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Corresponding author*
E-mail: sungsim@bau.ac.kr

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Review and Proposal Regarding Tattooing Procedures

Sanghyuk Moon¹

Baekseok Arts University, Seoul, Republic of Korea

Sungwoo Sim^{2*}

Baekseok Arts University, Seoul, Republic of Korea

Abstract

Purpose: The societal perception of tattoos has evolved, and tattooing procedures have become more prevalent. However, tattooing constitutes a medical procedure involving invasive actions on the skin, thereby falling within the scope of medical practices. Unless performed by qualified medical professionals possessing medical expertise, there is a constant risk of jeopardizing the life, physical well-being, or public health of tattoo recipients. Consequently, this paper seeks to investigate the current state of tattooing practices in South Korea, examining the legal issues at hand, and proposing measures to mitigate potential harm to consumers.

Method: Through a comprehensive review of prior research and analysis of relevant literature, including an examination of judicial precedents, this study aims to examine the stance of the Constitutional Court and the Supreme Court regarding tattooing. Additionally, it seeks to review the legislative systems pertaining to tattooing in foreign countries such as the United States and Japan in order to propose improvements to the current tattooing system and suggest measures for consumer protection.

Results: Through a review of legal precedents in our country, we have identified the evolving perception regarding the practice of tattooing. Additionally, by conducting research on foreign laws and systems, we have gained new insights into the legalization of tattooing and the considerations for potential solutions. By engaging in comprehensive discussions encompassing the protection of citizens' right to life and health, public health concerns, as well as the artistic nature, freedom of expression, and freedom of occupational choice associated with tattoos, we have sought to explore measures for improvement in the field of tattooing.

Conclusion: Through this study, it was possible to ascertain the changing public perception of tattooing. Additionally, by conducting an analysis of foreign legal systems that reflect the evolving perception of tattoos, avenues for the legalization of tattooing could be explored. Protecting the right to life and promoting health, which are the objectives of medical law, naturally entail reserving medical procedures for qualified healthcare professionals. However, given the difficulty of reversing the widespread acceptance of tattooing brought about by societal changes, it is now necessary to consider the legalization of tattooing through legal and regulatory frameworks. This should be accompanied by consistent governmental oversight and supervision by the Ministry of Health and Welfare to safeguard the health rights of the population.

Keywords: Tattoo, Medical Treatment, Medical Law, Unlicensed Medical Treatment, Cosmetic Plastic Surgery

1. Introduction

We live in a society where we create our own individuality within diverse cultures. Breaking away from a conformist society means being able to establish one's own identity by expressing oneself to others or society as a whole. There are various ways to express this individuality. Generally, people express themselves in the public eye through external beauty. They may express their individuality by wearing fashion-forward clothing or owning limited edition bags,

among other methods. Unique makeup or hairstyles are also used as forms of self-expression[1][2][3][4][5]. Furthermore, the practice of getting tattoos on the body is becoming increasingly popular as a means of expressing individuality[6][7].

Perceptions of tattoos have also changed with societal shifts[1][8]. In the past, tattooing itself was not socially acceptable. Even cutting one's hair freely was not allowed in Confucian culture, let alone marking one's body with tattoos[9]. Moreover, when tattoos were done, they were often seen as a means of showcasing the characteristics of a specific group, resulting in a strongly negative image associated with tattoos. However, nowadays, tattoos are being performed not only for the purpose of expressing individuality, regardless of age or gender, but also for aesthetic reasons[10][11].

However, tattoo procedures involve invasive actions on the skin, making them medical procedures with associated risks and potential side effects. This raises concerns regarding the protection of individuals who may suffer harm due to health and hygiene issues arising from tattoo procedures[12][13].

Despite the fact that tattooing is considered a medical treatment and should ideally be performed by medical professionals, the majority of procedures are carried out by non-medical individuals. This exposes tattoo recipients to the risks of side effects, thereby infringing upon the rights to life and health of the general population. Additionally, there is a general lack of awareness regarding the risks faced by consumers who receive tattoo procedures from non-medical practitioners, which constitutes unauthorized medical practices.

Despite the various social demands and phenomena surrounding tattoos, current regulations on tattoo procedures remain ambiguous. The Medical Act and Act on Special Measures for the Control of Public Health Crimes completely prohibit unlicensed medical treatment, allowing only licensed medical professionals to perform medical acts[14]. However, there is a lack of legal provisions supplementing the definition of medical treatment, resulting in a situation where courts are punishing non-medical individuals for tattooing activities, rather than physicians[15].

Therefore, this research aims to examine the precedents of the Supreme Court and the Constitutional Court regarding tattoo procedures and explore the issues and possible solutions related to tattooing activities.

2. Major Constitutional Court and Supreme Court Precedents on Tattooing

2.1. The constitutional court decision

[2017Hun-Ma1343, 2019Hun-Ma993, 2020Hun-Ma989, 2020Hun-Ma1486, 2021Hun-Ma1213, 2021Hun-Ma1385(consolidated), March 31, 2022]

According to the Constitutional Court's decision, it was determined that the provision concerning "medical treatment" within the subject of adjudication does not violate the principle of legal clarity and does not infringe upon the freedom of vocational choice, thereby remaining in accordance with the principle of proportionality. The essence of the decision is as follows [16].

(1) Considering the legislative purpose of the Medical Act, various provisions related to the duties of medical professionals, and the concept of medical treatment as interpreted by the Supreme Court, the term "medical treatment" among the provisions subject to adjudication is clearly understood as actions that go beyond disease prevention or treatment. It encompasses acts performed by individuals with medical expertise, experience, and skills, such as examination, diagnosis, prescription, medication, or surgical procedures, as well as actions that, if not performed by medical professionals, could pose a potential risk to public health and hygiene. Therefore, the provision subject to adjudication, specifically the term "medical procedure," does not violate the principle of clarity.

(2) Tattooing is a dermal invasive procedure in which pigments are introduced into the skin by puncturing its integrity using needles. This process poses various risks, including the potential for infection and adverse effects resulting from the introduction of dyes. These risks associated with the procedure not only affect the recipients of tattoos but also raise concerns about public hygiene. By allowing only medical professionals to perform tattooing procedures, the clauses subject to judgment aims to ensure the safety of such procedures.

An alternative approach that has been suggested in foreign jurisdictions is the implementation of a separate tattooing qualification system, which would permit non-medical individuals to engage in tattooing treatment. However, the medical knowledge and skills limited to tattooing cannot guarantee the same degree of safety as current medical practitioners and the full performance of any pre- and post-operative medical measures that may be required, so the adoption of these alternatives implies a social acceptance of health and hygiene risks. Furthermore, it is pertinent to acknowledge that the implementation of alternative measures, such as a tattooing qualification system, requires the development and implementation of a completely new regulatory framework. This framework would encompass the certification of tattoo artists, the regulation of tattooing environments, and the standardization of tattooing procedures. However, it is important to consider that the introduction of such a system would entail significant social and economic costs.

Therefore, it is within the realm of legislative discretion whether or not to introduce alternatives such as a tattoo licensing system. It is important to recognize that the legislative decision to allow only healthcare professionals to perform tattooing, in order to safeguard public health and hygiene, does not constitute a violation of the principle of excessive prohibition.

(3) Accordingly, the clauses subject to judgment does not contravene the principles of clarity or excessive prohibition and does not violate the claimant's freedom of occupational choice. It is a legislative measure taken to protect public health and hygiene.

2.2. Supreme court decision

[Supreme Court, May 22, 1992, Case No. 91do3219]

The basis for considering tattooing as a medical treatment in South Korea, as established in the Supreme Court precedent, defines medical acts as "not only preventive and therapeutic acts for diseases but also acts that may pose health and hygiene risks if not performed by medical professionals." Furthermore, the Supreme Court stated that the act of creating eyebrow or eyelash tattoos using an automatic tattooing machine on the skin of customers' eyebrows or eyelashes, which does not cause pain, bleeding, or other side effects by injecting pigments into the epidermis, cannot be considered a medical act. The original judgment that concluded that it was not a medical treatment did not properly examine whether it is possible to create permanent tattoos by injecting pigments only into the epidermis, the specific procedure involved, or the potential risks of piercing the dermis or the possibility of infection through tattooing needles. However, the Supreme Court indicated that if there is a possibility of piercing the dermis or injecting pigments into the dermis due to the worker's mistake and if there are concerns about disease transmission through tattooing needles, it can be considered a medical act. Therefore, the act of non-medical individuals performing such procedures was deemed guilty.

3. Main Issues Regarding Tattooing Procedures

3.1. Medical nature of tattooing procedures

From a legal perspective, the Supreme Court has established that the notion of "medical treatment" is not explicitly defined in Article 12(1) of the Medical Service Act, which refers to the

implementation of medical, obstetric, nursing, and other medical techniques by medical professionals. According to Supreme Court precedents, medical treatment encompasses the prevention and treatment of diseases through examination, diagnosis, prescription, medication, or surgical procedures, based on medical expertise, experience, and skills. Additionally, it includes surgical procedures, acupuncture, and moxibustion, as well as methods that involve significant physical impact on the body, such as massage or pressure, which extend to therapeutic actions for various diseases[17].

Regarding tattooing procedures, the Supreme Court finds it challenging to view them solely as injecting pigment into the epidermis. Tattoos are perceived as permanent rather than temporary, and the act of injecting pigment into the dermis carries a substantial risk of side effects. Even if the defendant's action is considered a tattoo procedure that only injects pigment into the epidermis, there is a possibility of accidentally piercing the dermis or injecting pigment into it due to the worker's mistake. Moreover, if a tattoo needle used on one person is also used on another, there is a concern about the transmission of various diseases. Therefore, it can be interpreted that such tattooing falls within the scope of medical treatment.

Furthermore, the Supreme Court highlights that while the Medical Service Act strictly differentiates medical professionals, such as physicians, dentists, and traditional Korean medicine practitioners, and prohibits and penalizes medical treatment performed beyond the limits of their licenses, it does not provide specific regulations on the extent of their respective professional duties and the specific range of medical acts covered by their licenses. This reflects the legislative intent to allow for flexible legal interpretation that aligns with the evolving nature of medical practices, influenced by the development of medicine, societal progress, and the changing demands and perceptions of healthcare service recipients. Therefore, the law explicitly states that only medical professionals with valid licenses, particularly doctors, can perform medical acts while leaving room for interpretation regarding the specifics of medical treatment.

