

Protection Convergence

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Wig Damage Related Repair and PROTECTION Clinic Utilizing Oxidation Potential Solution

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Abstract

Purpose: The purpose of this study is to examine and understand the effects of oxidation potential solution treatment which does not cause an environmental pollution and hair damages when hair is damaged by repeated washing, perming, and dyeing of wigs, etc., and this study is meaningful in that it provides the basic data which may properly be use for an environmentally friendly oxidation potential solution in the field of beauty.

Method: Soak the damaged and tangled wigs in a reduction potential solution of pH 11 for 30 minutes to remove wastes and shampoo, then apply the treatment and let it sit naturally for 30 minutes, then classified the control group which rinsed clinic with tap water without undergoing the oxidative potential water treatment and the experimental group which rinsed clinic with the oxidation potential solution, thereby comparatively analyzing the extent of entanglement, elasticity, and gloss of the hair.

Results: First, the hair was immersed in a reduction potential solution of pH 11 for 30 minutes, then shampooed. Consequently, it was discovered that both the experimental group and the control group did not get their hair entangled any more. Second, the control group at which the treatment was rinsed with tap water had even more entangled hair and even after they were combed, they looked stretched and poor. In the experimental group which rinsed with the oxidation potential solution, the tangled hair became loose, combing was made easier, and the hair's gloss and softness turned out relatively well.

Conclusion: Based on the information above, it was demonstrated that the extent of damages for the control group's wigs without the oxidation potential solution treatment increased during shampooing, while the experimental group's wigs treated with the oxidation potential solution demonstrated little damages and maintained elastic hair. This is because the product is completed by removing the cuticles from the hair with acid treatment during the wig's manufacturing process to prevent the entanglement of the hair, and hence, with an alkaline shampoo, almost no cuticles are left behind, making them rough, and the loss of polypeptide in the hair increases the damages. Meanwhile, the oxidation potential solution(pH 2-11) has a lower chlorine concentration compared to the general chlorine based disinfectants, and hence, it is easy to decompose and does not cause environmental pollution, and it was also confirmed that there is no further damage caused to the hair as there is no secondary damage given the residues because it is reduced to its properties.

[Keywords] Wig Damage Related Repair, Protection Clinic, Oxidation Potential Solution, Reduction Potential Solution, Polypeptide

1. Introduction

1.1. Purpose of the study

Customers are interested in and demand good products in order to satisfy their desire for the quality of life with improved cultural and qualitative levels and improved economic levels [1][2], and other than the genetic boldness which appeared in men during or after their 40s, the

increase in the population with hair loss in their 20s and 30s, who have begun their career, is also expanding to teenagers[3], while more customers are increasingly using full wigs or partial wigs for the hair loss for the customers with thin hair or to cover gray hair given side effects of dyeing, hair damages, and for health reasons, etc. Examining the papers related to wigs, the effect of wig wearing and hair thickening surgery on self esteem and psychological well being of empty hair and bald individuals[4][5][6][7][8], perception and purchasing behavior of wig wearers, and self efficacy and satisfaction[8][9], hair loss and wig perception survey according to the elderly women's wig wearing related status, satisfaction and preference, and hair interest[10][11], status of using customized wigs and service quality were related to customer satisfaction and relationship orientation, and they are primarily related to the perception, self-efficacy, and satisfaction of wig wearers, such as the effect on the customer satisfaction and relationship orientation, etc.[12][13], and there are no studies available on wig care other than those reported to be the most common at the point of purchase[14][15]. In order to meet the needs of customers who need to maintain healthy hair, it is necessary to perm or dye the wig by applying a pH balance which could help minimize hair damages from the hair's physiological point of view[16][17]. When strong alkylase(pH 10 or higher) and hair protein contained in a perm or hair dye operate, hair is dissolved[18].

Hair is consisted of the structure of the epidermis, cortex, and medulla, and among which, epidermis is an important part which helps to protect the inside of the hair from against physical and chemical factors[19][20][21]. When making a handmade wig, the hair is folded in half and transplanted, and hence, cuticle, which is the cuticle of hair, is positioned conversely in 50% of the direction. The direction of the cuticle ought to be uniformly arranged so that the hair is smooth and free from entanglement. However, the hair which must be frizzled can become entangled, thereby making it difficult to comb and manage[22][23]. Given such reason, the hair of handmade wigs is acid treated to remove the cuticles or manufactured by pressing, and hence, the hair is easily damaged during perming and dyeing as well as shampooing, and it is not easily regenerated even with clinic applied.

In particular, the damage caused to the wig is greater because the cuticle is compressed or removed as much as possible by placing the hair in water diluted with hydrochloric acid, a strong acid, and hence, that the drug penetrates evenly[24][25]. As such, the cuticles are removed or the compressed hair is repeatedly softened and hardened due to frequent treatments performed with acids and alkalis, and the hair becomes increasingly damaged[26]. The existing hair treatment recipes have such time constraints as overtime and redness, and they remain on the hair and interfere with the next sequence of work. In particular, it is apparent that the proteins of the hair piece are detected in very small amounts even in the distilled water, because the hair is consisted of protein, and given the characteristics of the S-S bond, O-H bond, and cuticle structure. Damaged hair has a characteristic such that when the cuticle layer is destroyed, the protein protection ability in the hair declines, and hence, the protein loss rate also increases[27]. The treatment using the oxidation potential solution does not harden the hair, softens, and does not melt, does not remain on the hair, and is non-toxic, and it opens and closes hair cuticles with a pH of 2-11 at large width, and it does not interfere with the next operation[28]. In addition, when examining the safety and antibacterial effects of oxidation potential solution in dermatology and internal medicine, the dermatology department announced that inflammatory acne individuals were reduced due to the antibacterial properties of oxidation potential solution, which is an effective and well-tolerant treatment for acne patients[29], while reporting that the tissue growth was promoted in burn wounds of the group using an electrolytic strong acid aqueous solution to promote epithelialization in burn models[30], and that when used on depigmented corneas of guinea pigs, it had a similar effect to povidone, which completely inhibited bacterial growth, and had significantly lower toxicity than povidone solution($P<0.05$)[31]. The internal medicine also announced that it could inactivate feline calicivirus using electrolyzed water and prevent cross-contamination caused by norovirus when cleaning kitchen utensils, and

in the same context, positive papers on efficacy and safety were also published for the internal medicine[32].

In this paper, strong acids and strong alkaline water with a pH of 2.5 to 11 do not harden the hair, soften them, and do not melt, and do not remain in the hair, and by applying a non-residual oxidation potential solution, it was sought to maximize the treatment on damaged and entangled hair and improve hair entanglement, elasticity and gloss. In the era of COVID-19, it is also intended to help revitalize the hair clinic market and the wig management market by using an oxidation potential solution which brings antibacterial operation, and is harmless to the human body and does not damage hair.

2. Issues of the Study

The details of this study are presented as follows.

Research Issue #1. Collect and analyze the data on the factors and characteristics which cause and influence hair damages.

Research Issue #2. After applying treatment, classify them into the experimental group for which oxidation potential solution was applied and the control group for which tap water was applied after treatment, and compare hair entanglement, shine and elasticity before and after the experiment.

3. Experimental Materials

3.1. Hair sample

The hair sample for this study cannot be used since the hair was tangled due to damages at Company S located in Seoul and Daejeon, and if the length of the hair is short among the discarded top pieces, tangles can be easily released, and hence, 6 products with a hair length of 20 cm or more were used for the experiment.

3.2. Hypochlorous acid water generator

Panacee(ND-002), a device of Intech Co., Ltd. of Japan, was used. If you dilute 3.2g of 100% pure salt(NaCl) in 3 liters of tap water, and place it on the top of the device and operate it, 1.5 liters of strong acid hypochlorous acid water and strong alkaline washing water will automatically be generated in the reservoir in approximately 3 minutes and 30 seconds.

3.3. Treatment

The treatment of Company D, which controls the pH balance by lowering the pH index raised by chemical treatment, which is the basic condition of the treatment, and which forms a moisture barrier on dry hair to provide a moisturizing effect, which satisfied all 4 conditions of a hydro-ized silk component and keratin component of pH 3.5 to impart a sense of elasticity, was selected.

3.4. Experimental method

This study compared hair tangle, gloss, and elasticity of hair of the control group and the experimental group by comparing the control group which rinsed the hair after shampooing with tap water, and the hair group which rinsed the hair after shampooing with the oxidation potential solution.

4. Theoretical Basis

4.1. Oxidation potential solution(hypochlorous acid solution, pH 2-11)

Oxidation potential solution is an aqueous solution containing hypochlorous acid solution(HOCL) which is generated via electrolysis by adding only purified salt to general tap water without using hydrochloric acid. Compared to the general chlorine based disinfectants, the chlorine concentration is low, and hence, it is easy to decompose, and it does not affect the environmental contamination. On top of safety, it loses its oxidation potential after exhibiting the sterilization power and is further reduced to the properties of pure water, and hence, there is no secondary harm caused by the residues.

As for water, $2H_2O$ produces the reduced $4H^+$ and O near the anode and is also electrolyzed into OH^- and H^3O^+ (oxonium ion). The salt dissolved in water is electrolyzed into Na^+ and Cl^- , and the active oxygen is generated at the anode by the electrode reaction, whereby anions are collected at the anode and cations at the cathode along with various ions dissolved in the water.

4.2. Hair and pH(power of hydrogen ions)

The amino acids which form the hair have both electrically (+) and (-) properties, and exist as (-)ions in the alkaline solutions and (+)ions in the acidic solutions. Furthermore, if a solution is neutral, the (+)ion and the (-)ion are in the same conditions, which is called the isoelectric point, and is expressed as pH.

The pH of hair is approximately 4-6, and when this figure is reached, the salt bonding of the side chain is the safest. Hair becomes weak at pH 4 or lower and pH 5.5 or higher, and it is susceptible to damages, and the binding force is weaker when it is alkaline than when it is acidic. Hence, in order to maintain hair strong, it is important to keep the hair condition in an isoelectric state each and every day.

pH is the "power of hydrogen ions"(concentration of hydrogen ions), and is also a value indicating how many hydrogen ions(H^+) and hydroxide ions(OH^-) are mixed in the aqueous solution(water), and does not exist in any substance without moisture, and can be measured and expressed only in the substances with moisture.

pH is a unit which determines as to whether a substance containing water is acidic or alkaline.

