facilities, self-service robots. To protect public robots, in most cases, people need to provide personal information before accepting services from robots. As the frequency of use increases, the robot can grasp the user's life trajectory, living habits, and even personal property information. Direct surveillance can lead to more than personal use. By collecting historical records and big data analysis, all parties of available robots can quickly obtain the private information of each user. In other words, every user has a sufficient external understanding.

3.3. AI wisdom network

Compared with independent, intelligent robots, the privacy and security challenges faced by AI intelligent networks are more severe. As we know, AI can process and output the input information. AI uses machine learning to improve its performance. The more data entry and the more its capabilities improve. When AI connects to the Internet or IoT sensor network, multiple AIs can run on the same network. Therefore, in most cases, there is a collaborative relationship between AI and other systems or other AIs [11]. If the AI intelligent network outgases regarded as a whole, it will have most of every user's privacy. From life to work, users can see everything in front of AI. In China, the surveillance system connects to the AI intelligent network. When a vicious case occurs, the police can quickly find the criminal through the AI intelligent network, thereby improving the efficiency of solving the case. Every coin has two sides. Their move is being watched who are law-abiding citizens. People's worry is not without basis. The first is that there are no complete laws to restrict intelligent robots in many countries. The second is that there is no clear indication of the relationship between humans and artificial intelligence. The division of artificial intelligence's legal and moral responsibilities is fuzzy. The third is that governments have not set up corresponding departments to manage them. Therefore, there are still many uncertainties in the future of AI intelligent networks.

4. Some Recommendation to AI

The rapid development of intelligent technology has provided convenience to human beings, but also threatened human privacy. This chapter explains the protection of privacy through two parts: protection regulations and improved algorithms.

4.1. Protect regulations

Relying on individuals or groups to achieve privacy protection is difficult and requires strong laws and regulations to restrict it. From 2016 to 2017, the EU, the UK, and the US successively issued laws and regulations on robot ethics. The core of these regulations comes from putting people first[12]. For those more complex decisions, supervisors and AI need to work together. At the same time, high penalties are imposed on companies or individuals that violate laws and regulations. To a large extent, the degree of privacy protection has been improved, but it has also brought considerable controversy. People-oriented regulations have greatly hindered the development of AI. Overly cumbersome regulations have significantly increased the cost of AI research and development, and the implementation of some regulations may lead to catastrophic damage to the AI system[13].

Therefore, in 2019, China's National Robot Standardization General Group put forward the "China Robot Standardization Prospect." Different from the schemes proposed by other organizations, it is based on the theory of decentralization. The plan puts forward the symbiosis concept between humans and robots diversity, nature, justice, and prosperity. Based on this, the ethical standards of Chinese robots cover the five main ethical goals of robot design, operation, and use, including human dignity and human right, accountability, transparency, awareness of misuse, and prioritizing shared flourishing. The plan is composed of the China Optimal Symbiosis Design Plan(COSDP) and corresponding implementation methods. The purpose is to optimize the world symbiosis order through the design and research of AI robot technology.

4.2. Change algorithms

The promulgation of various regulations to protect privacy must be an inevitable trend in the future. It dramatically increases the cost of compliance for companies in data collection, use, and circulation. It even creates islands within and between enterprises, which restricts the value of data obtained by enterprises. Therefore, another method is accomplished through AI privacy protection technology. Privacy protection technology mainly uses data bundling, distributed computing, edge computing, machine learning, and other technologies to protect data security[14]. There are many specific privacy protection technologies. For example, in the early stage of artificial intelligence development, Cavoukian proposed the universal principles of the Fair Information Practices(FIPs) in Privacy by Design (PbD). It uses seven principles to limit the information technology and physical design of robots(See <Table 1>). Next, differential privacy is a way to protect privacy through cryptography. The purpose is to provide a way to maximize the accuracy of data queries when querying from a statistical database while minimizing the chance of identifying its records. This technology has been used in both Apple and Facebook.

Table 1. The mapping of FIPs onto the 7 foundational principles[15].

Privacy by design foundational principles	Fair information practice principle(GPS)	Extended principles
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1. Proactive not reactive; preventative not remedial		Demonstrable commitment to set and enforce high privacy standards. Evidence that methods to recognize poor privacy designs, to anticipate poor privacy practices and outcomes, and to correct the negative impacts proactively are established.
2. Privacy as the default setting	3. Purpose specification 4. Collection limitation, data minimization 5. Use, retention and disclosure limitation	Privacy as the default starting point for designing and operating information technologies and systems represents the maximum personal privacy that one can have. That is, privacy becomes the prevailing condition - without the data subject ever having to ask for it - no action required.
3. Privacy embedded into design		Systemic program or methodology in place to ensure that privacy is thoroughly integrated into operations. It should be standards-based and amenable to review and validation. All privacy threats and risks should be identified and mitigated to the fullest extent possible in a documented action plan.
4. Full functionality – positive-sum, not zero-sum		All legitimate non-privacy interests and objectives are identified early, desired functions articulated, agreed metrics applied, and unnecessary trade-offs rejected in favor of achieving multi-functional solutions.
5. End-to-end security - full lifecycle protection	7. Security	
6. Visibility and transparency - keep it open	2. Accountability 8. Openness 10. Compliance	
7. Respect for user privacy - keep it user-centric	1. Consent 6. Accuracy 9. Access	

In summary, protecting privacy requires strong science and technology and a sound legal system. Nevertheless, this is not enough to curb the loss of personal privacy. The protection of privacy also requires the government to establish functional departments to supervise producers, operators, and users. Make AI coexist with humans in the same society.

5. Conclusion

The emergence of artificial intelligence robots has brought convenient services to humans, and at the same time, threatened human privacy. Whether it is a service robot or an AI smart network, they obtain users' private information all the time. Moreover, output the information after analyzing and summarizing it. To this end, some developed countries in the AI field have promulgated laws to protect user privacy better. Western countries represented by the European Union believe that everything should be people-oriented, and the core of regulations lies in user decisions. On this basis, China put forward the idea of optimizing symbiosis. The purpose is to optimize the world symbiosis order through excellent robot technology design and research

and development. In addition to the law, improving robot algorithms is another way to protect privacy.

Even so, there is still much new information in the field of artificial intelligence. In future development, how will humans and AI robots coexist? It is a question that deserves further study.

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7. Contribution

7.1. Authors contribution

	Initial name	Contribution
Lead Author	YL	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/>
Corresponding Author*	GYP	<ul style="list-style-type: none"> -Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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The Super-Aged Multiculturalism in South Korea and the Necessity of Wearable AI Ethics

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Abstract

Purpose: With the advent of the 4th Industrial Revolution, the importance of AI is being emphasized. AI which is developed to improve the quality of human life will also need ethics that its developers, producers and users must follow. The Purpose of this paper is to showing the super-aged multiculturalism in South Korea and the necessity of wearable AI equipment ethics. Together with this, it is approached to deal with current social situation and trends of social change in this paper.

Method: This paper focuses on the fact that human being is facing the super-aged and culturally-diverse society, and an era before and after COVID-19. In this regard, this paper tried to establish AI ethics calls for a discourse on super-aged society, multicultural society, the 4th industrial revolution(4IR), and the untact society. And review the achievement of some comparative research including Europe, the U.S., and China's announced AI ethics guidelines which encourages the development and production of AI.

Results: AI is no longer just a passive robot. They are closely related to humans and continue to evolve as they develop each other. Many countries give strong emphasis on the values such as transparency, dignity and diversity on the production of AI. However, the AI ethics has not fixed to focus on specific identity. AI, developed to improve the overall quality of human life, requires a common ethics that its developers, producers and users must follow.

Conclusion: AI ethics based on the trend of aged society and diversity should be focused on: First, it should be the ethic of data science-based management where theory and practice converge. Second, it should be an ethic of exchange and coexistence to solve the problems that mankind are jointly facing, such as UNESCO's Sustainable Development Goals(SDGs) 17. Third, it should be super-convergence wearable AI ethics as wearable technology is progressing.

[Keywords] 4th Industrial Revolution, Untact Society, Sustainable Development Goals(SDGs), Wearable AI Ethics, Wearable Technology

1. Introduction

According to current statistical data, Korean society entered an aged society. The number of people aged 65 or older is 14 percent in 2017 and 14.2 percent in 2018, exceeding 14 percent of the total population. The problem is that the figure reaches a super-aged society where the figure exceeds 20 percent in the near future. Compared to developed countries, Korea is transforming to be a super-aged society very quickly. As the transformation of Korea into a super-aged society calls for various issues, e.g. Migrant crisis management [1], Disaster and Safety Management System at Local Government [2], public health such as influenza vaccination status

management[3], preparing unification between South & North Korea in view of crisis management[4], reviewing 4th industrial revolution and extract the tasks of AI [5], and so on. In comparative research view, Japan has leading achievement for diagnosis of super-aged society, as exemplifying “locomotive syndrome” [6], showing process of physical disability among older adults[7], in conversing how super-aging society prepares for the future [8].

Also, Korean society is an immigrant multi-cultural society. More than 4 percent of the total population is foreign residents who come from outside. Although some people are insisting the policy of de-globalization due to the Covid-19, Korean society, the multi-cultural phenomenon, which began with a low birth rate, aging population, and a lack of labor, will inevitably continue.

The Covid-19 triggered in 2019 calls for a paradigm shift all around the world. Mankind are facing a new environment that they have not experienced in previous times, such as conflicts between the G2, US and China, structured poverty of underdeveloped countries, and the deepening seriousness of conflict between the rich and the poor.