3.2. Unlicensed medical treatment of tattooing

Understanding what constitutes an unlicensed medical act can help determine whether tattooing falls under the category of unlicensed medical treatment. According to Article 27(1) of the Medical Service Act, "Anyone who is not a medical professional is prohibited from performing medical acts, and even medical professionals are not allowed to perform medical acts beyond their licensed scope." Violators of this provision are subject to imprisonment for up to 5 years or a fine of up to 50 million won. Unlicensed medical acts under the Medical Service Act can be divided into medical acts performed by non-medical individuals without a medical license and medical acts performed by medical professionals beyond the scope of their licenses, both of which are prohibited. Furthermore, according to Article 5 of the Act on Special Measures for the Control of Public Health Crimes, if a non-physician conducts medical acts for profit in violation of the aforementioned prohibition on unlicensed medical acts, they can be punished with imprisonment for a minimum of 2 years or more without suspension and a fine ranging from 1 million won to 10 million won.

The reason why only medical professionals are allowed to perform medical acts is explained in Supreme Court precedents as follows: "Given that the medical acts of a physician require advanced professional knowledge and expertise and have a close and significant relationship with human life, body, and public hygiene, the Medical Service Act sets strict requirements for qualifying as a physician while prohibiting non-medical individuals from engaging in such acts. By monopolizing medical acts exclusively to physicians and prohibiting non-medical individuals from performing them, as stipulated in Article 25 of the former Medical Practitioners Act, the purpose is to prevent risks to human life, body, and public hygiene that may arise from non-medical individuals conducting medical acts."

The Constitutional Court also states that "Completely prohibiting medical acts by non-medical professionals is a suitable measure for protecting the fundamental constitutional rights of the people, such as the right to life and health, and fulfilling the state's duty to protect public health(Article 36, Paragraph 3 of the Constitution). Considering that such significant public interest can be realized effectively only by prohibiting non-medical professionals from conducting medical acts, which minimally infringes on the basic rights of the people, the limitation on the freedom of occupation is constitutionally justified as it is in line with the principle of proportionality." Consequently, the prohibition of unlicensed medical acts performed by non-medical professionals is upheld. Therefore, if tattooing procedures are performed by non-medical individuals, it falls under unlicensed medical acts, and the person can be penalized according to Article 27(prohibition of unlicensed medical acts) of the Medical Service Act and Article 5(penalties for illicit medical practitioners) of the Act on Special Measures for the Control of Public Health Crimes[18][19].

3.3. Possibility of accidents in tattooing treatment

When accidents occur as a result of tattooing procedures, the tattoo recipient may suffer damages. Since tattooing involves penetrating the skin using needles, there is a significant possibility of risks to individuals' physical well-being and public health, such as skin disorders or transmission of diseases. Particularly, performing such procedures without being a licensed medical professional is subject to legal penalties[17].

Tattoos in the United States, regulated by state laws, refer to the injection of pigments beneath the dermis of the human body using needles or other instruments to create permanent marks or designs that cannot be easily removed[20].

Harmful cases that can arise from tattooing include scarring, pain, infection, immune-related disorders, and even cancer. Causes of such harmful cases may include tools used, inadequate procedures, the skill of the tattoo artist, interactions with external factors, or unexplained causes[21].

In medical institutions, prior to surgeries or procedures, patients are subjected to allergy tests or drug reaction tests to prevent potential side effects. Therefore, before tattooing, it is necessary to conduct tests to determine if the tattoo recipient has any adverse reactions to pigments. However, even if the tests show no adverse reactions to pigments, tattooing should still consider the possibility of infections in the dermis or epidermis layers of the skin, as the procedure involves injecting pigments into the skin using needles.

4. Improvement Measures for Tattooing Treatment

Medical acts refer to actions performed by individuals with medical expertise, based on medical knowledge, experience, and skills, including examination, diagnosis, prescription, medication, or surgical procedures, for the prevention or treatment of diseases, as well as other acts that, if not performed by a medical professional, may pose health and hygiene risks.

"Medical professionals" who can perform medical acts are doctors, dentists, traditional Korean medicine doctors, midwives, and nurses who have obtained a license from the Minister of Health and Welfare(Article 2, Paragraph 1 of the Medical Act).

Therefore, tattooing treatment that fall under medical acts can only be performed by medical professionals, and if non-medical personnel perform tattooing treatment, it is considered unlicensed medical acts and subject to punishment under the Medical Act. Some argue that the concept of medical acts should be redefined to allow non-medical personnel, such as tattoo artists, to perform tattooing treatment. However, redefining the concept of medical acts requires significant time, effort, and social consensus. Furthermore, according to the Supreme

Court precedent, "since medical acts require a high level of specialized knowledge and experience and have a close and significant impact on the lives, bodies, and public hygiene of individuals, the Medical Act sets strict qualifications for becoming a doctor while monopolizing medical treatment for doctors and prohibiting non-medical individuals from performing them in order to prevent risks to human lives, bodies, and public hygiene that may arise from non-medical individuals performing medical acts." Therefore, even if the concept of medical treatment is redefined, there are limitations to non-medical tattoo artists performing tattooing procedures. However, there has been a positive change in the societal perception of tattoos, and it has become undeniable that the government and the Ministry of Health and Welfare have been negligent in managing and supervising tattoos. There are diverse opinions on tattooing, and depending on one's perspective, there is sharp opposition between those who have a positive view of tattoo culture and those who have a negative view.

When examining legislative examples from foreign countries, it is evident that most jurisdictions have established regulations to protect tattoo recipients. In the United States, for instance, the regulation of tattoo pigments falls under the purview of the Food and Drug Administration(FDA), and to date, no tattoo pigments have been approved by the FDA. Regulations pertaining to tattoo artists, tattoo parlors, hygiene standards, and prohibitions on tattooing minors are typically governed by state laws.

In the United States, no tattoo ink pigments have been approved by the FDA(Food and Drug Administration). Other tattoo regulations/ legislation were state codes. On February 20, 2008, the Committee of Ministers at the Council of Europe adopted a negative list of tattoo ink ingredients(Resolution ResAP, 2008). As result of this resolution, many European countries considered developing tattoo-ink regulations. In France, tattoo regulations were established in 2008, including tattooist/tattoo parlor regulations, hygiene regulations, prohibition of tattooing minors, and tattoo ink regulations[21].

In the United States, tattoo regulations encompass requirements for tattoo artist qualifications, registration of tattoo parlors, implementation of licensing systems, use of disposable equipment and sterilization, wearing of gloves, prohibition of tattooing minors, and parental consent requirements. Recently, there has been a trend of granting and regulating tattoo artist qualifications for individuals with specific credentials, and some states even require supervision by a physician. For example, in Connecticut, only licensed physicians are allowed to perform tattoos independently, and even if a tattoo artist holds a license, they must operate under the supervision of a physician. Another significant aspect of regulation within the United States is the strict regulation of tattooing minors. Tattooing is prohibited for individuals below a certain age, and parental consent is required in certain cases. It is the responsibility of the tattoo artist to verify that the tattoo recipient is not a minor[21].

In the case of Japan, a ruling by the Supreme Court declared that although the treatment of tattooing itself, considering societal norms based on historical and realistic reasons, does not fall within the scope of the medical duty of "medical and health guidance" performed by physicians. However, the ruling pointed out that tattooing can invade the human body artificially, causing damage to the integrity of life and the body, as well as posing public health risks by triggering skin diseases, including AIDS infection. It emphasized the potential adverse effects on the health of the public, who are medical consumers, and highlighted the concern that such risks should fall within the exclusive domain of medical practitioners[22][23].

According to a recent paper titled "Concept of Medical Acts and Unauthorized Medical Acts in German Law" presented by the Korean Society of Medical Jurisprudence on April 15, 2023, in Germany, tattooing and piercing(including ear piercing) are not considered medical treatment. These procedures do not require medical expertise, do not pose direct risks to the body and health, and do not sufficiently give the impression of being medical treatment. Therefore, they

are not considered medical treatment in Germany[24]. Furthermore, in Germany, becoming a tattoo artist only requires a health certificate and the necessary equipment. There are no specific qualifications or other legally binding regulations. Vocational training is conducted regularly in tattoo shops, focusing on health and technical education(<https://tattoomed.de/blogs/tattoo-news/welche-gesetzlichen-regelungen-gibt-es-fur-die-tattoobranche>).

Due to these reasons, it is necessary for our country to establish regulations regarding tattooing as soon as possible and ensure systematic management in order to minimize the medical gaps related to tattooing and protect the rights to life and health of the citizens.

5. Conclusion

The social perception of tattooing has undergone significant changes, and the techniques used in tattooing have also advanced compared to the past. It cannot be denied that the risks associated with tattooing have decreased accordingly[8][25]. In relation to this, within the medical field, it is necessary to discuss the argument that illegal tattooing practices have increased, leading to an increase in associated risks and the extent of harm caused[9][15].

However, despite these changes, under the current medical laws, tattooing, classified as a medical procedure, can only be performed by healthcare professionals. Therefore, non-medical tattoo artists who perform tattooing procedures without proper medical qualifications cannot evade punishment for engaging in unauthorized medical practices[26][27].

This paper began with a questioning of the societal changes and the discrepancies in the current legal framework. Through constitutional court decisions and Supreme Court precedents, we were able to understand the approach and understanding of tattooing procedures by the Korean courts. By examining dissenting opinions from the Constitutional Court, which are interpreted positively, it became apparent that there are not only negative perspectives regarding tattooing procedures.

At the present stage, establishing a new definition of medical treatment within the current medical laws to address this issue appears challenging. Instead, it seems more plausible to introduce licensing or qualification systems, as seen in foreign legislative examples, for tattooing procedures. If tattooing continues to be performed by unqualified practitioners, it can only be interpreted as an attempt to evade responsibility for management and supervision.

In the medical field, advocating that only healthcare professionals should be allowed to perform tattooing procedures based solely on the argument of potential risks, such as infections, will no longer be acceptable to the public. Therefore, it is necessary to actively propose measures such as increasing the number of healthcare professionals capable of performing tattooing procedures according to market demand[28].

Currently, the protection of tattoo recipients relies on the collaboration between tattoo artists and healthcare professionals. Qualified and licensed tattoo artists should perform tattooing procedures while undergoing inspections by healthcare professionals to prevent issues such as infections. To achieve this, a system of qualifications and continuous management and supervision for tattoo artists is necessary[29][30]. Additionally, tattoo artists should bear responsibility for damages caused by issues such as infections resulting from tattooing procedures. Healthcare professionals should assess the extent of health risks for tattoo recipients through medical examinations and take immediate measures to minimize harm if there is an increased risk of infection. Given the opportunity, further research should be conducted on legislation(draft) specifically targeting tattooing treatment.