If and where there are many hydrogen ions, the pH value decreases and becomes acidic. Conversely, if and when the number of hydroxide ions increases, the pH value increases and the alkali(basic) takes place.

A difference in pH by 1 means that the hydrogen ion concentration is 10 times thicker or weaker. For instance, a pure water with equal amounts of hydrogen ions and hydroxide ions at 25 extents Celsius is neutral because the concentrations of hydrogen ions(H^+) and hydroxide ions(OH^-) are equal.

The pH of hair refers to the pH of the water contained in the hair and the proteins and lipids dissolved in the water, and at which time, the pH is usually approximately 4.5 to 5.5, indicating acidity.

Hair is largely influenced by the binding force of the proteins which form the hair according to the pH. Amino acids, which are proteins which comprise hair, have both positive and negative properties in terms of their molecular structure, and the ionic bonds in hair account for 35%, respectively.

If the hair is immersed in an acidic solution, the amino acids would remain as anions when immersed in an alkaline solution only in an acidic solution, in which event, amino acids would weaken the binding force and consequently damage the hair.

Hair swells when the pH is high(alkaline) and the bonds become loose. When the pH exceeds 10, it swells and becomes mushy and eventually melts.

If the hair is alkalinized, it will become dull or dry because it peels off the sebum layer of the epidermis. Hence, one ought to use a weakly acidic shampoo or a weakly acidic conditioner to maintain the pH balance of the alkalinized hair after perming or dyeing.

Since soap has a pH of 10 to 11, it has the effect of opening the hair cuticle layer more than the normal shampoos with a pH of 6 to 7, and hence, it can remove stains from the hair well, but causes damages.

Acids tend to condense the hair. Using an acid rinse may restore or tighten sagging hair. However, when the pH becomes a strong acid of 3 or less, the hair would be hydrolyzed, and the two polypeptide chains would be cleaved and decomposed into the amino acids.

4.3. Acidity and hair

The resistance to acidity is stronger than alkali, and the extent of damages to the protein and epidermis in the hair is very minimal given the contraction action against acid. However, the hair would be damaged in a strong acid(pH 1.5-2).

Hair, which is a protein, reacts with acid to contract the hair epidermis and hardens the epidermal layer.

Acidic rinses offer hair shines and also make hair healthy and manageable.

The weakly sensitized sebum film which wraps the skin or hair prevents the growth of bacteria and has a protective effect, thereby further preventing chemical damages and the drying of hair.

It closes the epidermis to make the hair strong and shiny.

4.4. Characteristics of alkalinity

It offers a bitter taste, and is soapy and slippery, making the hair bloat.

The higher the alkalinity of the pH, the more the hair would swell and expand, and the salt bond of the protein would be destroyed, thereby making it unstable.

In a weak alkali, one may feel the flexibility of the hair, yet in a strong alkali, not only the side chain bonds of the hair but also the protein itself would be decomposed.

4.5. pH balance

The pH balance is intended to restore the original pH of 4.5 to 5.5 after chemical treatment is performed on the skin or hair. The general pH balance would have the same effect as the acid film of the skin.

4.6. Alkali dissolution of hair

Treatment of the hair with an alkaline solution reduces the weight of the hair. The more severe the damages are to the epidermis, the greater the reduction rate would be because the polypeptide of the cortex, which is the inside of the hair, dissolves in an alkaline solution and flows out.

When the hair becomes alkalized, its structure would become loose and the protein structure become unstable, swollen and softened.

If the pH is 10 or greater, the hair would swell due to alkalinity and, using the properties of swelling and softening, permanent wave and color treatments easily penetrate the cortex and cause hair damages.

4.7. Isoelectric point

The average pH of 4-6, which is the amino acid's isoelectric point of hair, is the extent of safety of the salt defects of the side chain, and in the solutions of pH 4 or less and pH 6 or more, the salt bond is weakened or the binding force is lost.

When strong alkali and amino acids with a pH of 10 or higher act, they are neutralized by acting as amino acids, and hence, amino acids and water would be dissolved.

In the strong acids with a pH of 3 or less, it is hydrolyzed, and the polypeptide main chain is broken into the amino acids.

If one pulls the hair after soaking it in the water, it may easily be stretched even with a tiny force because the hydrogen bonds of the side chains are temporarily sticky by the water.

If one pulls the hair after soaking it in acid or alkali, the salt bond of the side chain is strong, and hence, if there is alkali left in the hair, it may cause damages.

When H_2O_2 acts, it cuts the side chains and main chains, and hence, the hair loses elasticity and becomes short hair.

If the alcohol concentration is greater than 50%, it dehydrates the proteins which form the hair or causes convergence and coagulation to denaturalize the hair.

5. Factors of Hair Damage

In the damaged hair, the tip of the cuticle is damaged or has partial detachment or exfoliation. Such hairs are dull and rough since they reflect light.

5.1. Factors of physical damage

Causes of friction : When shampooing, and if one shampoos with bad foams, one would be stimulated by the hair and the friction of the hair. The foams of a good quality shampoo not only performs a cleansing function, but also acts as a cushion, thereby preventing frictions. Excessive brushing would also cause friction and damage the hair. Before brushing, one ought to use a product which offers shine and gloss to the hair, reduces friction, and suppresses static electricity to prevent hair damages.

Damage caused by heat : It is a damage caused by drying by heat stimulation, UV exposure and sun rays during the hair drying process through blow drying, electric iron, and electric setting machine, etc. The moisture contents of hair is 10-15%, yet when it is heated, the moisture evaporates and the hair becomes dry and rough. Furthermore, when the heat of 130-150 °C is applied to the hair, bubbles begin to form in the cortex and medulla, and the hair loses elasticity, while it expands and causes the protein denaturalization, which cannot be restored to its original conditions.

Damage caused by poor cut : Hair may be damaged due to the cross section of the hair being cut diagonally with poorly cutting scissors, inexperienced cuts, or laser cuts.

5.2. Factors of chemical damage

When such oxidizing agents as hydrogen peroxide or urea peroxide used for hair bleaching or dyeing act strongly on the hair, they cut not only the side chain bonds but also the main chain bonds, thereby causing the hair damages to an even more severe extent.

The reducing agent contains 6% of thioglycolic acid, and ammonia is used as an alkali agent to increase the pH. As the pH increases, the extent of swelling of the hair increases, and if and where the pH exceeds 9.0, the extent of swelling of the hair would rise rapidly, and the hair would be damaged. Ammonia is volatile, and hence, there is little hair damage without residue. Hence, it is good for hair health to wash well with an exclusively dedicated acid shampoo to ensure that alkali does not remain after perming or dyeing, then use an acid rinse or treatment to neutralize the alkali and remove it for the better health of hair.

Many hair cosmetics including hair tonics, sprays, and set lotions contain alcohol. When the concentration of alcohol exceeds 50%, the protein forming the hair undergoes a dehydration reaction, which further causes a hydrocoagulation reaction, thereby denaturalizing the hair. Since such protein denaturalization is non-flammable, the hair would not return to its original conditions.

5.3. Factors of physiological damage

First, the imbalance of hormones and excessive secretion of androgens promotes the activities of the sebaceous glands, making the scalp seborrheic, and the decrease in thyroid function and oral contraceptives also cause hair damages.

Second, the environmentally damaged hair is chemically damaged by such substances as sulfuric acid compounds and nitrogen compounds contained in the combustion gases of factories and exhaust gases of the automobiles. Even if the hair is directly exposed to the infrared or ultraviolet rays, it causes the keratin's denaturalization.

Third, the abnormalities of the scalp oily scalp, dry scalp, and scalp sclerosis, scalp is not developed, and if the scalp is tense and the blood circulation of the scalp deteriorates, the nutrients would not reach the hair roots, and hence, growth stops and the hair falls out.

Fourth, if and when the protein is insufficient due to a severely imbalanced eating habit and weight loss, the hair color would become pale brown, and the hair growth and function are weakened and easily affected by various damages. A balanced intake of protein (soybean, anchovies, milk, meat, and egg, etc.) containing the amino acids which influence hair and vitamins A and D to maintain the skin and hair healthy and prevent dandruff and hair loss is needed.

Fifth, if the stress is quite severe, the blood vessels constrict due to the stimulation of the sympathetic nerve, and the blood circulation is disturbed. When the blood circulation to the head is impaired, the supply of nutrients to the hair will not be smooth, further leading to the decreased hair growth, weakened hair, and the hair loss.

Sixth, the extent of damages may be determined by analyzing the changes in the amount of amino acids in hair, which is approximately 20 kinds of changes in the structure of amino acids. As the extent of damages increases, the amount of cystine, which is the most contained, decreases, and the amount of cysteic acid increases.

6. Protection of the Damaged Hair

The oil film formation of the epidermis helps to prevent damages by reducing friction on the epidermis by using the hair oil and hair conditioner, and prevents damage by forming a resin film on the epidermis and wrapping the epidermis with a resin film such as a set of lotion or hairspray.

Furthermore, by supplying the amino acids and polypeptides, which are components similar to the polypeptides, the moisturizing effect would be enhanced and the hair would be reinforced from the inside by combining the active groups between the active groups of polymerized polymers of polymers in the hair and hair keratin.

7. Results

This study has examined the changes in hair following the oxidation potential solution treatment with shampoo and clinic, and the results of the study are as illustrated in <Table 1>.

Table 1. Changes in the hair following the oxidation potential solution treatment with shampoo and clinic.

| | | Before experiment | After experiment |
|--------------------|---|---|--|
| Experimental group | 1 |  |  |

| | | | |
|---------------|---|---|--|
| | 2 |  |  |
| | 3 |  |  |
| | 4 |  |  |
| | 5 |  |  |
| Control group | 6 |  |  |

First, all 6 samples were immersed in the reduction potential solution (pH 11) for 30 minutes, then the hair was cleaned using L's weakly acidic shampoo (pH 5.5). While the reduction potential solution was pH 11, no further hair sagging or damage was apparent nor observed. This is because when hair is treated with an alkaline solution, the weight of the hair would be reduced, and the more severe the damages are to the epidermis, the greater the reduction would be because the polypeptide of the cortex, which is the inside of the hair, is dissolved in the alkaline solution and flows out, which was not consistent with the study of Seonmi Park, who reported that it becomes unstable, and swells and softens.