Until now, ethics may have been a study of nitpicking to the arrogant development of science. In the meantime, the identity of ethics is getting slimmer. AI ethics in the era of the 4th Industrial Revolution based on diversity have to propose a convergent alternative to theory, practice and evaluation of ethical problems in real society.

AI ethics will only be able to establish its identity if it presents the alternatives to society after the 4th Industrial Revolution. In addition, it should present the practical ways that are able to improve the condition of human life and establish a system that allows us to evaluate it not only theoretically but also in practice and overall. AI ethics also should be based on sustainable learning, wearable technology ethics. These three identities should be based on the ethical value of diversity. Centered on the diversity, problems arising in the new globalized untact society after Covid-19 should be analyzed and alternatives presented. AI ethics should solve global problems such as 17 kinds of Sustainable Development Goals(SDGs), and establish its identity in the respect of practical measures forming the wearable technology ethics.

2. Super-Aged Multiculturalism and Untact Society Meet the 4th Industrial Revolution

2.1. Multicultural society due to the super-aged society

The causes of the emergence of multicultural society are low birth rate, aging population, and labor shortage. Without awareness of the aging population, which is the root cause of the multiculturalism, it is difficult to solve the problem of multicultural society. The super-aged population is a problem that the world suffers from, and it is caused by the welfare system and abundant resources of food etc. The increase of aging population has led to a decrease of labor power with a low birth rate. Without a fundamental diagnosis and resolution of super-aging, a rational multicultural solution cannot be obtained.

As actualizing Framework Act on Low Birth in an Aging Society(2012) [9], Korean Ministry of Health and Welfare prepared specific schedules. One of them is every 5-year plan. According to the third basic plan which covers 2016~2020, low birth rate and aging society was formulated in consideration of the linkage and complementarity among the detailed policies for comprehensive solution to elderly poverty, health, care, social isolation and suicide and safety issues derived from the increase in the elderly population. The most important issue is the establishment of a multi-layered old age security system, and the guarantee of a healthy and independent life in a continuous health support system of prevention, treatment and care. At the same time, health-welfare policies intend to ensure active care for the unhealthy elderly, and to prepare them to overcome the aged society by applying an integrated generation perspective [10]. In this

regard, it is necessary to establish a new AI ethics for the development of the medical field in the era of the 4th Industrial Revolution, especially with the focus on the prevention-therapy-care health support system policy.

2.2. Untact C-generation and future society

Covid-19 has started to cause a lot of problems that requires serious contemplations over the global community. Nearly every country is suffering from economic problems and the situation may last for considerable times. In the U.S., the number of unemployed people has reached tens of millions in recent months, and the situation in Italy and other EU countries is not good either. Korea also has faced numerous economic challenges such as shutdown of small business, contract systems, layoff of short-term workers, so the government gave out emergency aid to all citizens.

People regard hygiene issues as more important than ever, and a culture based on untact is spreading in all workplaces, including schools, businesses and government offices. In the case of education, this trend has existed before, but in today's intelligence society, the direction of development of the 4th Industrial Revolution is now likely to rapidly expedite the untact culture. In the AI field, medical robots deliver medicine on behalf of nurses, while hotel service robots also deliver food to rooms. Telemedicine is being commercialized in the developed countries, and AI is reducing costs for accidents and repairs by informing people in advance where problems may break out.

AI ethics based on the untact culture of the 4th Industrial Revolution has become even more necessary. Now we need not only human-to-human ethics, but also human-to-machine ethics. Can ethics last in the untact relationship between people and people in today's intelligent information society? Can such a non-face-to-face human relationship become ethical if it becomes a voice-only relationship without seeing in person? Also, can machines with manlike intelligence really make ethical thoughts, judgments and decisions? Can machines make ethical judgments, especially in terms of diversity and cultural diversity? Prejudice and discrimination in human society will be one of the challenges of AI ethics today, such as how to manage whether or not the AI has already been learned them through deep learning.

2.3. Necessity of the 4th industrial revolution, aging multiculturalism, and untact discourse

The basic principles of the 4th Industrial Revolution are characterized by hyper-connections, hyper-convergence, and super-intelligence, etc. made up by the convergence of information and communication technology. The ethical value of super-aged multiculturalism should be based on the basis of hyper-connectedness, hyper-convergence and, super-intelligence. In most countries, multiculturalism is related with the phenomenon of super-aging, but the ethical value of multiculturalism is distorted in the real society, and prejudice and discrimination are committed throughout the society. The recent case of racism in the United States reminds us the pervasiveness of the prejudice. Will prejudice and discrimination in our society disappear in the society of the 4th Industrial Revolution based on the artificial intelligence and the untact communication. Rather, it could be regenerated and more complex problems may appear.

Among the processes of hyperconnectivity, hyperconvergence, and superintelligence, the value of cultural diversity in particular will be a more and more critical. Diversity in the ethics of artificial intelligence is being demonstrated through the case of Microsoft's Tay in 2016 [11] or MIT's first psychopath NORMAN [12] artificial intelligence experiment. Especially in the former case, depending on what information the users and the developers chat with artificial intelligence, the chatting session was ended up due to racist conversations. In the latter case, artificial intelligence turned into psychopath as a result of the user's intentional injection of unethical and negative information. Especially in the former case, Tay was able to express racist ideas

without hesitation and that demonstrated threats to ethics of diversity.

AI ethics of super-aged diversity in the intelligence information society are ethics that should be observed between humans and machines, or between machines and machines, and it also should be applied as practical ethics in terms of practicality. In other words, the ethics of super-aged diversity are both normative and practical ethics. In this regard, the ethics of super-aged multiculturalism and diversity can be named hyper-convergence AI ethics.

AI ethics of hyper-convergence is that the super-aged diversity ethics should be input through data science and artificial intelligence should learn it through the deep learning. In the process, developers, producers and users will have to recognize AI ethics of super-aged diversity not only in terms of normative aspect but also in terms of application. In other words, hyper-convergence AI ethics should be ethics of the necessary and sufficient conditions that must satisfy both the theoretical and practical aspects of ethics of super-aged diversity.

3. Ethics of Diversity in AI Ethics Guidelines

Regarding the basic direction of AI ethics guidelines around the world, social issues and responsibilities, cultural diversity and diversity are being discussed. All countries of the globe recognize AI as a new measure of national competitiveness and they are pushing for various AI-related policies and strategies to secure global leadership. They are also announcing various recommendations and guidelines from a comprehensive perspective, including AI's social responsibility and ethics, as well as industrial strategies such as fostering R&D industries. The U.S. announced Google Principles for AI Usage in June 2018 and the Ethical Design Report(IEEE) in March 2019, China proclaimed the next-generation AI management principles in June 2019, and Japan announced the human-centered AI society principles in March 2019.

European Union(EU) aims to promote balanced AI policies and ethical problems such as human-centered values, ethics, responsibility[13], and security, and announced the AI Cooperation Declaration in April 2018 and the Trusted AI Ethics Guidelines in April 2019. EU's reliable AI requirements include autonomy and supervision, technical robustness and safety, privacy and data governance, transparency, diversity, non-discrimination, fairness, social and environmental welfare, and accountability. The main content of 2019 Guidelines of UK for the Use of AI in the Public Sector highlights AI evaluation, guidelines for planning and management methods, and guidelines for the ethical and safe use of AI. The 2018 AI recommendation of French government is emphasizing measures to respond to changes in French society due to AI, and it especially responded to social issues such as environment, ethics, gender, and inequality. In particular, the AI Ethics Problem Report of August 2018 highlighted ethics in the field of artificial intelligence business, citing bias, discrimination and exclusion, machine autonomy and human identity issues among the six concerns of artificial intelligence ethics.

AI ethics requires discussion of identity through alternative, sustainable, and ultra-converged wearable AI ethics approaches in theory and practice, given that social problems such as super-aged society, inequality, diversity and anti-discrimination should be solved in the diversity ethics, along with the hyper-connectedness of the 4th Industrial Revolution and the technological development of superintelligence.

4. Identity of Hyper-Convergence Wearable AI Ethics Based on Diversity

4.1. Ethics as alternative

AI ethics in the era of diversity-based hyper-convergence multiculturalism should be a study

that actively suggests alternatives in advance rather than chasing after the direction of science. It should present solutions to common human challenges, demonstrating the alternatives in the future beyond the 4th Industrial Revolution, and prepare for the untact world after Covid-19, and become a win-win study through exchange and cooperation with other areas.

While the existing ethic was the study left behind the natural science, the ethics of the post-Covid era should be the alternative ethics of presenting the direction of the natural science of intelligence information. In other words, with the rapid development of science so far, ethics has been a form of complacency that should not go so fast from the back. But science is already facing the era of the fourth scientific revolution, even before it presents the right ethics, as ethics progress beyond its peak. At this point, the task of AI ethics is to properly presents the direction of fourth science, especially artificial intelligence science, and to manages it in for the usage of deep-learning.

This is an ethical issue not only in the design and use of data, but also in the collection and analysis of data, and in the manufacture of derived production and services[14]. In that sense, it will be a part of the discussion in AI ethics.

4.2. Ethics as a sustainable study

Hyper-convergence AI ethics should be sustainable ethics. The 17 goals of SDGs should be those of hyper-converged AI ethics. Hyper-convergence ethics should provide concrete answers to common human problems. Specific answers should be presented not only in theory but also in practical terms. To this end, hyper-convergence AI ethics should be the ethics on which the diversity of exchange and co-prosperity are rooted in.