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7. Appendix

7.1. Author's contribution

	Initial name	Contribution
Lead Author	SM	-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"/>
Corresponding Author*	SS	-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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Corresponding author*
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Consideration on the Direction of Enactment of the Local Council Act

Seungchal Lee

Daegu University, Daegu, Republic of Korea

Abstract

Purpose: Local autonomy was revived in 1991, and 30 years later, local councils have made a lot of progress. However, local residents' trust in local councils is not at a satisfactory level. In particular, on January 13, 2022, the entire 「Local Autonomy Act」 was amended to strengthen the autonomy of residents and local governments, and to secure transparency and accountability. It can be said that it is necessary to enact a local council law that can increase.

Method: Comparison and analysis of the 'Local Council Act' proposed by Jeon Hyun-hee, former member of the 20th National Assembly in February 2018 and Lee Hae-sik, a member of the National Assembly in November 2020, which is the most representative proposal among local council laws, and refer to the Local Autonomy Act and the National Assembly Act to determine the direction of local assembly law wanted to make a suggestion.

Results: The role of local councils is becoming more important to respond to the changing social structure and solve local problems. Therefore, it is necessary to activate local legislative activities to fulfill practical authority and roles. In other words, the direction of enactment of the Local Council Act should ensure the autonomy of the local council while at the same time strengthening its responsibility (professionalism). Therefore, it is required to secure transparency and reliability in the legislative activities of local councils and local councilors in parallel with the expansion of the authority of local councils.

Conclusion: As matters to be considered in enacting the Local Assembly Act, first, the practical benefits of enacting the Local Assembly Act should be fully considered. If the authority and independence of the local council can be strengthened and established by supplementing the current Local Autonomy Act, the need for enactment of the Local Council Act is low. Second, the direction of strengthening the responsibility and autonomy of local councils so that the enactment of the Local Council Act can solve problems in the local community with the strengthened authority and status of the local council, improve the quality of life of local residents, and activate grassroots democracy. should be enacted as.

Keywords: Local Council Act, Local Autonomy Act, National Assembly Act, Responsibility, Accountability

1. Introduction

Local autonomy was revived in 1991, and 30 years later, local councils have made a lot of progress. However, local residents' trust in local councils is not at a satisfactory level. As a result of the integrity evaluation of local councils, national and public universities, and public medical institutions in 2021 by the Anti-Corruption and Civil Rights Commission, 82 local councils scored 6.74 points, 16 national and public universities scored 7.36 points, and 13 public medical institutions scored 6.95 points. It is a very low level compared to the comprehensive integrity of public institutions (8.27 points). In this survey, the reasons for dissatisfaction with the legislative

activities of local councils were lack of professionalism(35.6%), corruption and lack of morality(29.1%), and lack of control devices(13.5%).

Among the amendments, in terms of autonomy, matters concerning the strengthening of the capacity of local councils and independence of personnel rights are stipulated(Articles 41 and 103(2)), and residents submit opinions on enactment, amendment, and abolition of local government rules(Article 20). Article), etc., and in terms of accountability, provide a basis for diversifying the organizational composition of local governments(Article 4), give local governments the duty to disclose information to residents(Article 26), and In order to respond to the improvement of the audit request system(Article 21), the chairperson's advice on concurrent offices and profit-making activities of local council members, and the ethics special committee's advice on disciplinary actions of local council members, the ethics review advisory committee is set up in the ethics special committee. (Article 66), revised the provision prohibiting concurrent office of local council members(Article 43), secured professional manpower for policy support(Article 41), and the Ministry of Cooperation promotes cooperation between the state and local governments and promotes the development of local autonomy and regional There were many changes, such as the establishment of the Central Regional Cooperation Council(Article 186), to deliberate on important policies related to balanced development between the two countries.

Despite the complete revision of the Local Autonomy Act, it can be said that it is necessary to enact the Local Council Act to increase the trust of local residents by securing more responsibility and autonomy of the local council. Therefore, in this study, we intend to examine the direction and points of enactment of the Local Council Act, focusing on the 「Local Council Act」 proposed in the standard.

2. Theoretical Discussion

2.1. Local council act necessity

The local council is a representative body of the residents, directly elected by the residents, and an institution that decides the decisions of local governments, playing an important role in the development of local autonomy and democracy. However, the role of local councils is becoming more important to solve these problems, such as responding to the risk of local extinction and improving the centralized political system due to social changes caused by population aging and low birth rates.

The reasons for the enactment of the Local Council Act are: First, the local authority in the local government is concentrated in the head of the local government due to the crowd-oriented mindset, so the authority and status to perform the role of the local council are not properly granted. Second, there is a need to have a separate authority independent from local governments that have strengthened the policy formation function rather than the administrative monitoring function in the past due to the increase in local problem solving and local administrative functions[1]. Third, unlike the National Assembly to which the 「National Assembly Act」 is applied, local councils are partly stipulated within the 「Local Autonomy Act」, so there are certain limitations on the authority and position of local councils. Fourth, the fully amended 「Local Autonomy Act」 shows limitations in terms of independence, professionalism, and responsibility despite certain supplements to local councils, so it is necessary to enact the local council law to strengthen the status and authority of local councils. Fifth, it is necessary to enact laws covering the overall organization and operation of local councils [2].

2.2. Limitations of local autonomy act and local assembly act legislative process

2.2.1. Limitations of local autonomy act

The limitations of the recently amended Local Autonomy Act are as follows[3][4][5].

Table 1. Limitations of the revised local autonomy act.

Division	Statutory provisions	Limitations
Ordinance enactment range	Article 28	As the local council's autonomous legislative power is limited by the principle of primacy of law and the limits of the principle of primacy of law, there is a need to revise the scope of ordinance enactment from 'the scope of the law' to 'within the scope of not violating the law'. It is necessary to expand the scope of ordinance enactment so that residents' rights can be restricted or obligations can be imposed through ordinances.
Strengthening the expertise of local councils	Article 41 Section 1 Section 2	Limiting the number of policy support professionals does not reflect the purpose of strengthening support for legislative activities of local council members. Policy support expertise is kept as a local public official, and the presidential decree stipulating matters necessary for operation, such as position, duties and appointment procedures, is evaluated as insufficient in terms of strengthening the autonomy of local councils and the capacity of local council members.
Independence of local council personnel rights	Article 103 Section 2	When the chairperson of a local council has the right to appoint and dismiss office workers, procedures for securing political neutrality and fair personnel appointments are required.
Securing local council accountability	Article 43,65,66,74	It is necessary to prepare institutional supplementary measures for the substantial operation of the ethics special committee and the ethics review advisory committee.
Diversification of composition of local government institutions	Article 4 Section 1 Section 2	It is desirable to establish an ordinance rather than a separate law in order to diversify the institutional composition of local governments.

2.2.2. Local council act bill process

In February 2018, Jeon Hyeon-hee, former member of the 20th National Assembly(Democratic Party of Korea) proposed the 'Local Council Act', but it was scrapped due to the expiration of the term of the 20th National Assembly. Legislative initiatives were initiated by Seo Young-gyo in August 2021 and by Lee Won-wook in December 2021.

Table 2. Progress of local council legislation[5][6].

Date	Detail
2016.10.31	Seoul city council decentralization TF composition(total of 13 members, including city council members, working-level council members, and external experts)
2017.04.28	Passed the 'resolution on 7 major decentralization tasks' by the seoul metropolitan council(jointly initiated by all 106 members)
2017.06.29	Seoul city council decentralization TF regular meeting enactment plan for 'local assembly act(draft)'
2017.11.17	Passed the 'resolution to strengthen the status of local councils and urge the proposition of local council laws' by the seoul metropolitan council
2017.11.28	National council of city and provincial chairpersons passed 'proposal for enactment of local council act'

2018.02.08	The 20th national assembly member Jeon Hyeon-hee co-sponsored the 'local assembly act'
2020.11.17	Lee Hae-sik, member of the 21st national assembly, reappealed the 'local council bill'
2021.08.18	The 21st national assembly member Seo Yeong-gyo re-proposed the 'local council bill'
2021.12.29	The 21st national assembly member Lee Won-wook reappraised the 'local council bill'

2.3. Prior research

Previous studies related to local council laws are as follows. Choi Eun-seok(2020) focuses on the Hae-sik Lee bill in a study on "Local Council Bill for the Realization of Local Power" First, according to the current "Local Council Bill," there is an exclusive exercise in the enforcement of the personnel rights of the office body of the local council. As it is predicted, it is necessary to obtain the approval of the head of the local government. Second, the fact that the current bill stipulates that the right to audit and investigate local administrative agencies(local governments) over self-government affairs can be exercised so that the heads of local governments or related public officials or related officials can be requested to attend. It seems appropriate, but since the tyranny of local councils against local governments can be expected, it seems necessary to prepare a check or protection device. Third, it is expected that the local council will dominate the budget deliberation and finalization of local governments, so if a check device is prepared, we can approach the root of local autonomy that we think. It was argued that the decentralized constitution should be amended so that the people could feel it, and that office work should be distributed in accordance with the size of the local government [7].

Moon Won-sik(2022) presented the direction of enactment of the "Local Assembly Act" by comparing and explaining the bill initiated by Lee Hae-shik and Jeon Hyeon-hee, the National Assembly Act, and the Local Autonomy Act in "A Study on the Enactment of the Local Assembly Act for Strengthening Local Power" [3].

Seong Jung-tak(2023) establishes the status of local councils and strengthens the independence of local councils by enacting the Local Council Law that regulates the organization and operation of local councils in a study on "direction of enactment of the tentatively named 'Local Council Act' for strengthening decentralization," Through this, it was argued that it is necessary to prepare an environment in which local councils can work properly [6]. The studies of these preceding studies suggest points of discussion by comparing the Local Assembly Act, Local Autonomy Act, and National Assembly Act proposed by members of the National Assembly.

Papers related to the enactment of the Local Autonomy Act include Choi Yong-Jeon(2022) It is expected that the role and functions of local councils will be strengthened as local autonomy affairs are increased due to the expansion of local autonomy and decentralization, and resident autonomy is expanded through the entire revision of the Local Autonomy Act. On the other hand, in the operation of the local council, the role of the negotiating body as well as the chairperson of the council is important. The function is also great. Nevertheless, the reality is that the legal basis for negotiating groups is incomplete. Therefore, I tried to examine the legal basis for this [8].