Second, the first cleaned hair was treated with Company D's treatment and left for 30 minutes, then the control group was rinsed with tap water and the experimental group was rinsed with oxidation potential solution. The results are as follows. The control group had more tangled hair than before the experiment although the treatment was performed at the clinic, thereby making it difficult to comb, and even after combing, the hair was sizzling. As for the hair of the experimental group, which was rinsed with oxidation potential solution, the tangled hair was easily loosened by combing, and the hair texture was changed to shiny and glossy.

This is considered to be because the hair epidermis is condensed due to the hair contraction action against the acid, and the epidermis layer becomes hard and closes the epidermis, which is not consistent with the study of Seonmi Park who claimed that the hair would be damaged in the strong acidity. As such, as for the oxidation potential solution (pH 2.6/pH 11, ORP-750-1100), the isoelectric point work which strongly pulls the alkalized hair down to the isoelectric point by perm, dyeing, and continuous use of alkaline shampoo, chelating work which complex ionizes and removes chemicals and heavy metals which are not removed even after shampooing, and sterilizes, shrinks, and repairs damaged hair, and the astringent action may be applied without damaging the hair, respectively.

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9. Appendix

9.1. Authors contribution

| | Initial name | Contribution |
|--------|-----------------|--|
| Author | YL | <ul style="list-style-type: none">-Set of concepts <input checked="" type="checkbox"/>-Design <input checked="" type="checkbox"/>-Getting results <input checked="" type="checkbox"/>-Analysis <input checked="" type="checkbox"/>-Make a significant contribution to collection <input checked="" type="checkbox"/>-Final approval of the paper <input checked="" type="checkbox"/>-Corresponding <input checked="" type="checkbox"/>-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 Critical Review of the Act on the Prohibition of Discrimination against Persons with Disabilities for the PROTECTION and Realization of the Right to Equality of Persons

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Abstract

Purpose: This study prohibits discrimination against the disabled and, in order to correct it, based on the grand principle of guaranteeing the equal rights of the disabled and prohibiting discrimination, Revision of the Constitution for the substantial realization of equal rights in the direction of realizing practical equality, demand for protection and treatment in consideration of the obstacles to mandatory provision of legitimate convenience, It is required to prohibit discrimination against non-compliance, strengthen support for vocational competency development, prohibit direct/indirect discrimination, and protect basic living rights. Therefore, the purpose is to solve this problem

Method: Based on the existing prior thesis, it is an attempt to compare and analyze the current law, previous studies, and foreign legislative cases, and to implement a new Act on the Prohibition of Discrimination against Persons with Disabilities.

Results: The issues and improvement measures of the current Act on the Prohibition of Discrimination against Persons with Disabilities in Korea for the realization of equal rights for persons with disabilities were presented in three specific results. First, Amendment of the disabled related policy as the provisions for the basic principles in the constitution. Second, specific regulations on guaranteeing the right to equality of the disabled and prohibiting discrimination against disability Third, it is a right regulation for guaranteeing human life and social equality of the disabled.

Conclusion: This study proposed alternatives to protecting the disabled and prohibiting discrimination against the disabled in the lack of legislation related to the prohibition of discrimination against the disabled and revising the Constitution to realize the right to equality for the disabled.

[Keywords] Disabled Discrimination Prohibition Act, Discrimination Against the Disabled, Practical Right to Equality, Basic Rights, Lack of Legislation

1. Introduction

The discrimination against the disabled is in progress. The state(government) has enacted and implemented anti-discrimination related elements in order to improve the social structure where discriminatory acts are prevalent, and while the Act on the Prohibition of Discrimination Against Persons with Disabilities, Remedy Against Infringement Of Their Rights, Etc.(hereinafter, "the Disabled Discrimination Prohibition Act"), which may be said to have consolidated the fact that the disabled can enjoy basic rights as humans, was enacted and has been enforced for 14 years, disability continues to exist as a synonym for discrimination, and the disabled are in the blind spot of equality[1][2].

The results of the National Human Rights Commission's public perception survey or the survey results which responded that the disabled have experienced discrimination in various surveys prove such, and according to the data of the disabled related fact finding survey, which

investigated the experience of discrimination in 2014, the experience of discrimination accounted for 47.1%, which is almost half, 35.8% experienced discrimination related to employment, 27.0% experienced discrimination related to school related admission, and 45.3% in terms of insurance contracts, demonstrating that the discriminatory situation in society as a whole is serious(Korea Institute for Health and Social Affairs, 2015). This proves the fact that the discrimination against the disabled is widespread across our society and compels us to recognize that the prohibition of discrimination for the realization of an equal society is a serious task.

Accordingly, other measures are required to realize the substantial equality and achieve the task of prohibiting the discrimination against disabilities, including the need to amend the relevant laws and regulations in parallel with the education to improve the social awareness for the prohibition of discrimination. In order to prohibit the discrimination against the disabled and correct it the constitutional amendment for the practical realization of the right to equality, mandatory provision of reasonable accommodations, demand for the treatment in consideration of disability, prohibition of non-performance discrimination, reinforcement of support for vocational competency development, prohibition of direct and indirect discrimination, and basic livelihood related rights(guarantee of welfare) are required[3][4].

The obligation to provide reasonable accommodations plays a particularly important role across all areas of life for resolving various barriers which cause disability, and it may be said that it is necessary to approach the content realization of the specific basic rights related guarantee, such as by clarifying that the disabled are the subject of the rights' guarantee, rather than social welfare(protection) in kind at the national level in terms of social life[5].

A change in perception does not translate into a change in behavior. The proposal of the constitutional amendment theory of the amendment of the Disabled Discrimination Prohibition Act, which includes the strengthened punishment for discriminatory acts, seeks to overcome the limitations of ambiguous interpretation in the text of the constitution and establish a basic provision to materialize the guarantee of equal rights for the disabled. Considering the specificities of the prohibition of discrimination against the disabled, it is necessary to apply and newly establish specific regulations such as guaranteeing equal rights in order to realize the basic rights of the people, and propose a plan to reorganize the rules for the human rights of the disabled.

2. Meaning of Equal Rights : Key Details of the Disabled Discrimination Prohibition Act

2.1. Definition and function of the equal rights

The norm of equality is the aim of the constitution, which is specified as a core basic principle of the constitution. Since the meaning of the equal rights is clearly defined in the constitution, it means that it is not a right that the people can enjoy, but a super statutory rule of human dignity and realization of its value.

Ensuring equal opportunities for all people through the active realization of the equal rights brings about the real function of increasing the assimilation effect of the basic rights and social integration by allowing all people to fully participate in the social integration process[3]. As such, the equal rights do not consent to any arbitrary exercise of public power by the state which goes against the request for equal opportunities since 'equal opportunities' are the key.

2.2. Key details of the disabled discrimination prohibition act

(1) Concept of disability and the content of discrimination against the disabled.

Thirteen laws[6] including the Disabled Welfare Act, which provides for the foundation of Korea's disability policy and system, were enacted according to the separate needs, and the definition of disability is different. First, the disabled in the Disabled Welfare Act is defined as

'a person who is significantly restricted by physical and mental disabilities' in the daily life in society. The Disabled Discrimination Prohibition Act defines disability as 'a condition in which a person's social life is significantly restricted for a long period of time given the loss or impairment of mental or physical function,' and a person with such disability may be called the disabled. The International Human Rights Commission Act describes disability as a limitation caused by the mental, physical, and social origins, and hence, it is apparent that the Disabled Welfare Act above is more comprehensive than the Disabled Discrimination Prohibition Act. The United Nations Convention on the Rights of the Disabled does not limit the concept of disability to personal damages or functional limitations, yet demonstrates an extension of the perspective which claims on the need to understand disability according to the influence of society and environment. Disability is viewed as an evolving concept, and a 'person with long-term mental(intellectual) and physical function impairment,' which prevents participation in community from an equal point of start with others due to interactions with various barriers, is defined as the disabled. The disabled is defined as 'a person with long-term mental(intellectual) and physical dysfunction' that prevents them from participating in community society from an equal starting point with others due to interaction with barriers. As it is apparent through the concept of various obstacles, the first task is to eliminate various barriers which are obstacles to ensuring equal opportunities and maintaining equal rights[7].

(2) Content of the prohibition of the discrimination against the disabled and the reasons of exceptions for the discrimination against the disabled.

Prohibiting the disability related discrimination means not infringing upon or excluding rights by virtue of disability. Our society has an environment formed and focused on people who are not restricted in their physical activities and who do not have difficulties with exercising their cognitive abilities. Such an social environment is created uniformly, and people are forced to meet the standards, and the basic human rights principle which should not be a factor of discrimination for any reason whatsoever has not been applied. That is, while rationally thinking that all humans have the right to live freely in pursuit of happiness, rather than changing the social environment in which they have to adapt to the standards, they blame the disabled for failing to meet the standards, etc., and hence, the barriers against the disabled across society are still high. Accordingly, as a condition for guaranteeing and realizing the innate dignity with which the disabled should fully enjoy as humans, Article 11 of the constitution first declares the right to be treated equally, and the Disabled Discrimination Prohibition Act explicitly embodies the equal rights.

The purpose of the Disabled Discrimination Prohibition Act is to "realize the rights to full social participation and equality by clearly specifying various forms of discrimination based on disability in all aspects of human life and effectively relieving the basic rights of the disabled." That is, it stipulates the right as an obligation under the current law to remove prejudice and charitable measures towards the disabled and strictly observe the prohibition of discriminatory acts. Compared with the existing legal provisions, the Act regulates the concept of disability and the disabled, grounds for discrimination, areas of prohibition of discrimination and types of discriminatory acts, and the human rights prohibition of discrimination against women with disabilities as key contents, while the guidelines for the disabled content and criteria for discrimination are presented. In addition to limiting the object to be discriminated against in detail only to the disabled, legal representatives(guardians and those holding parental rights), etc., those who help in terms of the disabled people's living area and discrimination relief, furthermore, guide dogs for the visually impaired and the disabled auxiliary(equipment) tools, direct or indirect discrimination against the expansion of essential services for daily life and refusal to provide reasonable accommodations("Even if the superficial standards are fairly applied, it is considered discrimination if it has adverse effects on a specific individual or group - Article 3 Paragraph 1 Subparagraph 2), and the essence may be found in the fact that the scope and target of

application are expanding, such as discrimination, linked discrimination(discrimination of refusal of fair accommodations - inclusiveness of discrimination against disability), and the discrimination using advertisements(personal and material means)[8].