In this regard, education policies and systems for understanding and cross-cultural exchanges should precede ASEAN region and other cultures such as Central Asia, South America and Africa, which have been backed by exchanges. In addition, the government should seek ways to co-exist and cooperate with them in the 4th Industrial Revolution and the development of AI industries.

Diversity-based AI ethics, which comes down to the ethics traditionally emphasized by the East and West, eventually emphasizes the quality of human life and human-to-human co-existence. The quality of human life, cooperation in the way of development, and values of coexistence, are patience, good will, conscience, and courtesy that emphasize coexistence in the traditional societies of the East and the East and West.

4.3. Science based on wearable technology ethics

Hyper-convergence AI ethics should be convergence ethics in theoretical and practical aspects. In today's wearable technology era, it should be practical and theory-based ethics, and it should also be ethics that scientifically proves how useful and harmful is. This would also mean efforts to match the NI(Natural Intelligence) with AI.

In addition, discussions on the ethics of wearable technology are under discussions and the ethics of management should be the basis for hyper-convergence wearable ethics. There should be ethics that manage whether developers and producers have developed and produced on the basis of hyper-convergence wearable ethics, and in this respect, hyper-convergence wearable ethics should be management ethics. This refers to the management of technologies that manage whether the correct data is entered and the correct ethics are applied. In addition, the basic and development and production areas of wearable technology should be based on AI ethics based on ultra-aged diversity.

Recently, discussions have also been held on life logging beyond augmented reality or virtual reality. Life-probing, which began to become routine with the advent of sensors and mobile devices, has become one of the hallmarks of modern society as the link goes beyond the Internet

of Things to people and things and things, and beyond to the intelligent, virtual-world convergence Internet of Everything[15].

In the development of artificial intelligence-based medical devices, it must be developed as a block chain-based technology(blockchain technology is a key development technology in the 4th Industrial Revolution that cannot modify or falsify information through block storage technology). The development of artificial intelligence-driven medical devices, one of the central areas of the 4th Industrial Revolution, is a critical technology. In an super-aged diversity society, medical device services for the elderly are necessarily an important area of development. Block-chain-based distributed storage technology should be central to the development of devices for artificial intelligence-oriented medical services in the super-aged diversity society. Medical device services through AI, which are impossible to modify and falsify information and protect individual medical information, should be the main development of the 4th Industrial Revolution.

Health wearable devices offer many benefits, including the quality of human life, and change the lifestyles in the positive way by saving time and money, but on the other hand, this will be another area of interest in AI ethics in that it relates to ethical issues corresponding to privacy, safety and known consent, such as the leakage of information accumulated by third parties without user consent[16].

In addition, wearable technology-based AI ethics will contribute greatly to the fact that digital therapies are attracting attention as new treatments. Digital therapeutics(Digital therapy) is software-based therapy such as app(application program), game, and VR(virtual reality) instead of pills or injections taken. In particular, the development of digital therapies will accelerate as face-to-face medical treatment becomes difficult due to the COVID-19 crisis. This treatment refers to a way to prevent, manage and treat diseases based on software instead of pills or injections taken. They mostly use smartphone apps, games, VR(virtual reality), and chatbots. It has the advantage of shorter development time and lower development cost than basic new drugs. Digital therapies are relatively cheaper to develop than new medicine. Medical apps do not require clinical trials and the duration of clinical trials is usually less than 1-2 years. Recent advances in technologies such as smartphones and wearable devices are also attributed to rapid growth of digital treatments. Technologies in this field include such things as medical psychotherapy software.

In addition, in the case of Milk Coin(MLK), the application of the block chain-based crypto is based on how good and ethical its users are, and MLK users can collect mileage and convert it into MLK and they can use it again through the digital asset exchange. MLK is a service that integrates scattered mileage or points by utilizing block chain technology. Consumers can check their affiliate mileage at a glance through the MLK app. They can be integrated into a digital asset called MLK and use the points for conversion, or users are able to cash the points. AI ethics can also be applied to wearable technology for distributing the storage-based services.

5. Conclusion

This study aims to present the need for AI ethics to cope with the characteristics of various civilized behaviors caused by the advent of the 4th Industrial Revolution, namely super-aged, multicultural, and hyper-convergent society.

AI is no longer just a passive robot. They are closely related to humans and continue to evolve as they develop each other. In the field of simple calculation and reasoning, AI already has surpassed the human ability. AI, developed to improve the overall quality of human life, requires a common ethics that its developers, producers and users must follow. In addition, AI applications

span the entire life of mankind, including academics, media, medicine, advertising, public security and national defense.

Today, mankind is in the midst of a super-aged society, and the advent of a diverse society, including cultural diversity, and COVID-19, which brought unprecedented pandemics to mankind. This situation calls for the so-called "uncontact," such as the reservation of communication between individual humans through social distancing and the intentional contraction of economic activities. In this situation, humans need more tact, or face-to-face communication, to survive. However, since such activities are practically impossible, AI technology, which can be called the best means of untact communication, is needed. Just as many life genres require practical ethics, AI, which encompasses all such situations, is also asked to do so.

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7. Contribution

7.1. Authors contribution

	Initial name	Contribution
Lead Author	ESS	<ul style="list-style-type: none">-Set of concepts <input checked="" type="checkbox"/>-Design <input checked="" type="checkbox"/>-Getting results <input checked="" type="checkbox"/>-Analysis <input checked="" type="checkbox"/>-Make a significant contribution to collection <input checked="" type="checkbox"/>-Final approval of the paper <input checked="" type="checkbox"/>-Corresponding <input checked="" type="checkbox"/>
Corresponding Author*	GYP	<ul style="list-style-type: none">-Play a decisive role in modification <input checked="" type="checkbox"/>-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/>-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Implications of Emotional Coaching and Integrated Art Therapy Teaching Method on Leadership Education in the AI Era

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Abstract

Purpose: The key keywords of this era are “leadership”, “communication” and “empathy”. Even in the field of education, in order for professors and students to exert leadership and followership together, an education in which communication and empathy are harmonized, but it can be understood and practiced as a true education.

In our educational field, we are trying various teaching methods that can breathe with the students, but we are still facing difficulties in that the creativity of students is limited due to the progress of evaluation for measuring performance. So, this study aims to examine the implications of applying emotional coaching and integrated art therapy teaching methods that can stimulate students' minds in the AI era to leadership education of police, military, and fire-fighting officials.

Method: This study analyzed the contents of the FGI interview with the students after applying emotional coaching and integrated art therapy education method to 250 students who participated in leadership education related to police, military, and fire-fighting officials for 8 months from March 1 to November 30 in 2019. In the future, education that this era aims for should be changed from 'knowing' to 'can' mind that can be practiced based on solid basic knowledge and converted into education that can move on its own. So, what is the teaching method that makes students have a strong will to actively practice? This study is to examine that emotional coaching and integrated art therapy are teaching methods that capture students' minds.

Results: The effects of the emotional coaching and integrated art therapy teaching method can be seen as three main factors. First, it helps students develop and stabilize their emotions by expressing their emotions in a comfortable quarter. In other words, while the integrated art activities express not only pleasant feelings but also unpleasant and unspeakable feelings and thoughts such as psychologically suppressed fear, anger, and jealousy through the medium of art, music, movement, and theater in a safe space of the education center, the students can get the opportunity to listen to their inner sound. Second, students learn naturally the ability to control their body. Third, in the field of education, students can actively help communication skills, that is, they will develop language and nonverbal communication methods in art activities. Considering the three effects of integrated art therapy and emotional coaching teaching method it can be helpful to maximize the effectiveness of education by applying integrated art therapy techniques to enable students to listen to their own inner sounds.

Conclusion: The integrated art therapy based on emotional coaching showed that the Warm Up time to listen to the students' actual mind is the most effective time. At this time, it was found that the effect of education differed greatly depending on how interested the instructor is in observing the students. The reason why I try this teaching method is that I can make students recognize the importance of self-existence value and this can be expressed as pride. This enhanced self-esteem of students is more brilliant when they go to the organization.

[Keywords] Coaching, Emotional Coaching, Integrated Art Therapy, Teaching Method, AI Era

1. Emotional Coaching

Emotional coaching means understanding and accepting emotions naturally as they are, but it has a clear limit to the behavior of expressing emotions and leads them to a more desirable direction in them. Before we discuss this meaning more deeply, let's first look at the types of behaviors that parents can do when their child is upset. The types of parents' behavior about the child's feelings can be divided into four categories [1][2].

First, Dismissing: It is a type of child who tries to pass on serious situations that have occurred to the child without any consideration and to draw up other topics; Parents recognize that the child is sad, but they ignore the child's work in light of their own experience. How many sad things are you living with? Is this why you're crying and crying? It's easy to say. Parents expect that the child's mind will be resolved to some extent by turning the topic into something else, but in the experiment, the feelings that passed without solving the part of the child's sadness or trouble remained stressful for the child [1][2].

Second, Disapproving: A child is offended, but he or she is trying to suppress his or her feelings without trying to understand them properly. Usually, in order to stop the crying of the child quickly, it is very important to treat the child as a case of greatly ignoring the child's feelings such as shouting or making a big horn. It often appears in poor parents [1][2][3].

Third, Laissez Faire: The child is expressed to the child that he or she understands the current feelings of the child to some extent, but he or she has not acted more than that and is in the state of being there. There is no direction for the child, and if the parent continues to do this as a state of trying to finish this phenomenon, the child will not even try to talk about his or her worries because he does not trust the parent anymore.