2.4. Considerations when enacting the local council act

The most important thing to consider when enacting a local council act is to actively reflect the opinions of local residents. Discussions by various stakeholders, such as local lawmakers, experts, the media, and the administration, are important, but considering the compliance and feasibility of the policy, it is important how to reflect the needs of the residents. From this point of view, if you look at the results of recent research on local residents, as a result of IPA analysis of local residents on major tasks for revitalizing local councils, local residents excluded the party

nomination system[9][10][11][12][13], enacted rules for the Special Committee on Ethics, and voted for key public officials in the areas of focus improvement[14][15][16][17][18]. In the field of gradual improvement of the introduction of the Korean personnel hearing, an assistant control system for parliamentarians was proposed[19][20][21][22].

As a result of public officials' perception analysis on decentralization tasks, in the area of intensive efforts, the expansion of self-governing financial power[23][24][25][26], the cooperation meeting between the central and local areas[27][28][29][30], and the gradual transfer of central administrative authority to local areas[31][32], were found to be the connection between general autonomy and educational autonomy, and the introduction of the autonomous police system.

3. Comparison of Local Council Laws Initiated by Assemblyman Jeon Hyun-hee and Assemblyman Lee Hae-sik

3.1. Comparison of proposals by Jeon Hyun-hee and Lee Hae-sik

<Table 3> compares the two bills in terms of the scope of ordinance enactment, code of ethics, policy experts, right to appoint the chairman, parliamentary security, composition of parliamentary negotiating groups, and resolutions of local councils.

Table 3. Comparison of local assembly act(draft) of representative Jeon Hyeon-hee and representative Lee Hae-sik.

Division	Jeon Hyun-hee	Lee Hae-sik
Scope of ordinance enactment	Within the scope of not violating the law	To the extent that it does not violate the law, penalties must be mandated by law
Code of ethics	Bylaw	Bylaw
Policy experts	Bylaw	Bylaw
Chairman's personnel rights	In accordance with laws and ordinances, such as appointment and dismissal of office staff, education and training, service, and disciplinary actions, matters concerning the organization and number of employees of office organizations are determined by ordinance.	In accordance with laws and ordinances, such as the appointment and dismissal of office staff, education and training, service, and disciplinary actions, matters concerning the organization and number of employees of office organizations shall be determined by ordinance to the extent prescribed by Presidential Decree.
Congressional guard	Appropriate to the budget of independent and local governments	Appropriate to the budget of independent and local governments
Formation of parliamentary negotiation group	Bylaw	Bylaw
Local council resolutions	The standards for important properties and public facilities for which the local council decides on acquisition and disposition are determined by ordinance.	The standards for important properties and public facilities for which the local council decides on acquisition and disposition are determined by ordinance.

3.2. Comparison of national assembly act and local autonomy act

Table 4. Comparison of national assembly act and local autonomy act.

Division	National assembly act[33]	Local autonomy act[34]
Personnel rights	<p>Regarding article 21(national assembly secretariat), article 22(national assembly library), article 22-2(national assembly budget office), and article 22-3(national assembly research service) the speaker of the national assembly guarantees the personnel rights of office workers.</p> <p>Regarding article 46-3(special committee on personnel hearing) and article 65-2 (personnel hearing) → mandatory personnel verification by the national assembly for persons whose appointment consent is required under the constitution and key government figures appointed by the president.</p>	<p>Control of the administrative organization and quota of local councils through higher laws, and until recently, the head of a local government had the right to personnel → lack of the right to self-governing organizations, complete independence of personnel rights is required.</p> <p>In the absence of upper laws, some local councils operate through agreements with the heads of local governments → there is a limit to the effectiveness of personnel hearings.</p>
Budget	Article 23(national assembly's budget) ① the national assembly's budget shall be independently appropriated in the national budget.	Local councils cannot organize independent budgets → Lack of autonomy in budget management.
Negotiating body	Regarding article 33(negotiating group), article 34(policy research fellow of negotiating party) → guarantee of authority of negotiating group and support for policy research fellow of negotiating party.	Establishment of negotiating groups and refusal to support under higher laws → difficulties in organizing and supporting negotiating groups.
Legislative power	There is no separate scope, delegation provision, or proviso clause in relation to the submission of the bill.	Enactment of self-governing laws is allowed only 'within the scope of the law', and restrictions on residents' rights or obligations can be imposed only when there is a delegation of the law → restriction on self-governing legislative powers.
Policy support	Article 9 of the 「act on allowances, etc. for members of the national assembly」 (assistant staff) ① in order to support legislative activities of members of the national assembly, aides and other staff are appointed.	Unable to hire personal assistants for local council members → due to the current revision of the local autonomy act, only policy support professionals can be hired.

4. Direction and Point of Enactment of the Local Assembly Act

4.1. Main issues of the local council act enactment proposal

Table 5. Issues of the local council act enactment proposal.

Authority(autonomy)	Responsibility(professionalism)
<p>Chairman and vice-chairman</p> <p>Legislative activity expenses of local councilors, etc.</p> <p>Compensation for injury/death of local councilors</p> <p>Negotiating body</p> <p>Local council resolutions</p> <p>Establishment of local council positions</p>	<p>Prohibition of concurrent offices of local councilors</p> <p>Education and training for local council officials</p> <p>Fair job performance</p> <p>Creating a healthy climate for local councils</p> <p>Personnel committee</p> <p>Petitions and review/processing</p>

Administrative audit and investigation rights	Remote video conferencing
Special local government	Discipline for local councilors
Appropriation budgeting authority of the head of the local council	Relations with administrative agencies and local residents
Confirmation hearing	Relations with the National Assembly and Members of parliament
Diversification of composition of local government institutions	Prohibition of speech, such as insults, and prohibition of speech interruption
	Operation of code of ethics, etc.
	Establishment of ethics review advisory committee, etc.
	Preventing conflicts of interest in local councils

From the perspective of accountability during the enactment of the Local Council Act, information on the results of voting on local councils, legislative activities, and the organization and finance of executive bodies should be disclosed to residents on a regular basis, and information disclosure systems should be established to improve residents' access to information. . In addition, as a preventive measure to prevent local council members from taking unfair advantage based on their duties, the regulation on the prohibition of concurrent offices, which has been controversial, must be more specific, and even when concurrent offices are permitted, the details of concurrent offices must be disclosed. In the disciplinary action of local council members, in order to ensure fairness for deviant behavior by local council members, an ethics review advisory committee centered on civilian members must be established, and various types of disciplinary actions must be stipulated so that they can be fair disciplinary actions.

Regarding authority, it is necessary to secure administrative expertise by establishing a local council ceremony and to enhance the efficiency of local finance by granting the right to organize expenditure budgets to local councils. In addition, when appointing local public corporations and local high-ranking officials, expertise and fairness must be secured through personnel hearings to ensure reliability in local autonomy.

4.2. Direction of enactment of the local council

The role of local councils is becoming more important to respond to the changing social structure and solve local problems. Therefore, it is necessary to activate local legislative activities to fulfill practical authority and roles. In other words, the direction of enactment of the Local Council Act should ensure the autonomy of the local council while at the same time strengthening its responsibility (professionalism). Therefore, it is required to secure transparency and reliability in the legislative activities of local councils and local councilors in parallel with the expansion of the authority of local councils. If the local council maintains the current level of trust, it will be difficult for local residents to support the necessity of enacting the local council law.

4.3. Composition of major enactments

4.3.1. Negotiating body

Forming a negotiating group requires securing the grounds such as local council operation ordinances, but as a voluntary group, it has legal limitations, so it is necessary to include it in the local council law in order to secure legal grounds. Since the current parliamentary bargaining body has not been statutoryized, it is not possible to secure the efficiency of local council operation, so it is necessary to include the contents of the bargaining body in the local council bill.

4.3.2. Establishment of local council positions

There is a need to actively promote promotion, transfer, and personnel exchange among local public officials belonging to local councils by introducing parliamentary administrative direct current or legislative administrative direct current and including them in administrative direct current. If the serial system is improved to create a parliamentary serial, since it is a minority

serial, it may adversely affect the promotion and personnel exchange of public officials who perform actual tasks, resulting in avoidance. Therefore, it is desirable to create a new direct branch with names such as parliamentary administration, legislative affairs, and parliament in the administrative position group administrative sequence to utilize a little more free promotion and personnel exchange within the administrative position. need something

4.3.3. Establishment of personnel exchange and personnel exchange council

In order to solve the personnel backlog of local council clerks, it is necessary to enact the personnel exchange council and personnel exchange in the Local Council Act. It is required to activate personnel exchanges between local councils in order to prevent a drop in morale due to personnel backlogs, balance the allocation of office staff at local councils, and develop local councils. Personnel exchange can also be used as a way to attract excellent human resources.

4.3.4. Relations with the national assembly and members of parliament

Decisions made by the National Assembly can have a significant impact on local governments and residents, so it is necessary to include the contents of the relationship between local councils, the National Assembly and members of the National Assembly in the Local Assembly Act to solve these problems and discussions. In other words, there is a need to regulate the response system of local councils to bills affecting local autonomy. Therefore, it is necessary to stipulate the contents of proposals by local councils on the agenda to be presented to the National Assembly within the scope of not infringing on the inherent authority of the National Assembly and its members. At the same time, there is an increasing number of tasks to be handled jointly through exchanges and cooperation between the National Assembly and local councils. Therefore, in order to jointly promote discussions on legislative activities and policies regarding the competent local government, cooperation between the 'National Assembly-Local Council Policy Council' and local councils and the National Assembly is promoted, and important issues related to the development of local autonomy and local governments are promoted. It is necessary to establish a 'National Assembly-Local Council Cooperation Council' to deliberate on policies.

4.3.5. Preventing conflicts of interest in local council activities

Provisions must be made to prevent conflicts of interest related to the pursuit of private interests in the performance of legislative activities by local councils. In the current "National Assembly Act," a new provision was established on May 18, 2021 for "prevention of conflicts of interest among lawmakers." A new law was established for Therefore, it is necessary to establish new provisions to prohibit the pursuit of private interests and prevent conflicts of interest in the legislative activities of local councils as well as in the enactment of the Local Council Act.

4.3.6. Cooperation between local councils and dispute mediation, etc.

It is highly likely that disputes will arise due to differences of opinion between local councils due to gradually deepening regional selfishness, so it may be necessary to establish a dispute mediation committee to resolve them. Regarding this, the bills of the two lawmakers do not specify provisions on cooperation between local councils and dispute mediation. However, the amended 「Local Autonomy Act」 stipulates matters related to consultation, mediation, approval of office work, or cooperation regarding requests for support in relation to requests for joint processing of office work between local governments, as well as matters related to mediation in the event of a dispute. Therefore, it is necessary to add a law on cooperation to resolve conflicts between local councils in the enactment of the Local Council Act.