In Chapter 2 “Prohibition of Discrimination” Section 1 “Employment” of the same Act, Article 10 “Prohibition of Discrimination” of the Disabled Discrimination Prohibition Act, Article 11 “Obligation to Provide Reasonable Convenience” and Article 12 “Prohibition of Medical Examination” of the same Act are stipulated. This is interpreted to be able to play a role in preventing recruitment and refusal of employment due to the presumption of past health conditions or disability, or a medical history of disability. Furthermore, Article 2 Paragraph 4 of the Trade Union Act stipulates that the union cannot reject the disabled workers from joining the union or impose discriminatory rules such as restrictions on the labor and activity rights of union members. Taking a step further, apart from the support of the state and local governments, the active(proactive) and legitimate provision of convenient facilities by employers is to further increase the working motivation and productive capacity of the disabled through securing(improving) the effectiveness of the employment environment, as they such are determined to be the necessary means(contents of action).

Meanwhile, despite the enactment and enforcement of the above Disabled Discrimination Prohibition Act, such as Article 4 Paragraphs 3 and 4 of the same Act, there is a provision to confirm the grounds for exclusion of discrimination against disabilities, and the controversy continues over the effectiveness of the law due to problems caused by the inherent limitations of the Act. The main content of the amendment, which is evaluated as an extremely passive and passive revision, is a measure intended to protect the human rights of people who have difficulty in communication in 2012, and was amendment to ensure that temporary measures(assistance) can be taken after confirming communication disorders(deafness) and the details of help are announced in real life. In the cases where the assistance of the disabled's attorney(consignee, translator, and interpreter, etc.) is required in the legal protection procedures, it was amended so that the right to assist is strengthened and the court can check whether there is a communication disorder.

3. Limitations of the Disabled Discrimination Prohibition Act for the Realization of Equal Rights for the Disabled

3.1. Issue raised(securing of effectiveness for the equal rights for the disabled)

The Disabled Discrimination Prohibition Act, which was reorganized as a part of the legal measures to prevent the discrimination against the disabled in daily life, prohibit discriminatory acts, and obtain ex post relief from unfair discriminatory damage by appropriate(law) procedural methods, is a just guarantee of rights and interests[9]. An issue is raised such that there are inadequate aspects in terms of quality of life improvement and self-actualization, and electronic information equivalent to non-the disabled includes appropriate anti-discrimination methods corresponding to various types of disability, convenience in communication, and equality of goods(services), etc., and hence, ensuring accessibility is not sufficiently regulated. Furthermore, given the lack of legal and institutional supplementary provisions for the discrimination against the disabled, there is an issue with the difficult social structural limitations of effective sanctions against the discrimination against the disabled[3][10][11][12].

Hence, by presenting the constitutional basis as the realization of the right to equality in the life field as the prohibition of discrimination against disabilities and the realization of the value of human dignity, the laws which conflict with the contents of the Disabled Discrimination Prohibition Act are reviewed to improve and supplement the legislative deficiencies, and the policy-making process of the disabled person will be necessary, further to creating an atmosphere of social cohesion through participation. Hence, in order to guarantee(realization) the equal right

of the disabled, it is urgently necessary to review and supplement the amended legislation related to the discrimination against the disabled.

3.2. Limitations of the disabled discrimination prohibition act

The Disabled Discrimination Prohibition Act has significant implications in that it was enacted as a solidarity of the civic organizations and leading legislative activities led by the disabled parties in the legislative process, while providing an opportunity to establish itself as a subject of rights. Since the enactment of the Act, by breaking down large barriers to employment in our society, the awareness of rights has improved across all fields by guaranteeing the disabled's choice and decision making related rights, which is the basis for self-reliance. Universal rights such as the active participation in social activities and securing equal rights, equality of opportunity, genuine equality with non-the disabled in employment and work, equal educational opportunities according to ability[13], and provision and request for access and convenience of movement has received good evaluations for the formation of awareness of the necessity of receiving it, and for the improvement of self-reliance, the change and improvement of social perception about the disabled diet and prohibition of discrimination. However, despite the continuous opinions and efforts to implement the definition of disability, the need for the existence of an independent discriminatory corrective organization, the need for practical rights remedies, and non-compulsory provisions of the law, no specific amendments have been made since the enforcement of the Act, and there are many concerns and limitations regarding the reduction of discrimination experienced by the disabled.

Accordingly, the following issue are raised concerning the effectiveness of the Disabled Discrimination Prohibition Act.[14] First, it is necessary to re-establish the definition of disability in the Act. It is necessary to mention the various barriers which cause disability, such as the definition of disability in the UN Convention on the Rights of the Disabled. Second, among the main characteristics of the Disabled Discrimination Prohibition Act, unlike other anti-discrimination laws, the disabled with disabilities are limited to the subject of protection. This means that in order to be protected from social discrimination, the legal concept of disability must be met, yet the definition of the concept of disability and the disabled follows the “disability” provisions of Article 2 Paragraph 1 of the same Act and the definition of “the disabled” of Paragraph 2 of the same Act[14]. Accordingly, in order to be recognized as the disabled as stipulated under the Act, it is a significant obstacle(interference) to fully participate in work life on an equal footing with non-disabled workers due to mental(psychological) or physical damage(impairment) or functional loss, which should be possible to confirm, and furthermore, it will be required to be in a state of limitation(constraint) for a ‘long-term.’ Hence, a disability condition which results in a short-term or temporary constraint will not be allowed. Third, while specifying the definition of disability and the disabled under the Disabled Discrimination Prohibition Act, it does not distinguish between the congenital and acquired disabilities, that is, the time of occurrence of disability, yet it is difficult to quantify the period in the ‘long term,’ ‘significant restrictions,’ and ‘full participation,’ and in order to apply the same law, a specific interpretation is required because the extent of completeness and considerable degree of ambiguity is also ambiguous[8][15][16] Fourth, it is unclear about the punishment provisions for the discriminatory acts.

4. Issues of the Disabled Discrimination Prohibition Act and the Plans for Improvement

Currently, the core of the discussion(issue) regarding the guarantee of equal rights for the disabled is the constitutional position of equal rights for the disabled, misunderstanding of ambiguous interpretation, interpretation of the individual laws of the systemic prohibition of discrimination against the disabled, and the explicit identification of the disabled, and the main

interest was whether it was reasonable in terms of the improvement points and regulation system introduced, and whether it was appropriate to pursue full disability related policy participation and guarantee of opportunities as the realization of the disabled basic rights (personal rights subject). There were cases where the prohibition of discrimination against the disabled was explicitly stipulated and implied in constitutional cases such as those in Sweden, a northern European country, Germany, and Switzerland, and in positive laws. In particular, in Article 8 Paragraph 2 of the Swiss Constitution, the basis for the prohibition of discrimination against disability was presented substantively. In particular, it is apparent that the structural measures for the prohibition of discrimination are realistically provided as the basic provisions in the constitutional regulations by clearly and concretely specifying and interpreting the problematic parts. The German Federal Constitutional Court has strictly stipulated the examination criteria for the prohibition of arbitrary interpretation (violation of the principle of equality) from the beginning [17]. This principle is such that it prohibits any act of arbitrarily acknowledging differences in fundamentally identical things or treating them unfairly or arbitrarily as equal or equal to essential differences. Accordingly, we, too, may propose a constitutional amendment faithful to the basic principles of the constitution as a concrete and effective improvement plan to guarantee the equal rights for the disabled.

4.1. Amendment of the disabled related policy as the provisions for the basic principles in the constitution

The most basic proposition which perpetuates the human history is equality, and in the modern constitutionalist constitution, the principle of equality is declared as the highest principle in the constitution. As such, the efforts to realize the right to equality have continued since human life began, and it has been established as a basic responsibility and task for the nation and society. It may be said that substantive equality was further strengthened by establishing the disabled as basic rights with constitutional value, such as the disabled, to guarantee the right to livelihood and political participation to live like human beings [18]. Due to the specificities and disadvantage of disability, it is necessary to take special consideration into the judgment structure of laws and institutions against discrimination and the guarantee and realization of the right to equality. Hence, the above special treatment may be justified in that it is necessary to materialize the clear position of the constitution by setting the basic provisions (principles). Furthermore, by reflecting the standards of general and institutional disability of the international community in the basic provisions for the disabled, including physical, mental, emotional (psychological), and sensory disabilities, the disability caused by various social structural barriers and restrictions, and in terms of the social integration, we need to protect the obstacles caused by irrationality and regulate the guarantee of rights. By reflecting the paradigm shift of the recent times in the disabled policy, it is necessary to include the basic contents of enjoying cultural rights, realizing the right to access information, and guaranteeing the right for self-determination.

4.2. Specific provisions on the guarantee of equal rights for the disabled and the prohibition of discrimination against disabilities

As the first step of the concrete regulations to guarantee the equal rights for the disabled and ensure the effectiveness of the prohibition of discrimination against disabilities, it is necessary to include a disability indicator in the individual prohibition of discrimination regulations. Furthermore, in consideration of the specificities of disability related discrimination, it is desirable to eliminate negative values to be implemented in the community and society due to controversies (prohibition of discrimination) and directly stipulate the realization of the right to equality under practical terms. The prohibition of direct or indirect discrimination on the basis of disability in the provision of guaranteeing equal rights for the disabled, prohibition of unfavorable discrimination against minorities, provision of equal opportunity with non-the disabled, abolition of discrimination in non-fulfillment of convenience, and realization of substantive

equality of the disabled are necessary to prepare a realistic device as a constitutional basis for the elimination of discrimination by specifying the state's responsibility for the active-active equality realization measures towards this end.