Fourth, Emotional coaching: It is a way to find the appropriate next behavior with the child after expressing the understanding of the child's current mood first. If the parent makes a proposal and the child accepts it or not, set the limit of the behavior, think with the child, and find the appropriate way to understand the child. I said that I would discuss why emotional coaching is needed later, but I can fully feel the need for emotional coaching even if I look at the four types of parents.

1. If emotional coaching is performed well, trust between parents and children is accumulated and the relationship with children is improved considerably; The child recognizes that the parents understand their minds well and feels that the parents really love me and can have a sense of stability.

2. Children familiar with emotional coaching may be able to resolve their conflicts of opinion in other relationships than their parents; If you play with your friends and have a conflict of opinion, you try to find a way to enjoy and play together rather than insisting on my opinion unilaterally.

3. If parents use the wrong way (such as coercive screaming, or begging) to soothe children easily, the child tries to suppress the same or easily resolve the conflict with the weak (such as his brother and friend) than he does. So what are the difficulties when emotional coaching is applied to education? The first is the problem from the starting point where the child is not seen as an equal person. The child is still in immature and has a lot to know, but he or she is more than a child in experience, so it is easy to conclude that his or her opinion is better and to unilaterally notify the solution [1][2][3].

The second is to show the understanding of emotions even if the child is perceived as an equal person, and then to experience the difficulty of presenting a solution to all problems. That's because parents don't know all the situations [3].

It is difficult, but it is necessary to try to coach emotions like the word 'start is half'. It is important to start with the whole beginning, 'I really understand your mind.' And to instill the perception that 'Let's solve this problem together well'. Even if you don't like the situation where your child is angry and irritated, or if you want to get rid of it quickly, you need to understand why the child is expressing it properly and then express it so that the child can feel that the parent knows your mind and calm it down and find a reasonable solution together. If this process is repeated, the trust between the child and the parent will naturally become thicker and the heart will respect and love each other[3][4][5].

As previously discussed, the emotional coaching technique is a technique that is widely used when communicating with children. But in this study I would like to intend to apply the emotional coaching technique to trainees in terms of teaching method.

2. Understanding Integrated Art Therapy

In order to motivate students to be educated, it is necessary to have contents that can feel pride in their minds. Pride is a mind that believes and respects one's values and abilities, and is also one of the main variables that explain the human behavior of pride(Tracy & Robins, 2007). Generally, pride is defined as a personal assessment that reflects what others think of themselves, or as a degree of ability by an individual to reflect judgments about values(Pierce, Gardner, Cummings, & Dunham, 1989; Marsh, 1998). Then, it is necessary to combine integrated teaching techniques to restore pride that the most opinions were given to the students.

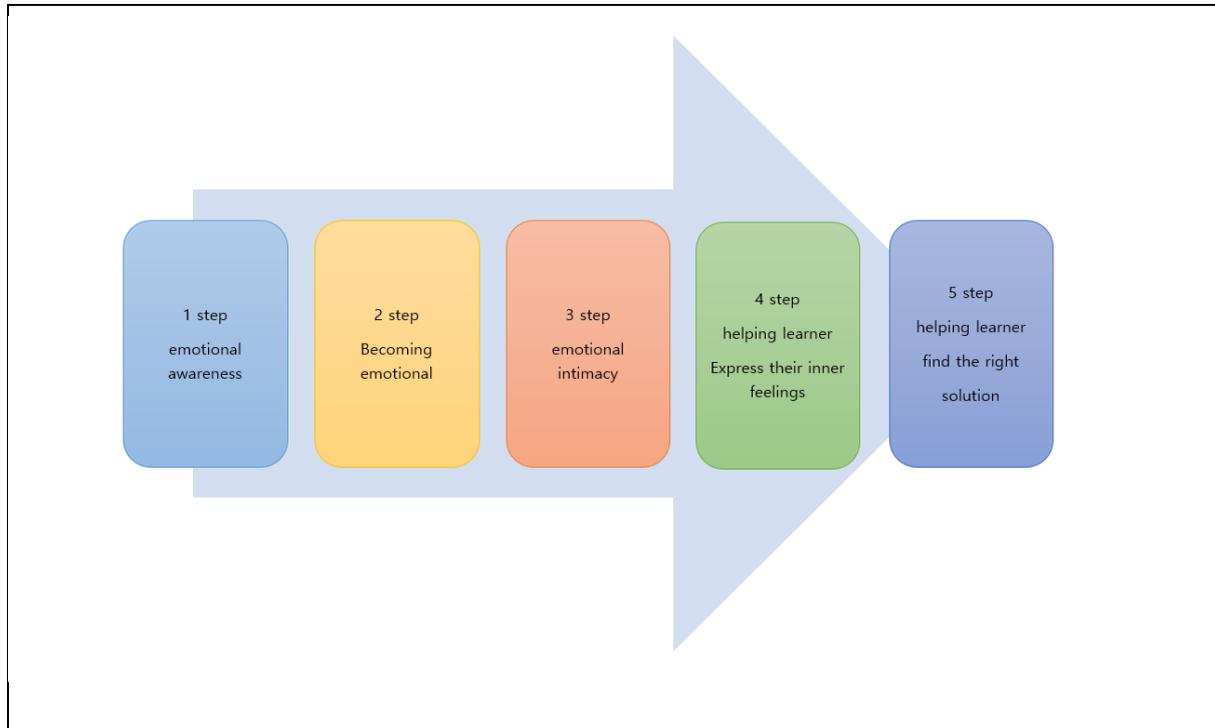
Self-esteem can only be a leader who acts if recovery is preceded, and it can contribute to the improvement of the military's combat power. In order to train leaders who practice and act as desirable leaders for naval soldiers and civil servants, PAL teaching techniques of problem solving middle school were applied. However, in order to maximize the effectiveness of such education, it is necessary to firstly implement an integrated teaching method that leads to healing and empathy for the students[6][7].

This integrated teaching method is now recognized as one of the teaching techniques that can restore pride. In particular, integrated art therapy is a field of counseling that enables the general public to access more easily and comfortably by combining the activities of 'art' without the rejection of 'cure', and it is also a teaching technique that can be applied in the education field. It is advantageous that students can feel as play or art activities rather than 'therapy', so they can participate more actively and self-directedly in counseling activities and education contents, and can select and integrate necessary activities among various arts fields according to the interest of the students[6][7][8].

The effects of the integrated art therapy teaching method can be seen as three main factors. First, it helps students develop and stabilize their emotions by expressing their emotions in a comfortable quarter. In other words, while the integrated art activities express not only pleasant feelings but also unpleasant and unspeakable feelings and thoughts such as psychologically suppressed fear, anger, and jealousy through the medium of art, music, movement, and theater in a safe space of the education center, the students can get the opportunity to listen to their inner sound. Second, students learn naturally the ability to control their body. The physical expression in musical instrument playing, dance and movement therapy in music therapy scene supports and encourages physical activities of students, and the change of emotions through integrated art therapy activities even plays a role of controlling physiological functions by controlling hormone secretion. Third, in the field of education, students can actively help communication skills, that is, they will develop language and nonverbal communication methods in art activities[6][8][9].

Considering the three effects of integrated art therapy techniques, it can be helpful to maximize the effectiveness of education by applying integrated art therapy techniques to enable students to listen to their own inner sounds <Figure 1>.

Figure 1. Emotional coaching 5 step.



What is the teaching method that makes students have a strong will to actively practice themselves? It is the "emotional coaching teaching method" that coaches students' minds. Through emotional coaching that coaches students' minds, students can lead to positive minds, and the classroom culture, the culture of the lecture hall, can be changed into a culture that communicates and sympathizes more. There are three main basic philosophy of coaching[1][2].

First, human beings have infinite potential. Second, the answer to the problem is that person. Third, we work together. Based on the three philosophies of coaching, it can't help but become a positive classroom culture when the instructor treats the students. The most important thing in this era is that we need leaders who fill the poverty of the mind, mental poverty.

Dr. John Gartman, Department of Psychology at Washington State University, conducted emotional coaching research for more than 30 years, and as a result, it was possible to reach learner-centered self-directed learning. This new education concept would be Professor Joe Wall if another pioneer was selected in Korea for the "emotion coaching" technique. If we combine these emotional coaching teaching methods with our classroom, we can summarize them in five way[1][2][3].

The first step instructor first sympathizes with the learners. The goal in which 2 step learner wants is confirmed. Step 3 empathizes and listens to the feelings of the learners about the solution they want. It helps the 4th stage learner to express the desired solution. The 5-step help learners choose their own solution.

Based on the actual emotional coaching teaching techniques, I am conducting training every hour. The most necessary thing for the education of breathing with students was ice breaking

based on emotional coaching. Warm Up time was the most precious time to listen to the students' actual heart. At this time, it was found that the effect of education differed greatly depending on how interested the instructor is in observing the students[5].

The reason why I try this teaching method is that I can make students recognize the importance of self-existence value and this can be expressed as pride. This enhanced self-esteem of students is more brilliant when they go to the organization[9][10][11].

As a result of applying emotional coaching teaching techniques in classrooms and fields for 15 years, the feedback that students heard most was that they could feel themselves changing enough, such as being immersed in class and feeling something that they could not express in their minds. In addition, it was found that they could find and prepare ways to find the same way as the compass, and that they felt it as a turning point experience of life. Therefore, if you want to foster creative leaders who act, I hope that the professor will take on the role of guiding them to take the lead as creative leaders who can solve problems by themselves through "active learning inducement" and "learning interest inducement" in the classroom[12][13][14].

3. Research Method and Results

3.1. Subject to research

This study was conducted with 250 police, military, and fire-fighting officials who participated in leadership education for 8 months from March 1 to November 30, 2019.