5. Conclusion

In order for local autonomy to be faithfully performed, the role of local councils that can actively reflect the needs of local residents and actively support policies and services is very important. In this environment, 'checks and monitoring' are also necessary, but the importance of coexistence, such as 'horizontal authority', 'cooperation', and 'balance' between local councils and executive agencies, between local councils, and between central and local governments, has increased. The status and authority of local governments became necessary to ensure high-level administrative services that could improve the quality of life of 'residents'.

In order to become such a local council, it is necessary to consider enacting the 「Local Council Act」 that can guarantee the status and authority of the local council while improving the current limitations.

As matters to be considered in enacting the Local Assembly Act, first, the practical benefits of enacting the Local Assembly Act should be fully considered. If the authority and independence of the local council can be strengthened and established by supplementing the current Local Autonomy Act, the need for enactment of the Local Council Act is low. Second, the direction of strengthening the responsibility and autonomy of local councils so that the enactment of the Local Council Act can solve problems in the local community with the strengthened authority and status of the local council, improve the quality of life of local residents, and activate grassroots democracy. should be enacted as.

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7. Appendix

7.1. Author's contribution

	Initial name	Contribution
		-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"/>
Author	SL	-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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A Study on the Relationship between the Utilization of Flexible Work System and Organizational Result Variables

Yongjin Sa

Keimyung University, Daegu, Republic of Korea

Abstract

Purpose: The main purpose of this study is as follows. First, it analyzes the differences in organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment) according to the use of the flexible work system. Second, it analyzes the difference between the presence or absence of experience in using the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment). Third, it analyzes the difference between experience without permission for the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment).

Method: In order to achieve the purpose of this study, a questionnaire was designed for public officials in Daegu to understand the use of the flexible work system and the degree of recognition of organizational outcome variables. Organizational outcome variables included family-friendly policy satisfaction, work-life balance, organizational contribution, boss trust, organizational satisfaction, job satisfaction, work performance, turnover intention, organizational commitment, and life satisfaction. In order to achieve the purpose of this study, basic statistical analysis, frequency analysis, and cross-analysis were sequentially performed.

Results: As a result of the statistical analysis of this study, there is a difference in the level of awareness of organizational outcome variables between groups that currently use and do not use the flexible work system, and groups that do not have permission to use the flexible work system.

Conclusion: The statistical analysis results of this study suggest that there is a clear difference in perception between groups of workers in different situations regarding the use of the flexible work system. This is thought to be a policy implication necessary for the proper design of the flexible work system in public organizations and the more active use of the flexible work system.

Keywords: Flexible Work System, Local Government, Public Officials, Use of Flexible Work System, Organizational Outcome Variables

1. Introduction & Literature Review

The flexible work system is a means of various family-friendly policies and provides workers with three main types of flexibility. The first is working hours, the second is work type, and the third is work place. In other words, the flexible work system has several positive effects on the individual level of workers and the organizational level of the institution by giving workers flexibility in working hours, types of work, and places of work outside of traditional working conditions[1][2]. Depending on where the flexibility of the flexible work system is placed, it is divided into part-time work, time difference work, working hours selection, intensive work, discretionary work, telecommuting, and smart work systems[3][4].

The flexible work system has been available to public officials belonging to government organizations(basic local governments, metropolitan governments, and central administrative agencies) in Korea since August 2010. More than 20 years later, it is judged that the level of awareness and awareness of the flexible work system has improved significantly for public officials working in government organizations. In particular, the positive effect and performance of the flexible work system have improved a lot due to the use of flexible work systems such as telecommuting and part-time work, which were forced to be used during COVID-19. However, various types of flexible work systems are still not being used evenly, local governments still use the flexible work system less than central administrative ministries, and various causes that hinder the active use of the flexible work system.

Over the past 20 years, when Korean public officials have been using the flexible work system, research on the flexible work system has been relatively active. Research conducted by setting the flexible work system as an independent variable, research conducted by setting the flexible work system as a dependent variable, and quantitative research using statistical analysis by setting the flexible work system as a regulatory variable or parameter have been conducted. In addition, research has been conducted to derive policy implications for improving the flexible work system and to use the flexible work system reasonably and actively. However, research on the flexible work system has been actively conducted in these government organizations, but no research has been conducted to derive follow-up studies on the flexible work system through an analysis that systematically classifies and types flexible work system research.

Recognizing the need for this research, Sa(2021) analyzed the studies on the flexible work system in public organizations studied so far and presented them in the following three types [1]. First, they are quantitative studies using statistical analysis on the organizational and personal effects of the flexible work system [5][6][7][8][9]. Second, there are studies on the factors that affect the selection and use of the flexible work system [10][11][12][13]. Third, these are studies for analyzing and improving the status of the flexible work system [14][15][16][17]. In addition to the above analysis results, the following research topics on the flexible work system of public organizations in Korea are presented as follows [1]. First, studies are needed for an organic and reasonable connection between the flexible work system of public organizations and other personnel systems. Second, studies are needed to verify the difference in relationship between organizational outcome variables according to the difference in satisfaction with the use of the flexible work system. Third, studies are needed to analyze the effect of the flexible work system between the group that is not allowed to use the flexible work system and the group that uses the flexible work system or does not use the flexible work system for other reasons.

According to the research background and necessity described so far, the core purposes to be carried out in this study are as follows. First, it analyzes the differences in organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment) according to the use of the flexible work system. Second, it analyzes the difference between the presence or absence of experience in using the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment). Third, it analyzes the difference between experience without permission for the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment).

2. Research Method and Scope

In order to achieve the purpose of this study, the use of the flexible work system for public officials in Daegu City. And, a questionnaire was designed to understand the degree of recognition of organizational outcome variables.

Organizational outcome variables included family-friendly policy satisfaction, work-life balance, organizational contribution, boss trust, organizational satisfaction, job satisfaction, work performance, turnover intention, organizational commitment, and life satisfaction. Questions related to the use of the flexible work system consisted of participation in the flexible work system, experience in using the flexible work system, lack of permission to use the flexible work system, satisfaction with the flexible work system, preference for the flexible work system, and reasons for the need for flexible work system. Finally, the control variables included gender, age, number of years of service, marital status, dual income status, child status, preschool age, and parent cohabitation. For about a month, Google Online Survey and Written Survey were conducted at the same time, and a total of 458 Daegu City officials' responses were collected. Basic statistical analysis, frequency analysis, and cross-analysis were performed to achieve the three purposes of this study described above.

3. Cross-Analysis between Currently using of Flexible Work System and Outcome Variables

Table 1. Cross-analysis between currently using flexible work system and work-life balance.

Unit: Person(%)

		Work-life balance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
(Currently) use or not	Yes	1(0.22)	1(0.22)	11(2.40)	10(2.18)	3(0.66)
	No	17(3.71)	83(18.12)	163(35.59)	141(30.79)	28(6.11)

As a result of conducting a cross-analysis between the use of the flexible work system and the work-life balance, the number of respondents who answered that the level of work-life balance is normal or yes without using the flexible work system was large.

Table 2. Cross-analysis between currently using flexible work system and reliability of boss.

Unit: Person(%)

		Reliability of boss				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
(Currently) use or not	Yes	1(0.22)	0(0.00)	10(2.18)	13(2.84)	2(0.44)
	No	5(1.09)	34(7.42)	142(31.00)	197(43.01)	54(11.79)

As a result of conducting a cross-analysis between the use of the flexible work system and the trustworthiness of the supervisor, it was found that many respondents answered that the level of trustworthiness of the supervisor was moderate or yes without using the flexible work system.

Table 3. Cross-analysis between currently using flexible work system and job satisfaction.

Unit: Person(%)

		Job satisfaction				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
(Currently) use or not	Yes	1(0.22)	1(0.22)	10(2.18)	11(2.40)	3(0.66)
	No	9(1.97)	45(9.83)	163(35.59)	168(36.68)	47(10.26)

As a result of conducting a cross-analysis between the use of the flexible work system and job satisfaction, the number of respondents who answered that the level of job satisfaction is normal or yes without using the flexible work system was large.

Table 4. Cross-analysis between currently using flexible work system and work performance.

Unit: Person(%)

		Work performance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
(Currently) use or not	Yes	0(0.00)	1(0.22)	7(1.53)	14(3.06)	4(0.87)
	No	1(0.22)	11(2.40)	140(30.57)	238(51.97)	42(9.17)

As a result of conducting a cross-analysis between the use of the flexible work system and the level of work performance, many respondents answered that the level of work performance is normal or yes without using the flexible work system.

Table 5. Cross-analysis between currently using flexible work system and organizational commitment.

Unit: Person(%)

		Organizational commitment				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
(Currently) use or not	Yes	0(0.00)	1(0.22)	14(3.06)	10(2.18)	1(0.22)
	No	7(1.53)	47(10.26)	172(37.55)	166(36.24)	40(8.73)

As a result of conducting a cross-analysis between the use of the flexible work system and organizational commitment, it was found that many respondents answered that the level of organizational commitment was normal or yes without using the flexible work system.

4. Cross-Analysis between Having Experience of using Flexible Work System and Outcome Variables

Table 6. Cross-analysis between having experience of using flexible work system and work-life balance.

Unit: Person(%)

		Work-life balance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having experience or not	Yes	5(1.09)	30(6.55)	72(15.72)	75(16.38)	18(3.93)
	Not	13(2.84)	54(11.79)	101(22.05)	76(16.59)	13(2.84)

According to a cross-analysis between the experience of using the flexible work system and the level of work-life balance, the largest number of respondents answered that the level of work-life balance was normal without using the flexible work system.

Table 7. Cross-analysis between having experience of using flexible work system and reliability of boss.

Unit: Person(%)

		Reliability of boss				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having experience or not	Yes	2(0.44)	15(3.28)	55(12.01)	102(22.27)	26(5.68)
	Not	4(0.87)	19(4.15)	96(20.96)	108(23.58)	30(6.55)

According to a cross-analysis between the use of flexible work systems and supervisor reliability, the number of respondents who said yes to supervisor reliability without using flexible work systems was the highest, followed by the number of respondents who said yes to supervisor reliability.