4.3. Regulations on the rights of the disabled for leading humane life and ensuring social equality

In the modern society, the principle of equality is an organism which is widely operative and applicable not only for the relationship between individuals but also between the state and individuals. For instance, the principle of equality ought to be applied across all sectors of employment and work throughout all sectors without exceptions. In Korea, a legal system related to the structure for realizing equality of opportunity is also implemented, and under the National and Local Public Officials Act, and as stipulated by the Presidential Decree, the disabled and women, etc., which are minority groups in public offices, based on gender equality or actively preferential treatment and hiring for the disabled are carried out under various and practical policies, and the disabled recommendation subsidy system(Article 26-2 of the Political Fund Act) is being implemented. In this regard, Article 34 Paragraph 5 of the constitution, which is the currently disability related article, may be amended, while the national guarantee for the disabled's right under Article 34 Paragraph 1 of the Constitution, the right to welfare and rights and interests to meet various needs, and in terms of the judicial relationship, it is necessary to stipulate the active equality realization measures of the disabled and the guarantee of equal rights(validation of ambassadors) in line with reality. It is necessary to remove mental prejudice and restrictions across all areas of exercising rights as a community member regardless of living ability as much as ensuring the living ability of the disabled. Considering the reality of the disabled, which is placed in the blind spot of the law, it is imperative to confirm the rights guaranteed by the constitution and to protect the entire life area of the disabled[13]. Furthermore, as it is clear that there is a flaw in the current constitution as a separate grounding clause, it is necessary to replace "person with a physical disability" with an appropriate expression. On top of interpreting only the disabled with weak ability for daily life as an object of protection, it would be reasonable to interpret it as a constitutional basis as the state's duty to protect the currently disabled or receiving political and economic marginalization(restriction) due to disability.

5. Words of Closing(Conclusion) and Legislative Proposal

1. Since the realization of the equal rights is an essential and basic right of the people, it ought to be the responsibility of the state to make efforts to realize substantive equality of the people. It is also a basic rule that the legislator when enacting laws, the executive branch when enforcing laws, and the judiciary must keep in mind when resolving legal disputes. In particular, in order to realize the equality principle guaranteed by the constitution of the disabled, the state must upgrade and promote the legal system on a phased in basis so that legal values will be realized upwards within the realm of individual ability(allowance) according to rational and objectively specified standards In particular, the discrimination based on prejudice against the minorities ought to be more actively corrected and protected as minorities[19].

Article 11 Paragraph 1 of the constitution directly states the comparative standard of prohibition of discrimination which cannot be justified by anything. Historically, it is self evident that the discrimination based on gender, discrimination based on religion, and oppressive and discriminatory treatment based on social status have been practiced in our community, and in the recent formation of a new constitutional system, it was stipulated under the recognition that it was necessary to exclude the acts of discrimination due to the reasons laid out in the above.

Based on the Disabled Discrimination Prohibition Act, and despite the laws related to equal rights for the disabled and the actual provision of protection, fair treatment and remedies for

the disabled under the constitution, the high barriers to the discrimination against disabilities in reality are still not easily removed, and the existing evils are not easily removed, further causing heavy tasks(issues) which the community needs to address and improve. Hence, as a countermeasure, efforts are made to discover and articulate the cause and find an amicable solution from various angles, such as lowering the socio-cultural threshold, changing the social perception of the disabled, and preparing measures to improve the legal system. However, by revealing the specificities of disability discrimination, that is, the fact that the guarantee of the equal right of opportunity will work only after the completion of legal and institutional supplementation which lowers the threshold of various barriers and starting lines in the social structure, the social structural causes of disability discrimination can be fundamentally identified, thereby understanding and proposing appropriate and amicable solutions thereto[20].

Under Article 34 Paragraph 5 of the Constitution, it is noted that it is inappropriate to use the term in the legal system to specify a “person with a physical disability” as a person with no ability to carry out daily life in the welfare protection regulations, and there are various differences in the interpretation of this expression, and by locating 'disability' with a disability in the same context with old age and disease, there is a room for the reinterpretation in the structure of the condolences, and in understanding the disabled, social misunderstanding(prejudice) and the problem of basic welfare security are distorted, creating a limit to community awareness, which in effect limits the basic rights of the disabled to the disabled welfare dimension, and hence, exposes the problem that it is not appropriate for the pursuit of full and active participation and effective equality guarantee as the realization of the disabled basic rights[21][22]. This study reaches its conclusions by presenting such issues and their plans of improvement.

First, considering the specificities of disability discrimination is required. As well as the explicit direct discrimination, the welfare policy approach is important in that the responsibilities of advanced countries in terms of the provision of fair convenience and practical equality of opportunity, guarantee of equal rights among basic rights, and the welfare state are important compared to the non-disabled.

Second, there is no mention in the current constitution concerning the provisions on the prohibition of discrimination against the disabled and the explicit provisions of measures for the realization of equal rights for the disabled. Given such a lack of legislation, the disabled's human rights to live(the right to actively demand the state, and the right to culture, etc.) are seriously infringed upon. The constitution must regulate the prohibition of discrimination by absorbing the unique characteristics of disability discrimination in each individual legal system of disability discrimination[23][24]. Furthermore, it should act as a basis for interpretation and protection content. Meanwhile only the term “physically disabled person” is regulated. Its interpretation is delegated to the general provisions of the Constitution, and hence, the legislative power is not spared in the functioning of the state. It is considered that it is urgent to prepare the countermeasures against the lack of legislation and constitutional flaws.

2. In addition to the two discussions conducted above, this researcher asks what is the human right to carry out daily life. When the basic rights(welfare and welfare dimensions) are guaranteed for the disabled's daily life as well as social life in general, the guarantee of the disabled's equal rights and the remedy for the infringement of the equal right may be realized even more effectively and clearly. was newly established independently, and discrimination against the disabled prohibited matters and behaviors were organized by type and reflected in the draft. Hence, as a legislative method for overcoming the formal limitations of the constitutional text and guaranteeing the rights of the disabled, a basic provision may be independently newly established in the constitution of the supreme court, and the prohibited matters and actions of discrimination against the disabled may be organized by type and reflected in the draft. Furthermore, I would like to recommend the legislative preparation according to the in-depth reflection of the legislators so that the establishment of specific regulations for the realization of equal rights for the disabled and the preparation of a legal system which can comfort the weary minds of the disabled may be accomplished much sooner.

3. Lastly, in the past, only the direct act of infringement of the equal rights were considered as the subject of consideration, yet in the age of artificial intelligence following the development of advanced science and technologies today[25], the types of infringement are also complex and evolving across complex and diverse behaviors. Just as the concept of disability evolves, step may be taken forward in entering into an advanced society only when various guarantees and appropriate remedies are followed to prevent and guarantee the infringement of equal rights in line with the changes in the society.

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7. Appendix

7.1. Authors contribution

| | Initial name | Contribution |
|--------|--------------|---|
| Author | JJ | -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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Impact of Career Path-Related Education on Learning Self and Career Efficacy: A Performance Analysis of Content-Related Vocational Education Considering Student PROTECTION

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Abstract

Purpose: This study seeks to examine whether the students who experience difficult vocational curricula can form a healthy vocational mindset and career efficacy based on teachers' support and career path-related counseling. Moreover, it aims to determine whether students undergoing the vocational education consignment course do, in fact, take up a related career.

Method: A total of 624 senior students participated at Ahyeon Industrial Information School. The questionnaire survey was conducted twice. A total of four questions regarding career path counseling were asked, to be scored on a 6-point scale; a total of six questions regarding teachers' support and another four regarding the learning self were asked, both scored on a 5-point scale; and four questions were asked about career efficacy, to be scored on a 4-point scale.

Results: According to the results of the statistical model based on the social cognitive theory, career path counseling and teachers' support, which correspond to environmental factors, seem to influence the formation of the learning self. The teachers' support and career path-related counseling influenced career efficacy; however, when the learning self question was added, the relevant effect was not directly demonstrated.

Conclusion: The career path-related counseling and teachers' support also had an effect on the formation of the learning self, and the learning self which was formed had a large effect on the development of career efficacy. Furthermore, career efficacy had a significant effect on career path maturity, mastery approach goal, and performance approach goal, suggesting that it is a powerful factor in helping students make their career path decisions. This study is expected to make a meaningful contribution to reminding them of the need for teachers' support and career path counseling to help improve students' learning self and career efficacy when designing game-related content vocational education programs.

[Keywords] Career Path-Related Education, Game-Related Content Vocational Education, Learning Self, Career Efficacy, Korean Secondary Students

1. Introduction

In the past, only two types of high school existed in the Republic of Korea, namely general humanities and vocational/professional; today, however, other types of secondary school have been created by high school diversification policies. This diversification has created special purpose high schools, such as science high schools, foreign language high schools, international high schools, and gifted high schools; autonomous public high schools and autonomous private high schools, which have autonomy over their school management and curricular organization; and specialized high schools, previously called vocational/professional schools, as well as master high schools which specialize in employment education. Unlike the special purpose high

schools, which have responded swiftly to the drive toward diversification, general humanities high schools have been relatively slow to do so, because they are geared only toward college and university entrance exams. Consequently, there has been an increase in the number of students in general humanities high schools who do not have a clear sense of purpose in terms of advancing to college or finding employment[1]. This phenomenon signifies that the identity of general humanities high schools has become unclear, unlike that of vocational high schools, as shown by the emergence of terms including “surplus of general high schools” and “decline of general high schools.” In particular, the largest problem for general humanities high school students is that they have no plans following graduation, because their only aim has been to move on to college[2]. The surplus of general humanities high schools has led to a situation in which their students do not go on to college or find employment after graduation[3].

Although, as noted above, students taking a humanities education aim to advance to a good college or university, some schools run job placement classes to help protect those students who fail to do so. This situation underlines the need for an active vocational education for general humanities high school students. Vocational education has a role to play in caring for those students who struggle to adapt to general high schools, while enabling them to discover their career path and develop appropriate skills. However, it is difficult to find teachers with expertise in vocational education, since general humanities high schools focus on academic subject competency. In order to address this real-life problem, the “vocational education consignment course” has been implemented, which offers a vocational curriculum in vocational schools established and operated by the Office of Education to those students in the third year of a general humanities high school who wish to find employment.