3.2. Period and method of research

This study was conducted by the author of 250 students who attended police, military and fire-fighting officials related leadership education for 8 months from March 1 to November 30, 2019, and analyzed the satisfaction of the students and FGI after applying emotional coaching and integrated art therapy education method and the interviews. In order to conduct more in-depth research I have to try to overall effectiveness of emotional coaching and integrated art psychotherapy teaching technique and more quantitative research should be conducted. However, it is meaningful to investigate satisfaction through response evaluation after leadership education and to listen to and analyze the voices of the students who actually feel in the education field to confirm the practical and necessary teaching techniques from the perspective of the students[5][15].

3.3. Results of research

In fact, 250 police, military and fire-fighting officials related students who met during the leadership lecture for 8 months showed an average of 4.98 satisfaction with 5.0 points. Compared with the average education satisfaction of 4.27 in the previous year, there was no big difference, but it was slightly raised. The reason for this is that the satisfaction level is very high compared to job education due to the nature of leadership education. So, 87 FGI(Focus Group Interview) students were conducted to identify the needs of the students so that they could find a way to improve and supplement the limitations of the actual response evaluation.

In order to analyze the needs of the students who participated in leadership education, 87 FGI students were conducted in parallel with the subjective survey.

- 1)The new teaching method was fresh and I could feel pride in 20 years of public life .
- 2)I think I am always happy, but as the class goes up, I feel frustrated.
- 3)I joined the teaching method that applies emotional coaching and integrated art therapy techniques, and I started to open my mind without knowing it.

4)It was meaningful because it was time to look back at myself.

5)It was good to be able to hear the sound of my heart through music.

The effects of the emotional coaching and integrated art therapy teaching technique can be seen as three main factors. First, it helps students develop and stabilize their emotions by expressing their emotions in a comfortable quarter. In other words, while the integrated art activities express not only pleasant feelings but also unpleasant and unspeakable feelings and thoughts such as psychologically suppressed fear, anger, and jealousy through the medium of art, music, movement, and theater in a safe space of the education center, the students can get the opportunity to listen to their inner sound. Second, students learn naturally the ability to control their body. The physical expression in musical instrument playing, dance and movement therapy in music therapy scene supports and encourages physical activities of students, and the change of emotions through integrated art therapy activities even plays a role of controlling physiological functions by controlling hormone secretion. Third, in the field of education, students can actively help communication skills, that is, they will develop language and nonverbal communication methods in art activities. Considering the three effects of integrated art therapy techniques, it can be helpful to maximize the effectiveness of education by applying integrated art therapy techniques to enable students to listen to their own inner sounds.

4. Implications of This Study

In this regard, this study analyzed the effectiveness of emotional coaching and integrated art therapy teaching method. After applying emotional coaching and integrated art therapy education method to leadership education for 250 people who entered the police, military and fire-fighting officials related leadership curriculum for 8 months from March 1 to November 30, 2019, the satisfaction of the students was raised rather than the satisfaction of the previous education. In addition, FGI(Focus Grup Interview) 87 was conducted in parallel with subjective survey for more detailed analysis.

Based on the implications of this study, the instructors in the leadership-related education field can present three major areas to be supplemented and developed in terms of emotional coaching teaching method and integrated art therapy education method. First, the satisfaction of the students was increased when the integrated art therapy teaching method led to the healing and empathy of the students and conducted the education in the conflict management, interpersonal relationship and effective communication subjects. Therefore, it is effective to apply emotional coaching and integrated art therapy techniques in parallel with theories and techniques for communication with others in the field of practice after conducting 1-2 classes of education contents that lead to healing and empathy to students by utilizing writing therapy and role play combined with music therapy. In order to cultivate as a "behavioral leader" in our society as a whole, the students themselves must first control themselves. It is possible to induce action learning through the communication of healing and empathy with oneself, and the interest in learning that the students feel is naturally motivated. Through this process, it is meaningful that the students were able to observe the leader who restores and feels confidence and pride.

In these times we are already AI era and the fourth revolution. Various and integrated teaching methods are needed in the field of education. In particular, leadership education is most important for learners to experience and feel themselves and motivate them to practice through it. In particular, for police, military, and fire officials who are special officials, leadership education helps to become a responsible leader who takes the initiative as a true leader. Through this, it will be possible to practice with the hearts of police, military, and fire- fighting officials trusted

by the people. The 'emotional coaching' education method and 'integrated art therapy' education method examined in this study will be a turning point for education that presents many opportunities for students[1][10][16][17][18][19].

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6. Appendix

6.1. Authors contribution

	Initial name	Contribution
Lead Author	YJL	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/>
Co-Author	MSL	<ul style="list-style-type: none"> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Instructor Competency for Innovative Teaching Methods in the UNTACT Era

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Abstract

Purpose: As the times change, the teaching and learning environment naturally changes. The recent “COVID-19” situation facing the world has brought many changes to the educational environment in Korea. By the way, there are a lot of social things out there. Therefore, this paper proposes the core competence of professors who will flexibly conduct innovative teaching methods even in crisis situations.

Method: This study analyzed thesis data applying the innovative teaching method from 2010. In addition, a literature study was conducted to collect public education and higher education materials to derive instructor competency in the untact era.

Results: Instructor competency for innovative teaching methods in the untact era was derived as follows.

First, the instructor should pay attention to prescribing the optimal course of study in order to derive the learning outcomes that the learner expects. In particular, as the 21st century enters, instructional design skills using ICT are required because teaching methods become diverse. Therefore, above all, instructors should have systematic instructional design skills and establish instructional strategies accordingly.

Second, because non-face-to-face classes are activated with 'COVID-19', learning curation skills are required to develop class contents and operate e-learning. Since Korea has a smooth internet environment, various attempts are possible. There is a need for digital literacy to develop high-quality educational materials by developing and modifying various instructional contents necessary for teaching and learning.

Third, in the 21st century, creativity is important, so rather than teaching students simple knowledge, we need to help them form their own knowledge. Therefore, the role of instructors should be coached to discover the potential of students through key questions.

Conclusion: In order to carry out a good education, various abilities of the instructor are required. In particular, when a special situation such as “COVID-19” is encountered, the instructor's ability to perform flexible teaching and learning has a great influence on learners. Therefore, in order to cultivate creative talents of the 21st century, it is very important to develop teacher competency.

[Keywords] Untact Learning, Teaching and Learning Method, Flipped Learning, Instructor Competency, Digital Literacy

1. Introduction

Currently, the “COVID-19” virus, which is hitting the world, is shaking not only our daily life but also the entire educational ecosystem. Now, our society and the educational world will change quite differently from before the outbreak of “COVID-19”. That is why it is necessary to be flexible in any crisis[1].

In general, a professor is a person who teaches professional knowledge and studies academics, and is a person who strives for the development of learners' personality and intelligence. However, depending on social variables these days, redefinition of the role of instructors is required[2].

It is argued that the competency of instructors should be changed in order to cultivate DT(Digital Transformation)-type talents only by looking at the “Digital New Deal” policy recently announced in Korea. However, in reality, only a few instructors attempt advanced teaching and learning[3]. Fortunately, some of the instructors prepared cyber learning grounds in advance and coped with their subjects with appropriate educational methods in the untact era.

According to the '2020 Distance Class Operation Casebook' published by the Ministry of Education in Korea, 51 class cases of 450,000 teachers were introduced in 12,000 schools nationwide[3]. Among them, some of the innovative schools were confused with 'COVID-19', and they communicated more closely with students and parents through active distance classes. In addition, a class was attempted to link online learning activities with offline.

In general, the representative types of classes conducted in response to “COVID-19” were ▷ real-time interactive class, ▷ content-oriented class, and ▷ task performance-oriented class. Its contents are shown in <Table 1> below.

Table 1. Representative types of distance learning in response to COVID-19.

Real-time interactive class	Utilization of real-time remote class platform ▷ immediate feedback for discussion and communication
Content-oriented class	Use feedback after viewing content ▷ distance discussion and teacher feedback
Task-oriented class	Presenting assignments for student self-directed learning ▷ Feedback on performance results

Among them, the interactive class was a class that was able to immediately interact with learners centered on discussion by using a real-time remote class platform, and the total usage was only 5.2%. On the other hand, the use of content-oriented classes reflecting post-feedback with instructors such as comments after viewing the content showed 40.9% utilization. On the other hand, 10.6% of classes focused on task performance, presenting tasks for self-directed learning to students and giving feedback on performance results. In addition, 45.3% of the mixed education methods that used two or more methods were mixed. In any case, the attempts and efforts of various educational methods that urgently responded to social variables showed significant results.

However, it cannot be said that the change in education method has increased the educational effect. Moreover, the classroom situation is very complicated in the educational field. Therefore, systematic instructional design according to learner analysis and educational goals is necessary[1]. The person who designs the class is also the instructor, and the person who actually runs the class is also the instructor. That is why the competence of the instructor is so important. If so, let's take a look at each one of the skills of an outstanding professor that this era wants.