Table 8. Cross-analysis between having experience of using flexible work system and job satisfaction

Unit: Person(%)

		Job satisfaction				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having experience or not	Yes	1(0.22)	12(2.62)	71(15.50)	88(19.21)	28(6.11)
	Not	9(1.97)	34(7.42)	101(22.05)	91(19.87)	22(4.80)

According to a cross-analysis between the use of the flexible work system and job satisfaction, the largest number of respondents answered that they had no experience using the flexible work system and that they had no experience using the flexible work system.

Table 9. Cross-analysis between having experience of using flexible work system and work performance.

Unit: Person(%)

		Work performance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having experience or not	Yes	0(0.00)	6(1.31)	44(9.61)	121(26.42)	29(6.33)
	Not	1(0.22)	6(1.31)	102(22.27)	131(28.60)	17(3.71)

According to a cross-analysis between the presence or absence of flexible work and the level of work performance, the largest number of respondents answered yes to the level of work performance without using the flexible work system.

Table 10. Cross-analysis between having experience of using flexible work system and organizational commitment.

Unit: Person(%)

		Organizational commitment				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having experience or not	Yes	4(0.87)	16(3.49)	66(14.41)	95(20.74)	19(4.15)
	Not	3(0.66)	32(6.99)	119(25.98)	81(17.69)	22(4.80)

As a result of conducting a cross-analysis between the presence or absence of flexible work and organizational commitment, the largest number of respondents answered that organizational commitment was normal without using flexible work, followed by that.

5. Cross-Analysis between Having Experience of Disapproval of using Flexible Work System and Outcome Variables

Table 11. Cross-analysis between having experience of disapproval of using flexible work system and work-life balance.

Unit: Person(%)

		Work-life balance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having disapproval or not	Yes	3(0.66)	7(1.53)	12(2.62)	3(0.66)	1(0.22)
	Not	15(3.28)	75(16.38)	162(35.37)	147(32.10)	29(6.33)

According to a cross-analysis between the presence or absence of experience in using the flexible work system and the work-life balance, the number of respondents who did not have experience in disallowing the flexible work system was the highest.

Table 12. Cross-analysis between having experience of disapproval of using flexible work system and reliability of boss.

Unit: Person(%)

		Reliability of boss				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having disapproval or not	Yes	2(0.44)	4(0.87)	11(2.40)	6(1.31)	3(0.66)
	Not	4(0.87)	30(6.55)	139(30.35)	203(44.32)	52(11.35)

According to a cross-analysis between the experience of not being allowed to use the flexible work system and the reliability of the supervisor, the number of respondents who said yes to the supervisor's reliability was the highest.

Table 13. Cross-analysis between having experience of disapproval of using flexible work system and job satisfaction.

Unit: Person(%)

		Job satisfaction				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having disapproval or not	Yes	1(0.22)	6(1.31)	9(1.97)	7(1.53)	3(0.66)
	Not	9(1.97)	38(8.30)	164(35.81)	171(37.34)	46(10.04)

According to a cross-analysis between the experience of not being allowed to use the flexible work system and job satisfaction, the number of respondents who said yes to job satisfaction without experience of not allowing the flexible work system was the next largest.

Table 14. Cross-analysis between having experience of disapproval of using flexible work system and work performance.

Unit: Person(%)

		Work performance				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having disapproval or not	Yes	1(0.22)	2(0.44)	6(1.31)	14(3.06)	3(0.66)
	Not	0(0.00)	10(2.18)	139(30.35)	237(51.75)	42(9.17)

According to a cross-analysis between the experience of not being allowed to use the flexible work system and work performance, the number of respondents who said yes to the level of work performance without experience of not allowing the flexible work system.

Table 15. Cross-analysis between having experience of disapproval of using flexible work system and organizational commitment.

Unit: Person(%)

		Organizational commitment				
		Strongly not agree	Not agree	Moderate	Agree	Strongly agree
Having disapproval or not	Yes	1(0.22)	6(1.31)	8(1.75)	9(1.97)	2(0.44)
	Not	6(1.31)	42(9.17)	176(38.43)	166(36.24)	38(8.30)

According to a cross-analysis between the presence or absence of experience in using the flexible work system and organizational commitment, the largest number of respondents answered that the flexible work system was normal.

6. Conclusion & Discussion

The core goal of this study is to expand research on the use of the flexible work system in public organizations in Korea and to analyze the topics of the flexible work system that have not been discussed so far. Specifically, the following three research contents were conducted with the Daegu Metropolitan Government Public Officials Perception Survey. First, it analyzes the differences in organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment) according to the use of the flexible work system. Second, it analyzes the difference between the presence or absence of experience in using the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment). Third, it analyzes the difference between experience without permission for the flexible work system and organizational outcome variables(work-life balance, boss reliability, job satisfaction, work performance, and organizational commitment). Overall, it was analyzed that there was a meaningful difference in perception of organizational outcome variables between groups that currently use and do not use the flexible work system, and groups that did not receive permission to use the flexible work system. These statistical analysis results are thought to be useful policy implications for the design and utilization of flexible work systems in public organizations.

The main limitation of this study is that statistical analysis was performed using data at a point in time, and policy implications were derived based on this. In other words, since panel data was not used, it is judged that there is a clear limitation in verifying and inferring more causal relationships between variables. Next, measurements for each variable were derived based on the perception survey of public officials, and statistical analysis was performed using them. It is true that many papers in social science research perform statistical analysis based on respondents' perception surveys and verify quantitative relationships between variables. However, if statistical analysis is performed using objective indicators in addition to data based on subjective perception, the level of explanatory power and implications of the main results of the study will be further improved. It is thought that this should be continuously supplemented and carried out in follow-up studies of the flexible work system.

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8. Appendix

8.1. Author contribution

	Initial name	Contribution
Author	YS	<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 may explain all aspects of the paper <input checked="" type="checkbox"/>

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Corresponding author*
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Future Learning Competency Extracurricular Program Operation and Performance Analysis

Seohyun Song

Osan University, Osan, Republic of Korea

Abstract

Purpose: This study has public value as it identifies the current status and problems of extracurricular program. It does so by analyzing the operation and performance of extracurricular program after selecting them based on the results of student needs analysis.

Additionally, it verifies whether participation in extracurricular program has an effect on self-efficacy and suggests implications for future program design and activation.

Method: Data collection was conducted by surveying students in the science department of O University in the Seoul metropolitan area, and analysis methods included frequency and percentage, exploratory factor analysis, reliability testing, correlation, and regression analysis. The research questions are

1. How is the selection of extracurricular program based on students' needs analysis?
2. What are the results of the analysis of the operational performance of extracurricular program?
3. Is participation in extracurricular program effective in promoting self-efficacy?

Results: Based on research question 1, the extracurricular program selected were the Creative Convergence Competition, the Foreign Student Mentoring Program, 5L DAY, and the 3D Printing Instructor Certification Course.

According to research question 2, the creative convergence competition was able to develop core competencies outside the major and needed communication channels between departments. International student mentoring needed to strengthen the criteria for international students to participate in the program, and the 3D printing instructor certification course needed online lectures for theory and in-person lectures for practice. 5L DAY had the highest level of satisfaction among the comparison programs. According to research question 3, participation in the Future Learning Capability Program was effective in improving self-efficacy.

Conclusion: The limitations of this study include that the research subjects are limited to the science departments of metropolitan universities, and the effectiveness of the "Future Learning Competency" extracurricular program is verified among the core competency-based extracurricular program of universities, and subsequent research requires subdivision by department and grade, and research on various factors such as learning effectiveness and satisfaction.

Keywords: Future Learning Competency, Extracurricular Program, Operation, Performance, Self-Efficacy

1. Introduction

The world is currently undergoing many changes due to the entry of the Fourth Industrial Revolution[1], and it is necessary to have the ability to increase one's added value by utilizing new knowledge and technology in a rapidly changing environment [2]. In order to actively cope with the evolving environment and create social value[3][4][5], competency-based curricula are being introduced[6] to train human resources with the competencies required by the future

society by specialty[7]. As the importance of college competency education has emerged, college human resources and core competencies are important keywords[8], and curricular and non-curricular curricula are operated[9], of which non-curricular curricula are relatively free to establish and operate compared to regular courses, and can provide various kinds of programs for students' self-development as needed[10], so that students can cultivate core competencies other than academic knowledge through extracurricular program and develop competencies required according to their careers through practical education[11], and school life adaptability, communication, career and employment skills, interpersonal skills, and moral and ethical competencies[12][13][14], and educational effects such as academic achievement[15], creative thinking[16], and self-efficacy[17] have been shown to be higher than regular curriculum[18].

The increase in extracurricular program reveals that the curriculum content may not be sufficient to meet the demands of today's times[19]. Analyzing extracurricular program can generate exchanges that revolve around pupil traits, essential proficiencies, and directions, instead of expanding these programs haphazardly through policy[20]. To reinforce their distinct core competencies, it may be more useful to divide and define learner cohorts, taking into consideration their distinct traits and paths[21].

Furthermore, there have been active efforts to verify and enhance the effectiveness of co-curricular programs tailored to universities for augmenting core competencies[22][23][24]. There are only a few cases of selecting future learning capability comparison programs among core competencies based on student perception and demand surveys and analyzing their operation and performance.

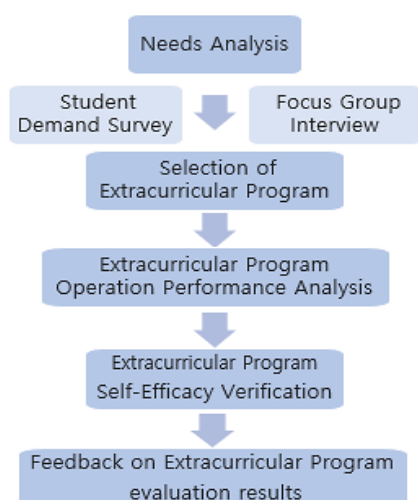
This study has public value as it identifies the current status and problems of extracurricular program. It does so by analyzing the operation and performance of the program, selecting it based on results of the student needs analysis, verifying whether the program has an effect on self-efficacy through participation, and suggesting implications for future program design and activation.

2. Research Method

2.1. Research questions

1. How is the extracurricular program selected based on an analysis of student needs?
2. What are the results of the performance analysis of the extracurricular program?
3. Is participation in the extracurricular program effective in promoting self-efficacy?

Figure 1. Research model.



2.2. Research method

The data collection was conducted by surveying first and second year students who are enrolled in the natural science department of O University in the metropolitan area and who are aware of or have experienced the Future Learning extracurricular program in the first semester of 2022. A total of 180 copies of the questionnaire were distributed from September 26 to October 28, 2022, and 158 copies were used for the final analysis, excluding 22 test sheets that were deemed unsuitable.