This study focuses on the situation whereby some students complete the vocational education consignment course, overcome the sense of defeat due to having been left behind in the regular course of the general humanities high school with which they are affiliated, and easily adapt to the unfamiliar vocational curriculum. Hence, this study seeks to examine whether the students who experience difficult vocational curricula can form a healthy vocational mindset and career efficacy based on teachers’ support and career path-related counseling. Moreover, it aims to determine whether students undergoing the vocational education consignment course do, in fact, take up a related career.

2. Research Background

2.1. Classification of high schools in the Republic of Korea

The curriculum of the Republic of Korea is divided into six years of elementary school education, three years of middle school education, and three years of high school education. Of these, the first six years of elementary school education and three years of middle school education are mandatory for all Korean citizens. After the mandatory curriculum, students generally choose a three-year high school education in line with their aptitude and academic environment[4][5][6]. As the previously binary classification of high schools has been subdivided, students who attend autonomous private high schools or specific purpose high schools go on to a good college or university, while those who attend specialized or meister high schools find employment immediately after graduating. Hence, the proportion of specific purpose high schools has increased, and the proportion of general humanities high schools which prepare their students only for college or university entrance has incrementally decreased.

2.2. Vocational education consignment course system

Among the students who would have previously advanced to a general humanities high school, it seems that those aiming to advance to a top-tier college or university now attend a special purpose or autonomous high school from the start, while those who want to find employment

after high school go to a specialized or meister high school. Unlike the other high schools, which have a purpose, the identity of a general humanities high school is not clear, and there is a growing number of students who do not have a clear sense of purpose about going to college or finding a job. The emergence of terms including “surplus of general high schools” and “decline of general high schools” reflects this situation. The largest problem for general high school students is that they have no plans after graduation. Such a surplus of general high schools leads to a state where students neither go on to higher education nor find a job after graduating. In order to save such general high school students, the need for active vocational education has been emphasized. Vocational education ought to have the function of looking after those students who struggled to adapt in general humanities high schools, while enabling them to discover career paths and develop appropriate skills. Accordingly, the “vocational education consignment course” was developed, whereby general high school students who do not advance to higher education and who desire to undergo vocational education to find employment are consigned to a vocational school established and operated by the Office of Education to complete a vocational curriculum.

The vocational education consignment course system is aimed at seniors attending general high schools. However, some consignment institutions of the Office of Education of the City of Seoul have expanded to operate the vocational education consignment course for juniors since the 2016 academic year. Students who apply for the vocational education consignment course attend the high school at which they are registered every Monday and complete 12 units of education per year. At the same time, they attend the vocational education consignment institution from Tuesday until Friday to undergo the vocational education. Hence, after changing their career path to the vocational education consignment course, they spend more time at the consignment institution and undergo a vocational training-centric education, which is significantly different from the school curriculum they learned until their junior year.

The vocational education consignment course is intended for students who entered a general high school with the goal of going on to study at a college or university, yet wish to find employment when they leave school and have a new awareness of their career path. Furthermore, the course’s goal is to help students who are unable to adapt to their studies at general high schools find a career which aligns with their talents and develops them into professionals who can fit well into society. There are industrial information schools, public vocational training institutions, and designated vocational training institutions as well as vocational and technical institutions implementing the vocational education consignment course. Of these, Ahyeon Industrial Information School, located in Seoul, is an industrial information school which teaches vocational education to students attending general high schools in Seoul. Approximately 800 students are enrolled across 15 departments in total, such as practical music, photography, broadcasting, and baking. In particular, the field of content-related career education is divided into K-POP-related departments, dance and practical music rebound, cartoon animation, visual content, and game production, all of which have operated successfully.

2.3. Career efficacy and social cognitive career path theory

Career efficacy is a measure of the extent of confidence that an individual can successfully complete a task required when deciding on a career path with self-directed beliefs[7]. The higher the career efficacy, the more confident they will be in making decisions and taking actions, and the more active they are in implementing their work[8]. Furthermore, career efficacy is known to be a very useful concept for evaluating and facilitating the career path development process throughout life, since it helps to strengthen a person’s motivation by positively evaluating their future and, consequently, positively influences other variables related to career path development[9][10][11].

To understand how career efficacy contributes to actual career path-related decision making, it is necessary to examine social cognitive career theory. Traditionally, career path development and career path decision making have been viewed as a result of the interaction between an

individual's innate disposition and the environment. However, according to social cognitive career theory, environmental factors including attachment and social support influence the development of career efficacy and indirectly influence career path search behavior and career path decision making[12][13]. Social cognitive career theory first emphasized the role of cognitive aspects such as self-efficacy and result-related expectation; thereafter, it expanded toward explaining the process of career path development and decision making by including individual characteristics and career path development, as well as environmental variables, such as individual career path-related interests, career path choices, and career path performance.

Under social cognitive career theory, the dynamic subject of the career path development is the individual. To explain the theory, the concepts of "self-efficacy," "result expectation," and "personal goals" were introduced. The first phase of the social cognitive career theory model is the "learning area," in which self-efficacy and result expectation factors are formed. Environmental variables(social support, role models, economic leeway, career barriers, etc.) and personal variables(disposition, ethnicity, gender, race, health status, etc.) influence the self-efficacy and result expectation. In the second phase, "goal setting and performance" are carried out via the interaction between self-efficacy and result expectation. Self-efficacy is related to an individual's ability to think about whether they can do something[14][15]. In general, self-efficacy influences the result expectation, because people tend to think that they can achieve desirable results from the activities they think they can perform well. Result expectation is the expectation of the result of performing a particular behavior. Such an interaction directly influences individuals' interest in departments, career paths, career goal setting, and career path choice, through which they can determine the direction of their own career path behaviors[16][17].

2.4. Origin of career efficacy

2.4.1. Environmental factors

(1) Career path counseling

Career path counseling includes career path-related counseling, tests, lectures, and programs. It is also a measure of whether students have experience in career path counseling and how helpful such counseling has been for the students regarding their career path choice. The need for career path counseling is emphasized because today's job structure is more sophisticated and segmented than it used to be. According to the Korean Standard Occupational Classification, based on the International Labor Organization's International Standard Occupational Classification, the number of occupations stood at 1,300 in the 1970s but has increased to 12,000 in recent years. Some jobs have disappeared as times have changed, and new jobs have been created due to the increasing subdivision and specialization of roles. Amid such changes, each student is required to be able to understand their own abilities, aptitudes, and interests, form their own values, and determine their own future. In particular, these abilities can be acquired through education. Thus, schools need to provide a range of career path-related information in connection with students' current college entrance and career path choice through appropriate career path counseling, as well as help them with career planning and career path decision making[18]. If students' decision-making ability is increased, the possibility of their choosing an efficient and successful career path may also be increased as a result[19].

(2) Teachers' support

Teachers' support refers to teachers' social support for the students, including emotional, informational, instrumental, and evaluative support. It is a measure of the students' perception of the extent to which teachers care about them and will help them[20]. The reason that the social support of teachers is important for adolescents is related to the social environment in which this group lives. The social environment of adolescents is much more limited than that of

adults. While adults can engage in various social activities, adolescents' activities are limited to home and school. In particular, adolescents spend most of their time at school, and the role and behavior of teachers are very important since students observe and imitate teachers, who are thus the subject of social learning. Adolescents taking vocational courses turned out to have much higher levels of career path maturity, as they received positive evaluations of their abilities and behaviors from teachers, and the more they received emotional support from the teachers, the further their ability to adapt improved. It has been reported that teachers' support has had a positive effect not only on adolescents' academic achievement but also on their emotional and psychological problems, internal motivation, and self-esteem; moreover, it increases their sense of happiness at school[21]. Hence, the social support of teachers helps to increase the career efficacy of adolescents and thus plays an important role in forming career path maturity[22].

2.4.2. Identity: learning self

The concept of the learning self encompasses the ability, determination, effort, perseverance, and concentration required to continue learning activities while refusing or repelling the factors or behaviors which can interfere with or substitute for learning[23][24]. Alternatively, it is defined as the will or emotion to continue learning. The learning self can be said to be a key factor influencing adolescents' development, as it influences not only their academic achievement but also their overall self-concept[25][26][27]. The learning self is a perception formed via personal cognition and interaction with the environment, and it may also change when influenced by various factors over time. For instance, adolescents focus their attention and effort on their learning when they feel that they are being respected by teachers and others. When they feel rejected, on the other hand, they become distracted, and they stop making focused efforts and have a negative perception of themselves. That is, the concept of the learning self is formed in connection with school and learning as a perception of self-esteem for learning; consequently, it has a close relationship with learning activities. The lower the learning self, the higher the probability that a student will drop out of learning activities over time[25][27][28]. Elevating students' self-concept helps them make wise and rational career path choices and decisions.

2.5. Performance of career path education

2.5.1. Achievement goal orientation

The achievement goal means the ultimate goal pursued by the learner in the achievement situation or the reason the learner is learning. The learner's attitude, emotion, and level of achievement may vary in line with two sub goals(mastery goal and performance goal). The mastery goal focuses on the acquisition of knowledge and one's own development. Students who are oriented towards the mastery goal think that their abilities can be transformed and that they can improve sufficiently if they make the necessary effort[29]. Hence, research has shown that the mastery goal allows for a positive approach towards the possibility of improving one's ability and renders positive results for in-depth strategy, interest, positive emotion, and recognition of the value of the task[30]. In contrast, students who aim to achieve a performance goal have a fixed ability and think that it is important to stay ahead of others. Hence, students who think their abilities are high enjoy performing challenging tasks, while students who lack confidence in their abilities tend to give up if they experience difficulties when taking on a task. The two goals are known to influence an individual's criteria for determining success and failure. As regards students oriented towards the mastery goal, success and failure are determined according to the standards they themselves determine, whereas those oriented towards the performance goal determine success in terms of staying ahead of others.