2. Instructor Competency for Innovative Teaching Method

2.1. Learning designer

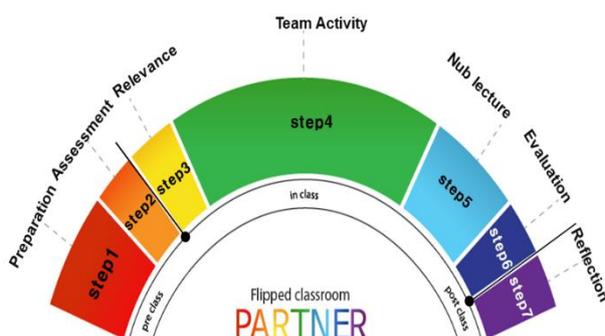
Most successful lessons take place under careful planning. In order for education to be successful, instructional design according to instructional procedures must be given priority. Instructional design refers to all processes that organically and well organize educational methods and evaluations based on the selection of educational content according to the learning goals. Instructors should pay attention to prescribing the optimal course of study in order to derive the learning outcomes the learners expect. Therefore, the instructor must have a creative idea, a logical systemic and rationality for teaching activities. Moreover, when an unexpected variable occurs, such as the current situation, it is necessary to have the ability to reorganize the entire curriculum. If the instructor does not set standards, learners are confused. In particular, how much effort was required to change the existing typical education system in the course of education through non-face-to-face classes. If you were a professor who usually carefully analyzed your subject and devised an optimal methodology, I think you would have dealt with this crisis smoothly.

In the 21st century, innovation in classroom teaching methods is being attempted with the development of information technology. As a part of improving the educational method using ICT, e-learning or blended learning classes were being actively conducted. And recently, flipped learning, a learner-centered teaching-learning model, is attracting new attention with the aim of perfect learning[4][5][6]. Flipped Learning can be a new alternative for students who go to school every other day or every other week due to the 'COVID-19' crisis. E-learning self-directed learning is carried out at home for a certain period of time to build basic knowledge, and in the face-to-face class at school, the educational goal can be achieved through discussion, discussion and problem-solving cooperative learning[7][8][9]. Systematic instructional design and instructional strategies are essential to operate on-offline mixed education, flipped learning, and 2PBL(Project/Problem Based Learning) using ICT[10][11][12].

The practical instructional design process of Flipped Learning is as follows[1]. For smooth Flipped Learning, there are three steps in total: a pre-class should precede; then, in the structure of classes in the classroom, in-class learning among peer learners should be done; and lastly, the operation of a post-class should be done. For successful Flipped Learning, class elements in each step should be designed with a time difference, interconnected so as to achieve a single educational objective. However, it was found that there was a limitation in that the teaching-learning model of the preceding Flipped Learning consisted of the order of analysis, design, development, implementation and evaluation as general procedures, so it would not sufficiently consider the situations of Flipped Learning only.

From the background, this paper suggests a teaching-learning model which is systematically designed for flipped learning. It named the model as 'PARTNER', and the PARTNER model is actively used by universities and for corporate education in Korea and results in a significant educational effect. The flipped learning teaching-learning model is largely divided into 7 steps[6]Its contents are shown in <Figure 2> below.

Figure 2. Flipped learning PARTNER teaching-learning model.



The first step, Preparation for pre-class requires needs analysis. Among some objects of the analysis, learners, environment and subjects should be initially analyzed. At the preparation step, video contents, the data source of pre-learning and other materials useful for self-directed learning are provided to LMS.

The second step, Assessment tests whether learners understand pre-learning contents.

The third step, the stage of entry into In-Class develops pre-learning and relevant activities. This step associates the class contents provided in the pre-learning with cooperative learning and announces teaching methods and educational goals.

The fourth step, Team Activity is the core of flipped learning. Team-based class is often conducted, instead of lecture-centered class. Here, teachers as facilitators serving as coaches help learners share knowledge and solve problems, by encouraging the cooperation among them.

In the fifth step, teachers should provide nub lectures, as the cooperative learning is closed. The step verifies whether educational goals are achieved at In-Class and performs deep learning, while arranging the whole class.

The sixth step, Evaluation should evaluate learners' performance process and academic achievement.

The last step, Reflection as the stage of post-class reflects on task performance by teams and individual learning, at the end of class.

2.2. Learning curator

One day, we are experiencing helpless difficulties due to the unexpected variables of the times. What is even more disturbing is that no one can predict the certainty of when the “COVID-19” situation will truly enter its phase. However, it is the teachers who are in the most difficult situation in the education world during this chaotic period.

The professors, who were preparing for the new semester with swelling expectations, were unable to keep their minds on the ever-changing government policy with the delay of school opening due to the unexpected COVID crisis. Moreover, in the process of solving various problem situations, instructors had to briefly change their role from educators to management administrators.

Even now, the situation has not changed significantly, and the situation is the same for higher education including public education. Meanwhile, as e-learning was developed as a countermeasure for non-face-to-face classes, the situation became more complicated. Various OCW(Open course ware, as a representative example, ebs lectures, etc.) were selected and provided to provide class content that was not yet prepared, and in part, instructors created and shared content it started. In the end, there is a burden of producing the entire second semester educational materials in anticipation of a crisis that will rise again in the second half of this year. In order to provide high-quality education, it is necessary to develop and secure various remote class contents and to improve the quality of contents.

After all, in the non-face-to-face education that will be developed in the future, the digital literacy capability of the instructor is absolutely necessary. 'Literacy' generally refers to the ability to acquire and understand knowledge and information through written records. Literacy with digital additions, or “digital literacy,” is the ability to understand and express information essential to the digital age. Digital literacy at the educational level does not require knowledge of specialized technical equipment. It is enough if the instructor develops materi-

als to be used in class or selects and re-edits good sources of curating skills. In order to increase digital literacy, the faculty's interest in the use of digital media and the ability to apply is needed above all else[7].

In the era of single-person broadcasting, you and I have become YouTubers and are showing their own talent and charm. Thanks to this, digital devices are also reasonably priced, and a variety of free software and applications provide endless ideas for use in class. It will surely be fun and rewarding if you let go of your fears about the device and create educational materials that contain your own personality[13][14][15].

Since many years ago, I have argued a lot about the competency development of instructors according to the change in the educational paradigm. At that time, several instructors who met through lectures and consulting predicted the trend of the times, developed high-quality educational contents, and redesigned classes. The redesigned classes were sometimes successful and sometimes not. However, even though it was a failure, it did its best to continuously improve the quality of education by drawing meaningful results for new attempts. Now, the instructors possess the best teaching skills and have become influencers in the education world to help fellow professors who are struggling around them.

2.3. Learning coach

“There are endless possibilities for students. And every student has their own problems and the only one who can solve them is himself. But you absolutely need a partner to solve that problem.”

This is my interpretation of the “three major philosophy of coaching” in learning. And the above-mentioned partner means a fellow learner or instructor.

Now, the capabilities of talented people required by the times are not limited to just a few. The world evolves and changes more rapidly, and it needs organic and creative competencies. Then, what concrete work should a professor do for our students?

The key point in how instructors can unlock learners' potential is in the question. 'Coaching' means the process of asking a question in a word. Great questions can help you maximize a person's potential and unlock tremendous energy. In other words, rather than giving the correct answer through 'coaching' rather than 'teaching', we should guide, encourage, and spread the thinking system by asking questions so that we can solve problems on our own.

The educational meaning of coaching is a series of processes that inspire learners to come up with smart alternatives when faced with a specific problem situation and support them to experience success opportunities. At this point, the key to learning coaching is the question.

Questioning is one of the speaking skills, which makes others think about their own problems and helps them to find solutions for themselves, thereby enhancing problem-solving skills. When everyone is asked a question, brain circuits work unconsciously to stimulate their thoughts to find answers. Einstein's quote also conveys the greatness of the question. 'The question is more important than the correct answer. If I'm in a situation where I'm dying soon and I have to find a way to save my life in just an hour, I'll spend 55 out of an hour trying to find the right question. Once you have found the right question, it will take less than five minutes to find the correct answer.' Questions like this are a great resource for getting results on a different level than simply acquiring knowledge.

Now, simple information and knowledge will gradually be replaced by online courses in lecture halls, and the role of instructors in the educational field will be changed to 'Coach' along with 'Teacher'[1][2]. Therefore, instructors must closely monitor learners in order to perform the duties of a coach and provide tailored education through appropriate feedback

to help individuals grow. The world is already filled with open educational resources, and quality content is very efficient. Some say that one e-learning star instructor can teach the whole people. Therefore, in order to become a proficient instructor, you must transform yourself into a coach role that helps students change and grow by arming them with good questions without exercising their competencies more than necessary to convey knowledge[1][13][14].

3. Conclusion

As mentioned above, we have looked at the competencies that instructors must have at the time when the educational ecosystem needs to be fundamentally changed in the era of untact. In order to develop education, the individual efforts of instructors are important, but there are certainly limitations. Therefore, for educational innovation, institutional support from relevant government ministries and in-depth interests between education classes are required. Korean education certainly has excellence. There have been numerous crises in the past, but in the end, they have made great achievements using crises as an opportunity. I believe that the power of education works on the basis of such overcoming. Recently, Korea is attracting attention around the world for K-culture and K-defense. In addition to this, we conclude the writing of the suggestion, wishing that K-Edu will gain its status as a host country in the global era through the propaganda of K-Edu, which has advanced to the next level in terms of education.

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5. Appendix

5.1. Authors contribution

	Initial name	Contribution
Author	JBC	<ul style="list-style-type: none"> -Set of concepts <input checked="" type="checkbox"/> -Design <input checked="" type="checkbox"/> -Getting results <input checked="" type="checkbox"/> -Analysis <input checked="" type="checkbox"/> -Make a significant contribution to collection <input checked="" type="checkbox"/> -Final approval of the paper <input checked="" type="checkbox"/> -Corresponding <input checked="" type="checkbox"/> -Play a decisive role in modification <input checked="" type="checkbox"/> -Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/> -Participants in Drafting and Revising Papers <input checked="" type="checkbox"/> -Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>

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Suggestions for Using AI in Preparation for a Super-Aging Society

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Abstract

Purpose: In modern society, the increase of the elderly population has become an important issue for every country. It is true that there is a difference in degree, but restrictions on physical activity in the elderly, deterioration of health, loneliness, economic poverty, and loss of social roles are challenges that we must continue to cope with. This study was conducted to find out what direction the use of AI and countermeasure strategies for the elderly should go in the face of a super-aging society.