SPSS 25.0 was utilized to analyze the study data. Frequencies and percentages were calculated for the general characteristics of the research participants. Furthermore, exploratory factor analysis and reliability analysis were done to confirm the validity and reliability of each factor. Furthermore, the reliability of the survey instrument was verified by calculating Cronbach's α coefficient to check internal consistency. Furthermore, self-efficacy analysis was examined according to participation in the extracurricular program using correlation and regression analysis.

3. Research Results

3.1. General characteristics of the subjects

Out of 158 participants, 53(33.5%) were male and 105(66.5%) were female. Moreover, 103(65.2%) participants belonged to the freshman class, while 55(34.8%) belonged to the sophomore class. Additionally, 97(61.4%) participants were a part of the program, while 61(38.6%) were not <Table 1>.

Table 1. General characteristics.

Classification	Item	Frequency(N)	Ratio(%)
Gender	Male	53	33.5
	Female	105	66.5
Grade	First year	103	65.2
	Second year	55	34.8
Participation in extracurricular program	Participated	97	61.4
	Not participated	61	38.6
Total		158	100

3.2. Results of student needs analysis

The Student Demand Survey was a 35-question online survey conducted between November 8 and November 12, 2021, among the entire student body of O University, overall extracurricular program, and program preferences by competency. The total number of respondents was 723, with 331 male students(46%) and 392 female students(54%).

Table 2. Analyze by survey question.

Programs	Analysis results
Psychological	Psychological testing, 1:1 personal counseling required, environment needs improvement
Startup	High preference for entrepreneurship club, entrepreneurship pathway specialization, and digital entrepreneurship competency specialization
Career and employment	High preference for 1:1 personal counseling, experiential programs, and professional development classes

Learning	Academic advising, strong preference for off-campus, need for more major-related programs
Language	Language courses specific to your major, preferably basic English classes
Creativity and career education	Preference for 5L special lecture method is experience type(49.1%) > lecture type(23.4%) > small talk concert type(18.4%) > large lecture type(8%)
Program preferences	Students prefer "experiential" versus online "LMS" programs

It is necessary to compare the results of the student demand survey and strengthen the promotion of the program, and improve the psychological test, personal counseling, and environment of the psychology program. In the startup program, there was a strong preference for startup clubs, special lectures on startup, and experiential programs in the career and employment program. In the learning programs, students preferred tutoring and off-campus study, and in the language support programs, students preferred language courses and basic English courses for their majors.

When it comes to Operations methods, we see a preference for " Experience " and online "LMS" methods <Table 2>.

3.3. Results of the focus group interviews(FGI)

The FGI interviewed six high-performing and low-performing students in the Comparative Studies in Natural Sciences program between October 12 and October 22, 2021, and asked them eight questions about the most necessary competencies among the core competencies, motivation to participate, advantages and disadvantages of participation, and rewards of completion.

Table 3. Focus group interview analysis.

Question	Interview transcript
Understanding core competencies	Understands comparative programs but not core competencies.
Which of the 5L core competencies do you need most?	Future learning skills, basic skills, and job skills are most needed.
How engaged is the comparative studies program?	The average non-majors participates in three or more programs per semester.
What motivates you to participate in the comparative medicine program?	I participate in tutoring programs because they are tied to mileage, I can earn scholarships, and they help me build my personal skills.
What is the completion rate for non-majors in the program?	Need to manage the attendance of students who have completed 80-90% of the non-credit programs they applied for and are attending and dropping out.
What comparative studies programs do you recommend?	CAP+ program satisfied with interview mock test feedback, shoulder tutoring program benefited students with 1:1 guidance. Japanese company customized classes are recommended for step-by-step lessons from the basics to the advanced level.
What are the pros and cons of participating in the comparative medicine program?	Applying for required courses, mileage scholarships, high quality classes, making friends from other classes, being able to reach out if I have questions, fatigue during long classes when using mobile for online classes, and not being able to fill out surveys.
How do you prefer to be rewarded for participation?	Mileage scholarships, credit for achievement hours, random prizes, etc.

The results of the FGI showed that the students were not familiar with the core competencies and that the competencies they thought were most necessary after the explanation of the 5L core competencies and the extracurricular program were future learning competencies, basic job skills, and job skills.

The motivation for participating in the extracurricular program is that it is linked to mileage and helps to receive scholarships and strengthen personal competencies, and the extracurricular program that I would recommend is the CAP+ program and the shoulder tutoring program, which have high teaching competence and class satisfaction. Immediate application for courses, mileage scholarships, and high-quality classes are good, but communication between participants and professors needs to be improved <Table 3>.

3.4. Choosing a comparative studies program

For research question 1, the extracurricular program was selected from the Future Learning Competency Comparison Program based on the results of the student demand survey and the FGI survey on the "most needed competencies among the 5L core competencies" question. Future Learning Competencies are defined as <Table 4>.

Table 4. Future learning competencies.

	Competencies	Defining competencies
5L core competencies	L2. future learning capability	In a global society connected by information and communication technologies, people from diverse social and cultural backgrounds can effectively utilize digital media, technologies, and communication tools to create new ideas and solutions to problems in order to achieve common goals, develop knowledge and potential, and effectively conduct social activities.
Sub-abilities	L2_1. digital literacy	Access, analyze, and evaluate information in a variety of forms to manage, integrate, and generate new information by leveraging necessary information and digital media and technologies.
	L2_2. global literacy	Openness to diverse social and cultural backgrounds and verbal and non-verbal communication skills will give you the basic skills to discover better alternatives through synergy of thinking and culture.

In addition, the preferred program methods in the student demand survey were "experiential" and "online LMS," and among the future learning capability programs, the creative convergence contest, foreign student mentoring program, and 5L DAY(comparative science fair) were selected as experiential learning programs, and the 3D printing instructor certification course was selected as online learning.

3.5. Comparative program performance analysis

The results of the operational performance analysis of the future learning competency extracurricular program under research question 2 are as follows.

3.5.1. Creative convergence competition

Table 5. Program overview.

Item	Contents
Operating period	2022. 03. 18. ~ 06. 17
Operational purpose	Increase student creativity, convergence competencies, and problem-solving skills
Operating entity	Teaching and learning support center
Participants	15 total teams, 61 participants Total 13 teams, 52 completers
Who can participate	Current students
5L competencies	L2 future learning competencies L2-1 digital literacy
How to operate (offline)	<ul style="list-style-type: none"> - Students from two or more disciplines participate as a team - Select a topic and work together to submit a fusion product that reflects the characteristics of each department - Presentation of results(video, PPT) - Selection of excellent teams through face-to-face screening by external experts and the steering committee - 6 excellent teams will be selected and awarded cash prizes
Expectations	Increase creativity, collaboration, and problem-solving skills

According to [4], students reported that their ability to communicate, collaborate, and be creative improved through interdisciplinary teamwork and by generating and implementing ideas. The students found that discussing projects with friends from different majors, project-based learning, and creative technique classes were also helpful.

Holding the creative convergence contest in the first semester may result in a lack of interest and understanding in the school and the program. Therefore, it is necessary to promote the contest through the distribution of guides and manuals during activities. Additionally, the comprehensive theme of the contest may contribute to low participation by current students. It is recommended to improve accessibility for current students by selecting keywords when operating the contest next year.

The lack of interaction between majors makes it difficult to recruit other majors. Therefore, it is recommended to establish and activate an SNS community that serves as an introduction and mediation role.

3.5.2. International student mentoring program

Table 6. Program overview.

Item	Contents
Operating period	2022. 04. 18. ~ 05. 13. 4 total meetings
Operational purpose	<ul style="list-style-type: none"> - Increasing satisfaction with school life through various student welfare programs for foreign students - Direct and indirect public relations effects by building a positive image of O university
Operating entity	International exchange center
Participants	<ul style="list-style-type: none"> - Mentors: 42 applicants(20 majors), 6 completers - Mentees: 11 applicants(5 for beginner class, 6 for intermediate class), 6 successful applicants
Who can participate	<ul style="list-style-type: none"> - Mentees: current students - Mentee: foreign students in Korean language schools
5L competencies	L2 future learning competency, L2-2 global competency
How to operate (offline)	<ul style="list-style-type: none"> - Current students: online recruitment via O-story - International students: apply through the classroom instructor of each class - 1:1 mentor matching with current students - If a foreign student wants to study in a specific department, prioritized matching with students in that department - Program locations are in the Gyeonggi region of Seoul where you can experience real life Korean language - Participate in activities for 2 hours or more(4 times), once a week, and complete and submit an activity report(2 pages) - Current students receive 600 mileage points upon completion of participation
Expectations	Creating mentor-mentee relationships between international students to provide familiarity with schools and departments

In the mentoring mentor program, mentors serve as "friends" who help foreign students adjust to life in Korea, "seniors" who introduce them to the joys of university life, and "civilian diplomats" who share various aspects of Korean culture. Since it is a new program, foreign students with beginner level of Korean were given the opportunity to participate as mentees, but due to communication difficulties, it is necessary to strengthen the program participation criteria for intermediate level and above.

Due to the frequent unilateral cancellation of appointments by foreign students, there is a need for program participation benefits for foreign students, such as mileage scholarships, to

encourage participation, and it is necessary to consider not only 1:1 matching of foreign students, but also a group of friends.

3.5.3. 3D printing instructor certification course

Table 7. Program overview.

Item	Contents
Operating period	2022.05.09. ~ 05.27.
Operational purpose	<ul style="list-style-type: none"> - Based on the correct understanding of 3D printers, students will have time to experience new technologies and strengthen their ability to realize their ideas. - To enable students to acquire basic theories and practical skills related to 3D printer development and operation, and to obtain 3D printing instructor certification.
Operating entity	Incubators
Participants	20 people signed up, 20 people completed
Who can participate	20 applicants from O University students(first come, first served)
5L competencies	L2 future learning competencies L2-1 Digital literacy
How to operate (offline)	<ul style="list-style-type: none"> - Understand the concepts of 3D printers and learn how they work and how to use them with the goal of earning a 3D Printing Instructor Level 1 certification. - Learn how to use the fusion 360 tool to create a basic model and learn the basics of 3D printing with Slicer SW. - Experience the entire process from fusion 360 modeling to 3D printing production by creating seven representative real-world drawing examples. - Online lectures(17 lessons) followed by an online written test.
Expectations	<ul style="list-style-type: none"> - Fostering creative talent by spreading maker culture. - Shared growth of university, community, and economy by promoting entrepreneurship. - Strengthening student employment and entrepreneurship.