In the early phase, in such a dichotomous approach, the performance goal was perceived to be relatively negative to the mastery approach. However, as studies accumulated, these two sub goals were further subdivided. The concept of the performance goal has been consistently

expanded and has also been sub-classified into the performance approach goal, under which one aims to achieve a superior performance or demonstrate one's own abilities, and the performance avoidance goal, under which, conversely, one seeks to avoid underachieving and lacking abilities compared to others[31]. This subdivision was also applied to the mastery goal, which was classified into the mastery approach goal, under which one pursues learning and seeks to improve one's skills, and the mastery avoidance goal, under which one seeks to avoid failure in the learning process and a decline in one's abilities[32].

Under all four goal structures outlined above, most studies have verified that the goal of avoidance has a negative effect educationally[33]. Middle and high school students in high-performing groups turned out to have higher mastery and performance approach goals than middle and high school students in low-performing groups, and it was reported that the mastery approach goal, rather than the performance approach goal, was correlated with academic self-efficacy and academic achievement. One study reported that achievement results, such as academic performance and learning strategy, were higher in a group with high mastery approach and performance approach goals than in a group in which only one of these goals was high. Hence, it is evident that there is a positive correlation between academic self-efficacy and achievement goal orientation, and the two goals of achievement goal orientation, as well as performance approach goal and mastery approach goal, have a positive effect on academic self-efficacy.

2.5.2. Career path maturity

Career path maturity refers to the ability to make the right career choice based on an individual's knowledge of the extent of professional development and preparation required to realistically succeed. While the conceptual definition of career path maturity still varies across scholars, it can be regarded as the process of making appropriate choices and preparations for adaptation in tandem with exploration by understanding and wisely integrating one's own circumstances and environment. It can also be understood as a comprehensive concept regarding how well an individual completes and owns a sense of career path in the phase of development.

When measurements are taken with a focus on the results of career path choice, the components of career path maturity may be conceptualized as the following five dimensions: 1) extent of interest in career issues and efficiency of using data needed for the career path choice; 2) thoroughness of collecting information on the desired occupation and participation in career path planning; 3) consistency in the field and collection of occupations to be chosen; 4) maturity and categorization of interest via self-understanding, independence of career path issues, acceptance of responsibility for career path planning, and interest in the compensation of work; and 5) consistency between one's own abilities and interest[34].

Career path maturity refers to the incremental development of occupational knowledge, attitude, and skills, which undergo a series of phases just as the human body and mind develop. Adolescence may be seen to be affiliated with the provisional period (ages 11 through 17), where people begin to consider their interests, abilities, and values, and the realistic period (ages 18 through early adulthood), where realistic choices are made in consideration of personal and reality factors, etc. High school students fall within the period of exploration, among the five phases of career path development proposed by Super[35]. The high school years are also an important period for self-validation, performance of role, and occupational exploration via school life, leisure activities, and part-time work. The higher the extent of maturity, the better the preparations for career path choice, which will increase the probability of adapting to the next developmental phase, and the higher satisfaction will be for the major. Hence, it is important to enhance the career path maturity of students to ensure that they can explore their career path by considering their needs, abilities, and environmental factors during their adolescence.

3. Methodology

3.1. Participants

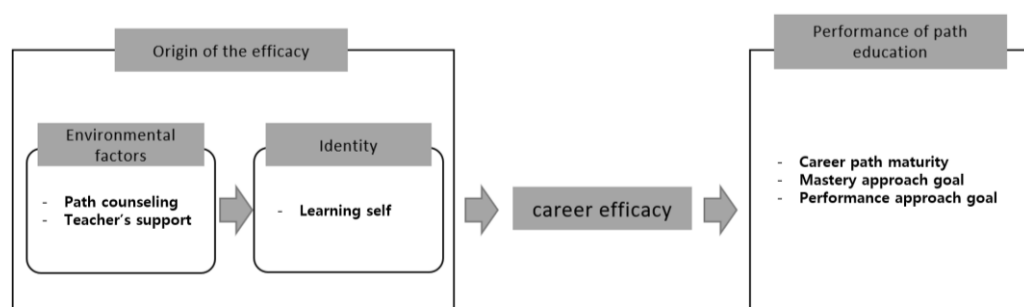
This study targeted seniors in the 2019 academic year who were completing their vocational education consignment course at Ahyeon Industrial Information School. A total of 624 senior students participated, and 325 were male and 299 were female students.

3.2. Research methods

3.2.1. Research model and the measurement tool

In this study, the longitudinal study of Korean education questionnaire, validated by the Korea Educational Development Institute, was used. Based on the social cognitive career theory model proposed by Solberg[13], a test paper was developed in line with the current research to measure the long-term impact of consignment education over one year. The purpose of the study was explained to the high school students selected for the study, and the questionnaire survey was conducted twice, namely in March and October 2019. A total of four questions regarding career path counseling were asked, to be scored on a 6-point scale; a total of six questions regarding teachers' support and another four regarding the learning self were asked, both scored on a 5-point scale; and four questions were asked about career efficacy, to be scored on a 4-point scale. The questionnaire survey's reliability(Cronbach's α) for this study was suitable as it met the threshold of 0.8.

Figure 1. The model of this study.



3.2.2. Processing of data

The data collected were analyzed by using the SPSS21 program in the following manner. First, to examine the demographic characteristics of the research subjects, the frequency and percentage were calculated. Thereafter, the Cronbach's α coefficient was calculated to validate the reliability of each measurement tool. Second, descriptive statistics were analyzed to understand the extent of the responses and examine changes over a year. These statistics were divided into the overall average of the respondents and average by department. Third, a correlation analysis was performed to examine the effect of teachers' support and career path-related counseling experience on the formation of the learning self. Fourth, a simple regression analysis was performed with the above scale as an independent variable and career efficacy as a dependent variable to examine the effects of the teachers' support, career path-related counseling experience, and learning self on career efficacy. Fifth, to examine the effect of the teachers' support, career path-related counseling experience, learning self, and career efficacy on achievement goal orientation and career path maturity, a regression analysis was performed with the above scales used as independent variables, and the achievement goal orientation and career path maturity as dependent variables. In each analysis, the significance probability(p-value) was determined to determine the statistical significance. A p value of less than 0.05($p < .05$) was taken to indicate a significant difference, while a p value of larger than 0.05($p > .05$) was taken to

indicate no significant difference. The significance probabilities are expressed as follows, according to their magnitude: * $p < .05$, ** $p < .01$, *** $p < .001$.

4. Research Results

4.1. Validation of the research model

According to the results of the statistical model based on the social cognitive theory <Figure 1>, The teachers' support and career path-related counseling influenced career efficacy <Table 1>; This seems to be the case since the teachers' support and career path counseling influence the learning self, and the learning self formed during this process has a high influence on the development of career efficacy. Large career efficacy is a key factor in the social cognitive theory, and it is also known that the larger the career efficacy, the more specific and confident one's career path decisions and actions will be <Table 2>.

Table 1. The result of analysis with career efficacy as a dependent variable.

| Dependent variable : career efficacy secondary | | n=624 | | | | |
|--|---|------------------------------|----------------|--------------------------|-------|--------------------------|
| Model | | Non-standardized coefficient | | Standardized coefficient | t | Significance probability |
| | | B | Standard error | Beta | | |
| 1 | (Constant) | 1.455 | .149 | | 9.736 | .000 |
| | Teachers' support_primary | .070 | .033 | .086 | 2.144 | .032 |
| | Teachers' support_secondary | .248 | .030 | .332 | 8.323 | .000 |
| | Career path related counseling experience_primary | -.015 | .016 | -.036 | -.959 | .338 |
| | Career path related counseling experience_secondary | .065 | .019 | .132 | 3.424 | .001 |
| R ² | | .172 | | | | |
| Adjusted R ² | | .167 | | | | |
| Durbin-watson | | 1.849 | | | | |

Table 2. The result of analysis with career path maturity as a dependent variable.

| Dependent variable: career path maturity_secondary | | n=624 | | | | |
|--|---------------------------|------------------------------|----------------|--------------------------|-------|--------------------------|
| Model | | Non-standardized coefficient | | Standardized coefficient | t | Significance probability |
| | | B | Standard error | Beta | | |
| 1 | (Constant) | 1.407 | .223 | | 6.308 | .000 |
| | Career efficacy_primary | .191 | .066 | .120 | 2.892 | .004 |
| | Career efficacy_secondary | .377 | .068 | .247 | 5.520 | .000 |

| | | | | | | |
|--|---|-------|------|-------|--------|------|
| | Learning self_primary | -.069 | .050 | -.060 | -1.386 | .166 |
| | Learning self_secondary | .334 | .049 | .321 | 6.824 | .000 |
| | Teachers' support_primary | -.008 | .047 | -.007 | -.179 | .858 |
| | Teachers' support_secondary | .118 | .046 | .104 | 2.579 | .010 |
| | Career path related counseling experience_primary | .030 | .021 | .047 | 1.399 | .162 |
| | Career path related counseling experience_secondary | .038 | .026 | .050 | 1.460 | .145 |
| | R ² | .388 | | | | |
| | Adjusted R ² | .380 | | | | |
| | Durbin-watson | 1.906 | | | | |

The results of this study also suggest that career efficacy has a significant effect on career path maturity, mastery approach goal, and performance approach goal, and that it is a powerful factor in helping students make their career path decisions <Table 2>, <Table 3>, <Table 4>. Furthermore, this study indicates that the primary learning self and primary or secondary teachers' support have an additional effect on the career path maturity, mastery approach goal, and performance approach goal. This finding demonstrates that teachers' support and students' willingness to continue their learning activities on their own may also be reflected on career path decisions.