Method: To achieve this goal, this study investigated the online data of the Korean National Statistical Office's social survey, and confirmed the elderly issues in the age of super-aging by referring to the policy report on the increase of the elderly population and the diversification of social service needs, which was investigated by the Seoul Institute. Also, by identifying 30 academic research articles related to the elderly and AI provided by Korea Education & Research Information Service(KERIS), the contents judged to be consistent with the contents of this study were considered and used for analysis.

Results: In the field of medical care for the elderly using AI, it could be seen as a process of changing the medical paradigm from disease diagnosis and cure centered to personalized care. In addition, the application of AI-based voice recognition system in the daily life of the elderly overcomes the vulnerability of the ability to use information technology, and can be a way to resolve the information imbalance by providing knowledge and information. However, it was confirmed that the reason for the low level of digital information among the elderly was limited and unfamiliar with adopting new technologies. Therefore, it is the time when new skill acquisition education is universally and easily required to improve the quality of life of the elderly. In particular, the protection measures related to the collection and use of personal information related to big data for the use of AI are as important as the use of AI, and should be carefully reviewed.

Conclusion: This study was an opportunity to confirm that AI can be appropriately applied to various issues caused by the increase of the elderly population in the modern society facing a rapid aging. In the future, the utilization of AI is expected to expand further to public support services for the elderly.

[Keywords] Super-Aging, AI, Elderly, Medical Care, AI-Based Voice Recognition System

1. Introduction

With the advent of the 4th industrial revolution, the world has entered a hyper-connected society in which objects, people, and countries are connected to each other. The first mention of the 4th industrial revolution is believed to have started when more than 2,000 experts, made up of politicians, economists, and businessmen, adopted the field of science and technology as the first major agenda at the World Economic Forum(WEF) held in Davos, Switzerland in January 2016. The WEF announced that a technological revolution in which digital, physics, and bio-

industries have already begun based on the 3rd industrial revolution, and emphasized the connection through convergence as a keyword[1][2].

The core of the 4th industrial revolution is intelligent information technology, and is divided into artificial intelligence technology and data utilization technologies such as IoT, Cloud, Big Data, and Mobile(ICBM). ICBM refers to a technology that combines technologies to realize human high-level information processing capabilities such as cognition, learning, and reasoning [3][4]. These ICBMs are predicted to lead the intelligent information society by accelerating convergence by interconnecting people, objects and information. Unlike the 1st industrial revolution that led to the change of labor force using steam engines, the 2nd industrial revolution, which was a period of mass production using electric power, and the 3rd industrial revolution that opened up the digital era using computers and information technology, the 4th industrial revolution is completely changing the fate of the nation, companies and individuals before we even notice the sense of change.

The Korea Institute of Science and Technology Planning and Evaluation announced in 2016 the global trend of future society changes that can take place by 2040. The macroscopic environmental model is divided into society, technology, economy, environment, and politics(STEEP), and the megatrend, called STEEP, is predicted in five dimensions. Among the STEEP models, the social megatrend is about population change, lifestyle, culture, health, and family, and one of the most notable ones is that the explosive increase in the elderly population changes into a super-aging society, resulting in drastic changes in lifestyle and health[5][6].

Until now, exercise has been actively recommended and implemented as a health intervention method for the welfare of the elderly, and positive contents can be confirmed through many previous studies on the effects of the elderly exercise[7][8][9]. However, due to the infectious disease threat of Covid-19, there are many daily life restrictions, and in particular, the elderly have more time to stay at home, leading to an increase in solitude and loneliness[10].

In modern society, the elderly issue is treated as a social issue. There are many issues that the elderly cannot solve themselves, and these issues are because social institutions and lifestyles are structurally complex and intertwined. Therefore, it is time for various policies to improve the quality of life and support independence for the increasing elderly population. As the standard of living in Korea increases, such as the increase in the elderly population and the improvement of the economic level, beyond the existing issues of food, clothing, and shelter, social services are expected to increase to cope with various needs[11][12].

The use of AI is gradually expanding and becoming common throughout our lives, such as robot control system, use of various apps connected to smart phones, customized services of internet platforms, and virtual assistants using voice recognition[13][14]. Thus, this study is paying attention to the strategy of using artificial intelligence that can be applied to the elderly in a super-aging society. The hyper-connection between people and objects using Internet communication networks and artificial intelligence can enable personalized services for the elderly, and can also help them with emotional problems like feeling of loneliness. In particular, this study attempts to examine how voice recognition technology, which is rapidly developing in the dimension of medical welfare for the elderly, can be used, and to find out the use and strategies of artificial intelligence. Such efforts will help to provide basic data for research related to artificial intelligence and welfare for the elderly in a super-aging era.

2. Research Methods

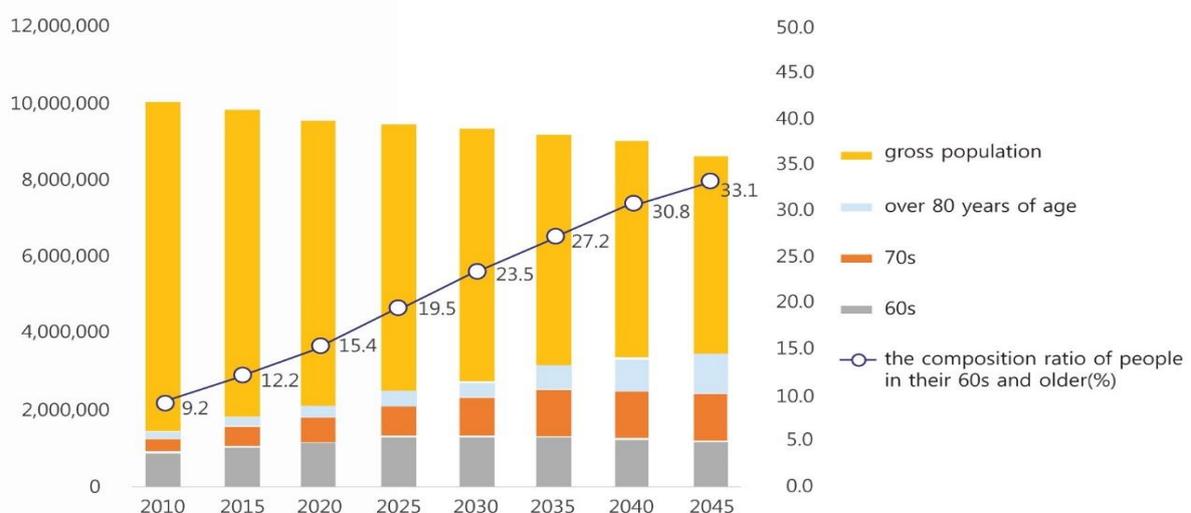
This study was conducted to find out what direction the use of AI and countermeasure strategies for the elderly should go in the face of a super-aging society. To achieve this goal, this

study investigated the online data of the Korean National Statistical Office's social survey, and confirmed the elderly issues in the age of super-aging by referring to the policy report on the increase of the elderly population and the diversification of social service needs, which was investigated by the Seoul Institute. Also, by identifying 30 academic research articles related to the elderly and artificial intelligence provided by Korea Education & Research Information Service(KERIS), the contents judged to be consistent with the contents of this study were considered and used for analysis.

3. Using AI for Happiness in Old Age

The aging of the population is already a global phenomenon, and Korea is no exception. Korea will enter a super-aging society in 2026, and by 2050, about 36% of the population is made up of elderly people, so it is expected that one in three of the total population will be elderly. The average life expectancy was 85.7 for women and 79.7 for men as of 2017, which is higher than the OECD average. Exploring the metropolitan city of Seoul, the capital and economic center of Korea, the elderly population is continuously increasing. As of 2018, the population of Seoul is 10,068,381, and it is judged that 1,405,404, or 14.0% of the total population of Seoul, are the elderly population 65 years or older and have already entered an aging society.

Figure 1. Estimation of population aged 60 or older in Korea[11].



Facing such an age of super-aging is directly related to the issue of caring for the elderly and can sometimes lead to social issues. In old age, people face various problems such as loss of physical function and feeling of alienation, and additionally, when economic retirement is not prepared, social isolation may have to occur[15]. Therefore, various issues derived from the increasing elderly population are also individual issues, but it is also a social issue to be coped with at the government level.

Examining the growth trend of GDP per capita in Korea, the GDP which was only \$12,000 in 2000, rose sharply, reaching \$34,000 in 2018[16]. As Korea's living standards have increased along with the increase in the elderly population and the improvement of the economic level, it is predicted that social services for the elderly people in Korea will increase to address various needs beyond food, clothing and shelter. In particular, in the results of a social service survey by the Ministry of Health and Welfare in Korea published in 2017, it was confirmed that the demand for health care services and adult care services is on the rise[17]. It can be seen that

along with the rapid economic growth, the need for various social services for the elderly is also increasing.

Figure 2. Korea's per capita GDP growth trend[16].



In addition, although there may be cultural differences in each country, in many cases around the world, the change in the family forms along with urbanization is turning into a family with a single member. Even in Korea, due to the prolonged period of the old age and economic growth, the standard of happiness in old age began to change in a different way than before. It was important to sustain life long in the past, but in these days of modern times, living healthily and happily has become the main task.