Since the outbreak of the COVID-19 virus, non-face-to-face classes have become the new normal of education [25] and going online is expected to accelerate [26], and many educational contents and teaching materials are now attracting attention to the teaching medium of remote technology [27]. In contrast to the study that the non-face-to-face class operation method is the most preferred by students [28], the 3D printing instructor preferred a mixed(face-to-face + non-face-to-face) method by requesting online lectures for theory and face-to-face lectures for practice, and will be considered for further development.

Non-face-to-face extracurricular program are less focused and difficult to communicate [29], so non-face-to-face communication methods, continuous schedule guidance during the program period to keep students' attention, and checking the completion rate to encourage participation are needed, and 3D printing output after online learning needs support from the startup support group.

3.5.4. 5L DAY(comparative science fair)

Table 8. Program overview.

Item	Contents
Operating period	2022. 05. 25. ~ 05. 26. 11:00~16:00(duration of athletic events)
Operational purpose	<ul style="list-style-type: none"> - Raise awareness of the need for extracurricular program by promoting the department and the program - Increase voluntary participation in competency-based extracurricular program

Operating entity	Student competency center
Participants	Total attendance: 1,000(attendees at 1 or more booths), participants who attend more than once are counted as participants on both days of the event
Who can participate	All students
5L competencies	L2 future learning competencies L2-1 digital literacy
How to operate (offline)	<ul style="list-style-type: none"> - Run departmental promotional booths - 14 total booths with 12 coins and food truck swag for participants - 300 5L mileage points for all participants
Expectations	- Enhanced support for student activities, 5L mileage operations, and certification

The 5L DAY was organized and operated with various promotional booths for each department, and helped to promote student self-governance activities through experience exhibitions for majors and entrepreneurship clubs. Currently, only one semester is being held, but due to the high level of student participation and interest, it is necessary to expand and operate departmental booths and club experience booths by securing a budget in the future. It is also necessary to secure an indoor space in consideration of hot weather and rainy weather, as it is operated like an athletic competition or festival, which is efficient for participation.

3.6. Validation of self-efficacy enhancement in extracurricular program

3.6.1. Validate self-efficacy factors

In order to verify whether there is an effect on self-efficacy based on the comparison of future learning capability and participation in the program according to research question 3, the self-efficacy measurement instrument was reconstructed by modifying and supplementing the instrument used in previous studies[30][31][32], and consisted of 22 items on a 5-point Likert scale, with responses to all items in the questionnaire ranging from 'not at all' to 'very much so'. To verify the validity of the self-efficacy factor, an exploratory factor analysis was conducted, and the results are shown in <Table 9>. The independent variable, self-efficacy, is composed of three sub factors: task challenge, self-regulation, and confidence, with 7 items for task challenge, 9 items for confidence, and 6 items for self-regulation.

The total variance explained for self-efficacy is 73.959%, and the KMO measure is .889. Bartlett's test of Spherical was also significant($p < .001$), and the reliability of the 22 items was .91, indicating that the factor analysis model is appropriate <Table 10>.

Table 9. Validation of the self-efficacy factors.

No.	Self-efficacy	Measurement factor	Component		
			1	2	3
20	I like hard things, even if I make some mistakes	Challenging tasks	.936	.157	.065
22	I prefer challenging work to easy work		.929	.000	.048
21	It's fun to get stuck into something difficult or challenging		.913	.136	.127
18	The harder the better		.907	.200	-.034
19	I choose hard things over easy things		.905	.022	.182
14	I can plan well		.736	.233	.358
11	My judgment and thoughts on a matter are generally accurate		.505	.304	.489
6	I don't panic easily when things get tough	Confidence	-.029	.922	.062
1	I don't feel depressed under pressure		-.042	.874	.148
5	When I start something, I don't feel like I'm going to fail		-.039	.844	-.070

4	I don't get stressed in threatening and difficult situations		.220	.813	.120
3	I can handle myself well in dangerous situations		.306	.793	.302
2	I don't get anxious easily when something big happens		.398	.707	.267
9	I am good at finding the cause and effect of something		.224	.695	.380
8	I have the ability to overcome difficult situations		.465	.609	.340
7	I can order my tasks and take them one after the other		.422	.495	.205
16	I don't give up when things get tough and keep trying	Self-regulation	-.034	.125	.850
13	I can fully utilize information to accomplish a given task		.035	.205	.795
12	I can always set goals and see how things are going		.369	-.045	.756
10	I can judge what I can and can't do		-.031	.368	.704
17	I can handle anything with precision		.480	.057	.670
15	I can quickly correct things if I think they're going wrong		.507	.395	.530
Eigenvalues			6.386	5.800	4.085
% dispersion			29.028	26.364	18.568
Cumulative %			29.028	55.391	73.959
KMO=.889, Bartlett $\chi^2=3578.090$, degree of freedom 231(p<.001)					
Method of factor extraction: principal component analysis. Method of rotation: varimax with kaiser regularization.					

Table 10. Analyze the reliability of self-efficacy factors.

Measurement factor	Number of items	Reliability
Challenging tasks	7	.932
Confidence	9	.933
Self-regulation	6	.875
Total	22	.910

3.6.2. Correlation analysis

To determine the relationship between self-efficacy and comparison and program participation, a correlation analysis was conducted and the results are shown in <Table 11>.

Table 11. Correlation analysis.

Item	Average	Standard deviation	Gender	Grade	Self-efficacy	Participation
Gender	1.66	.474	1			
Grade	1.35	.478	.069	1		
Self-efficacy	71.8077	8.89517	-.197*	.128	1	
Participation	.6139	.48840	.125	.170*	.386**	1

Note: ** $p<0.01$, * $p<0.05$.

The results of the correlation analysis showed that self-efficacy was significantly positively correlated with participation in the co-curricular program($p<0.01$) and gender($p<0.05$), and there was no significant difference in grade. Previous studies have shown differences in self-efficacy by grade level[33], which is different from the results of this study, but in the case of future learning capability-related extracurricular programs, freshmen can improve their self-efficacy without any difference from other grades.

Table 12. Validate regression models.

Model	R	R ²	Adjusted- R ²	Standard error of the estimate	Durbin-watson
1	.643b	.413	.406	.37510	1.744

Note: a. Predictors: (Constant), Self-Efficacy_Factor2, Self-Efficacy_Factor3.

b. Dependent variable: Participation.

The effect of participation in the extracurricular program on self-efficacy was tested by regression analysis. Among the self-efficacy factors, self-confidence factor(2) and self-regulation factor(3), which are significantly correlated, were set as independent variables and participation status as the dependent variable, and the results of the regression analysis are as follows.

First, the summary value of the regression model is .413, which shows how well the independent variables explain the dependent variable, and the R square value is .413, which explains about 41.3%. The smaller the difference between the corrected R value and the R value, the better the model, and the difference between the corrected R value and the R value is .007, which is not a big difference, so it can be considered a suitable model. In addition, the Durbin-Watson value is 1.744, which indicates that there is no problem with the independence of the residuals when $1 < \text{Durbin-Watson value} < 3$ <Table 12>.

Table 13. Analysis of variance ANOVA.

Model	Average	Sum of squares	Degrees of freedom	Mean square	F	P-value
2	Regression	15.159	2	7.580	53.873	.000
	Residual	21.527	153	.141		
	Total	36.686	155			

Note: a. Dependent variable: Participation.

b. Predictors: (constant), self-efficacy_factor2, self-efficacy_factor3.

Check the ANOVA value in <Table 13>, and the F value is 53.873($p < .001$). This is less than the .05 probability of significance, so the regression model is suitable. Checking the standardized coefficient value, the VIF value is 1.346, which is less than 10, indicating that there is no problem of multicollinearity in the independent variables. With a significance level of less than .05, the two independent variables, self-confidence and self-regulation, have a significant effect on the dependent variable, participation in the comparison program. The standardized coefficient beta values of .429 and .308 are defined as(+), and especially .308<.429, which means that self-confidence has a greater impact on participation in the comparison program than self-regulation <Table 14>.

Table 14. Standardization factor value.

Dependent variable	Independent variables	Unstandardized coefficients		Standardized coefficients	t	P-value	Collinearity statistics	
		B	Standard error	β			Tolerance	VIF
Participation	(Constant)	-1.494	.217		-6.882	.000		
	Confidence	.033	.006	.429	5.976	.000	.743	1.346
	Self-regulation	.048	.011	.308	4.289	.000	.743	1.346

4. Conclusion and Discussion

According to research question 1, we selected the future learning competency extracurricular program among the 5L core competencies based on the results of the student demand survey and FGI(Targeted Group Interview).

In the analysis of the operation performance of the future learning competency extracurricular program according to Research Question 2, the creative convergence competition is conducted in teams with students from other departments, so students can communicate and unite with new ideas and develop core competencies outside of their majors, but interdepartmental communication channels for team matching are needed.

The mentoring of foreign students was good for introducing Korea to foreign friends, but the unilateral cancellation of appointments by foreign students and difficulties in communication resulted in low satisfaction with the program, and it is necessary to strengthen the standards for participation in the program for foreign students.

The 3D printing instructor certification class was a non-face-to-face program that allowed students to take lectures for free and obtain a certificate, but due to difficulties in experiencing and operating 3D printing, it is necessary to conduct online lectures for theory and face-to-face lectures for practice in an on-off manner. 5L DAY was held in conjunction with an athletic competition, so there were many students who participated, and there were various booths with hands-on activities and food, so it was the most satisfactory among the extracurricular program. It is necessary to expand the operating space itself and secure an indoor space to consider hot weather and rainy weather.

In accordance with research question 3, we examined whether participation in an extracurricular program is effective in promoting self-efficacy through correlation analysis, and regression analysis showed that participation in the 'Future Learning Competency' extracurricular program was effective in promoting self-efficacy. In particular, self-confidence factors had a greater impact on participation in the extracurricular program than self-regulation, so it is expected that participation in the extracurricular program will give students confidence in college life and be effective in adapting to college life.

Since college and university co-curricular programs are often of a similar or identical nature[28], the analysis of student perceptions, and needs for co-curricular programs at O can be helpful in the development and operation of co-curricular programs at universities in similar educational settings.

As for the limitations of this study, the research subjects are limited to natural science departments of metropolitan universities, and the effectiveness of the Future Learning Competency Comparative Course Program among the university core competency-based comparative course programs should be verified, and subsequent studies should include subdivision by department and grade, and various factors such as learning efficacy and satisfaction.

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6. Appendix

6.1. Author's contribution

	Initial name	Contribution
Author	SS	-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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