The external factors that affect the feeling of happiness in retirement life are social support, social environment, standard of living, social activity, and social interest interact, and they appear in a complex and diverse manner[18][19]. In recent years, in a rapidly changing society in Korea, the term, 'medical welfare for the elderly' has emerged as a field of study to cope with physical and social issues of the elderly. Medical welfare for the elderly is a new field of studies that aims to optimize the lives of the elderly through convergence studies such as health care and rehabilitation science for the elderly with disabilities due to various diseases [20]. In line with this, discussions on the use of artificial intelligence in the elderly medical welfare field are being actively conducted.

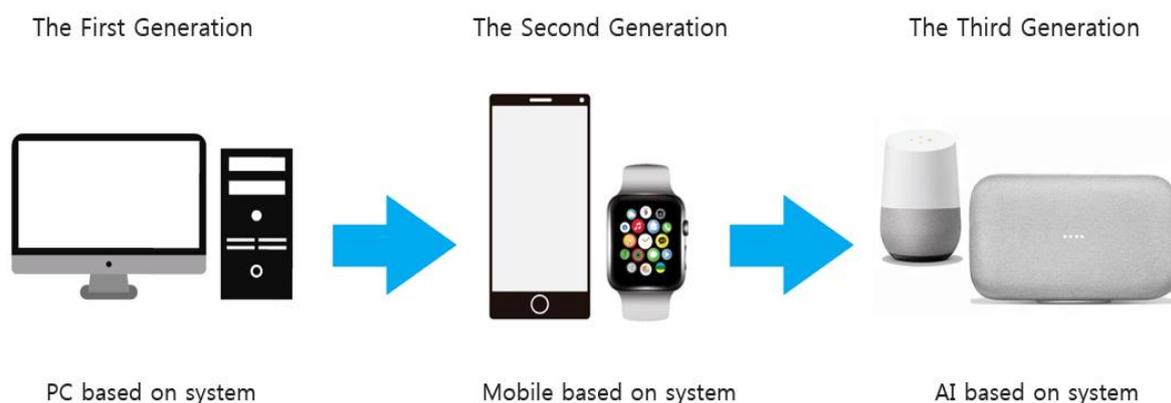
The development stage of AI is divided into four stages according to the development of technology. Stage1 is a simple control program installed in electronic products, stage 2 is a system that makes appropriate inferences and searches based on existing techniques in the case of a large number of inputs and outputs, stage 3 uses data-based machine learning and algorithms, and stage 4 refers to artificial intelligence, a deep learning technology that learns features themselves for judgment. Currently, the Weak AI technology at the 4th stage is actively used[21].

In old age, time spent alone increases due to retirement from work, loss of a spouse, and changes in family members. In some cases, a considerable amount of leisure time is spent watching TV, but it is noteworthy that the Internet use of the elderly is increasing recently. Therefore, the use of the Internet by the elderly must be preceded by convenience and simple operation, and the trend of increase can be stably further increased. This is because the modern society can actively utilize parts related to elderly health intervention in connection with artificial intelligence due to the rapid technological development of IoT.

4. Application of AI-Based Voice Recognition System to the Daily Life of the Elderly

Voice recognition technology using AI can be appropriately used for public support services or caring for the elderly in a modern society facing a rapidly aging society. AI-based voice recognition system can be used conveniently and in various ways for the elderly who are not familiar with the interface between the Internet and the media. Currently, AI-based voice recognition system is reaching a new era by interlocking information using big data with other external devices such as smart sensors, speakers and microphones.

Figure 3. Changes in the AI-based voice recognition system[22].



The use of the personal secretary assistant system based on AI began with the first generation PC, the mobile ecosystem was established with the release of the second generation iPhone and smart watch, and with the advent of the 3rd generation AI-based speaker system, social and cultural innovative changes have been made. These AI-based speakers are being released by companies all over the world, and various functions are being studied. For the disabled and the elderly who are unable to place orders at a fast food restaurant, cafe, or restaurant, an order payment system is being implemented that executes commands by voice by adding command elements of artificial intelligence speakers to visual command elements[23][24], and AI-based voice recognition system responds to reports that were written by hand in elderly caregivers, and a technology that significantly reduces working hours is being used[22].

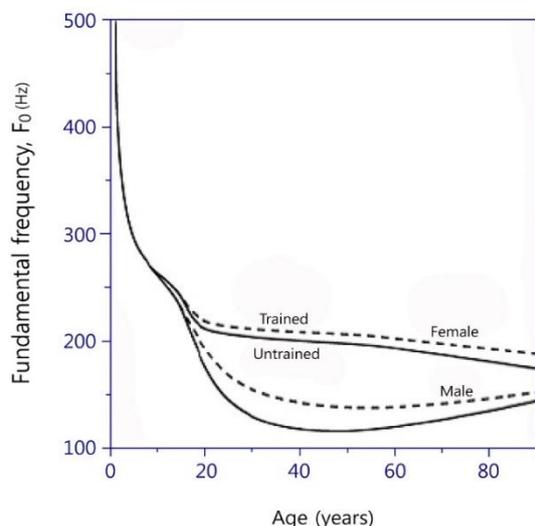
AI-based voice recognition system can be applied to the daily life of the elderly and can be expanded to public support services and nursing services for the elderly in earnest[25]. Current AI-based voice recognition system can distinguish an individual's special voice and accurately recognize the language used. Therefore, it can serve as a secretary for the elderly by accumulating emotional conversations, including personal conversations as diverse information, and instead of eyes and hands, it could moved them to cyberspace on the Internet.

In addition, AI-based voice recognition system may provide health care to the elderly through customized treatment system support services. It will check the current circadian rhythm and health status, and provide information on daily exercise and food intake. Watson, an AI developed by IBM, has built a service that can convert speech to text and text to speech based on deep learning. Also, based on big data, it is possible to read personal MRI or X-ray data and support the service by voice[26].

According to a presentation by the National Center for Vice and Speech in the United States, it is announced that in the elderly, the elasticity of the vocal cords and laryngeal organs decrease due to hormonal changes, so the characteristics of the voice frequencies are acoustically different from those of young adults. In other words, because the voice frequency of the elderly

differs according to aging, sex, and age, based on this, it is necessary to establish a customized treatment system for the elderly.

Figure 4. Average fundamental frequency as a function of age for men and women[27].



Besides, voice recognition technology and image recognition technology are combined to analyze the state of emotions according to individual facial expressions, and customized voice guidance technology is being developed. Based on these skills, it would be a great way to help older people heal their physical and emotional health. The routine application of AI-based voice recognition system can be effectively applied to dementia as well as the elderly who are inconvenient to perform daily life. This will serve as a companion and secretary to communicate emotions to the elderly, and it will be expanded to the field for health care.

In addition, the normalization of AI-based voice recognition system can overcome the vulnerability of the ability to use information technology for the elderly, and it is also a way to reduce the digital divide caused by Internet use. According to the 2019 digital information gap survey conducted by the National Information Society Agency(NIA) in Korea[28], considering the level of digital information level of Koreans as 100, the elderly showed low levels of digital information use(63.9%) and digital information understanding(51.6%). In addition, in questions related to the use of AI, the most frequent answer was that there is no need to use it(57.1%).

It is judged that the reason why the level of digital information level of the elderly is so low is that they are limited and unfamiliar with adopting new technologies. Therefore, it is the time when new skill acquisition education is universally and easily required to improve the quality of life of the elderly. The daily use of AI-based voice recognition system will provide knowledge and information to the elderly who are not familiar with the use and technology of equipment, and can be utilized as an active method to resolve information imbalance.

5. Conclusion and Recommendations

In modern society, the increase of the elderly population has become an important issue for every country. It is true that there is a difference in degree, but restrictions on physical activity in the elderly, deterioration of health, loneliness, economic poverty, and loss of social roles are challenges that we must continue to cope with. In the field of medical care for the elderly using AI, it could be seen as a process of changing the medical paradigm from disease diagnosis and cure centered to personalized care. The application of AI-based voice recognition system in the

daily life of the elderly overcomes the vulnerability of the ability to use information technology, and can be a way to resolve the information imbalance by providing knowledge and information.

In addition, protection measures related to the collection and use of personal information related to big data for the use of AI are just as important as the utilization of AI, and should be carefully reviewed. This study investigated the use of AI and countermeasure strategies in preparation for a super-aging era. It was an opportunity to confirm that AI can be appropriately applied to various issues caused by the increase of the elderly population in the modern society facing a rapid aging. In the future, the utilization of AI is expected to expand further to public support services for the elderly.

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7. Appendix

7.1. Authors contribution

	Initial name	Contribution
Lead & Corresponding Author*	JBL	-Set of concepts <input checked="" type="checkbox"/>
		-Design <input checked="" type="checkbox"/>
		-Getting results <input checked="" type="checkbox"/>
		-Analysis <input checked="" type="checkbox"/>
		-Make a significant contribution to collection <input checked="" type="checkbox"/>
		-Final approval of the paper <input checked="" type="checkbox"/>
Co-Author	DL	-Corresponding <input checked="" type="checkbox"/>
		-Play a decisive role in modification <input checked="" type="checkbox"/>
		-Significant contributions to concepts, designs, practices, analysis and interpretation of data <input checked="" type="checkbox"/>
		-Participants in Drafting and Revising Papers <input checked="" type="checkbox"/>
		-Someone who can explain all aspects of the paper <input checked="" type="checkbox"/>