Table 3. The result of analysis with mastery approach goal as a dependent variable.

| Dependent variable: mastery approach goal_secondary | | n=609 | | | | |
|---|---|------------------------------|----------------|--------------------------|--------|--------------------------|
| Model | | Non-standardized coefficient | | Standardized coefficient | t | Significance probability |
| | | B | Standard error | Beta | | |
| 1 | (Constant) | 1.470 | .121 | | 12.164 | .000 |
| | Career efficacy_primary | .002 | .036 | .002 | .053 | .958 |
| | Career efficacy_secondary | .229 | .037 | .266 | 6.198 | .000 |
| | learning self_primary | -.007 | .027 | -.011 | -.267 | .789 |
| | Learning self_secondary | .244 | .027 | .412 | 9.181 | .000 |
| | Teachers' support_primary | -.039 | .025 | -.055 | -1.533 | .126 |
| | Teachers' support_secondary | .074 | .025 | .115 | 2.979 | .003 |
| | Career path related counseling experience_primary | -.007 | .011 | -.020 | -.633 | .527 |
| | Career path related counseling experience_secondary | .005 | .014 | .011 | .336 | .737 |

| | | |
|--|-------------------------|-------|
| | R ² | .440 |
| | Adjusted R ² | .433 |
| | Durbin-watson | 1.869 |

Table 4. The result of analysis with performance approach goal as a dependent variable.

| Dependent variable: performance approach goal_secondary | | n=609 | | | | |
|---|---|------------------------------|----------------|--------------------------|--------|--------------------------|
| Model | | Non-standardized coefficient | | Standardized coefficient | t | Significance probability |
| | | B | Standard error | Beta | | |
| 1 | (Constant) | 1.735 | .203 | | 8.541 | .000 |
| | Career efficacy_primary | .028 | .060 | .023 | .462 | .644 |
| | Career efficacy_secondary | .242 | .062 | .208 | 3.889 | .000 |
| | Learning self_primary | -.002 | .045 | -.003 | -.050 | .960 |
| | Learning self_secondary | .161 | .045 | .203 | 3.618 | .000 |
| | Teachers' support_primary | -.119 | .043 | -.124 | -2.788 | .005 |
| | Teachers' support_secondary | -.033 | .042 | -.038 | -.782 | .435 |
| | Career path related counseling experience_primary | .014 | .019 | .028 | .705 | .481 |
| | Career path related counseling experience_secondary | .015 | .023 | .027 | .658 | .511 |
| | R ² | .128 | | | | |
| | Adjusted R ² | .116 | | | | |
| | Durbin-watson | 1.748 | | | | |

Hence, in order to enhance students' learning self and career efficacy moving forward, it is necessary that 1) teachers perceive that they can provide support for the students to make career path decisions at the start of the semester, and that they need to start with a positive evaluation of the students' abilities; 2) during the semester, an educational program is conducted alongside the teacher's career path counseling to provide students with the necessary information and help them understand their individual abilities, aptitudes, and interests; 3) as students may face new problems after parental counseling during the semester and after mid-term exams, while receiving continuous teachers' support, they are provided with specific advice on the career path they have considered during the semester to ensure that they can receive practical help from the counseling.

5. Discussion and Educational Implications

This study sought to examine the job-seeking mindset of students undertaking Ahyeon High School's vocational education consignment program by validating a research model based on social cognitive theory. A questionnaire survey was conducted twice in one year for students undergoing Ahyeon High School's vocational education consignment program, after which a regression analysis was performed after classification, as per the social cognitive theory model. According to social cognitive theory, career path-related counseling and teachers' support, which are environmental factors, influence career efficacy through the learning self, which seeks to continue learning activities. People think that career efficacy is a measure of their confidence in success. In general, people believe that they can secure desirable results from the activities they think they can thrive in doing; hence, it is known that the higher the career efficacy, the more confidently they make career-related decisions and act accordingly.

In this study, the career path-related counseling and teachers' support also had an effect on the formation of the learning self, and the learning self which was formed had a large effect on the development of career efficacy. Furthermore, career efficacy had a significant effect on career path maturity, mastery approach goal, and performance approach goal, suggesting that it is a powerful factor in helping students make their career path decisions. The fact that the learning self and career efficacy improved overall indicates that the students intended to continue their learning activities by advancing to Ahyeon High School, and that their confidence in terms of their career path achievement had been restored. However, since the performance and mastery approach goals and career path maturity did not increase as much as the students had improved, it seems that the students need to be provided with help in setting specific goals and career paths which are in line with their interests and abilities rather than abstract success.

The limitation of this study is that it was not able to compare the field of game-related content with the field of traditional function-related career paths. Follow-up studies should thoroughly examine what kind of environmental factors influence each functional and content field, such as cooking, gardening, beauty, art, and baking, improve the environment to derive positive results in career path education for the field of game-related content, and study the distinction of career path-related education in depth. Moreover, the results of this study suggest that it is necessary to study not only high school students but also college students majoring in game-related content. To form a foundation for the continuation of the relevant majors, more specific discussions of support at school level and from teachers should be pursued. This study has examined whether the students who chose game-related content as their career path, with a focus on the broadcasting and video class, cartoon animation class, and game production class, changed their career path maturity as a result of teachers' support. This study is expected to make a meaningful contribution to reminding them of the need for teachers' support and career path counseling to help improve students' learning self and career efficacy when designing game-related content vocational education programs.

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7. Appendix

7.1. Authors contribution

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

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The Effect of University Student's Perception of Rapport with Professors on Learning Participation and Satisfaction: Focused on Online Class in COVID-19

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Abstract

Purpose: The pandemic situation has caused a variety of changes in many areas. In the field of education, real communication of emotion with students has become an issue. The purpose of this study is to examine the causal effect of rapport between professors and students, learning participation and satisfaction in online class under COVID-19 pandemic situation.

Method: In order to conduct the research, the online survey was performed for two years university students in Seoul, and three hypotheses were proposed to identify the relationships among three variables such as rapport, participation and learning satisfaction. A total of 207 questionnaires were used for analysis. SPSS 21.0 was used to conduct analysis for hypothesis verification, and the demographic information of the sample was organized by frequency analysis. Also, exploratory factor analysis and reliability analysis were conducted to confirm the validity and reliability of each concept measurement item. Lastly, regression analysis was used to examine them.

Results: The results of analyses are follows. First, rapport influenced positively learning participation. Second, rapport influenced positively learning satisfaction. Third, learning participation influenced positively learning satisfaction. This result was found to be the same as that of previous studies about learning participation and learning satisfaction.

Conclusion: 'Although it is a study only for two-year college students in Seoul, it has been recognized that students' participation in learning is a major leading variable in improving learning satisfaction. In this study, building rapport between professors and students is an important factor to improve the quality of online class. Hence, professors should focus on how to build rapport effectively and universities should provide practical supports and programs to develop their skills to improve rapport level. It can have a positive effect on students' satisfaction with the university and their academic achievement in the long term.

[Keywords] Rapport, Learning Participation, Learning Satisfaction, Online Class, COVID-19

1. Introduction

The COVID-19 pandemic situation has brought about drastic changes in the university's educational environment and structure. Since 2020, offline classes at educational institutions have been converted to non-face-to-face classes using online classes. Professors and students suffered confusion and difficulties in the absence of a process to respond to sudden changes in the educational environment, educational systems, and support policies. Given the COVID-19 situation, the commencement of classes has been postponed and the operation of online classes has been decided[1]. Currently, most universities have been conducting classes through non-face-to-face online lectures for the fourth semester, and the online classes have been offered in the form of recorded lectures and live video lectures. However, there are complaints about the online classes[2], and the management of the quality of education has become an issue[3]. To improve the quality of education, learning participation and learning satisfaction are considered

to be important variables, and the higher satisfaction with online classes, the better learning effect[4]. Although many studies have been conducted to search methods to improve the students' learning satisfaction in online class environment[5][6], and as the point to be supplemented in the online class, the part which is commonly suggested is the interaction between the professor and the student. By expanding the scope of interactions such as question-and-answer, feedback, assignment of task, delivery and announcement, which have been suggested as the interactions with the professors in the previous studies[5], this study intends to focus on the rapport between the professor and the student, which promotes and motivates the learning participation, and which means closeness and psychological bonding in terms of the human relationship. Rapport means the close relationship and positive interaction formed in the communication process[7], and is also a topic which has been actively researched across various fields[8][9][10]. Hence, this study intends to apply the concept of rapport between the professor and the student in the online classes, and intends to emphasize the importance of the formation of rapport as a part to be considered by the professor in the online class in the future by identifying the influence of rapport between the professor and the student on the students' learning participation and learning satisfaction. That is, this study intends to provide useful data for the effective operation of the online class in the future, and present the guidelines to improve the quality of lectures to the professors and educational institutions based on the results of analyzing the effects of the rapport between the professor and the student on the learning participation and learning satisfaction in online class.

2. Theoretical Background

2.1. Rapport

Rapport has become a topic of research across various fields including medicine[11], psychology[12], education[13][14] and service[15]. Rapport generally means positive interaction[7], including the meaning of pleasurable interactions and personal bonding[8]. In the field of service, the formation of the rapport between service providers and customers is regarded as a major factor for the sustainable growth of a company. Many studies have been conducted in tourism[16], hotel[17], and airline[18], and has also been validated as an antecedent variable which has a positive effect on job performance and organizational effectiveness variables. Research on rapport has been conducted on a limited basis in the field of education. Rapport may also be understood as a psychological bond and friendly interaction between the professor and the student. The professors' positive emotional expression and authenticity have a positive effect on the formation of rapport, and the students feel reliability and satisfaction with professors as they perceive higher rapport level[19]. Jeong, Choi, and Lee(2016) emphasized on the importance of the professor's role in the student's learning performance in the e-learning classroom environment, and also emphasized on the need for the consensus formation and feedback with the students[20]. In the field of education which is the subject of this study, there is a lack of comparable previous studies on the formation of rapport, learning participation and satisfaction between the professor and the student, however, it has been confirmed that the high level of interaction between the professor and the student improves the learning performance[21]. Therefore, the results that the rapport between service providers and customers has a positive effect on the behavioral intention of customers make it possible to predict that the rapport between the professor and the student in the learning environment will have a significant effect on the behavioral intention of the student. Since few studies have been conducted by applying the concept of rapport to the online class, the attempt to validate how the rapport between the professor and the student in the online class affects the student's learning participation and satisfaction can become an opportunity to provide a method to improve the quality of education in a rapidly changing environment due to the COVID-19 pandemic.

2.2. Learning participation and learning satisfaction

Learning participation refers to a student's effort to commit voluntarily in class [22] and is also a variable which has a meaningful effect on the learning performance [23]. Learning satisfaction refers to the overall satisfaction with the class after the student has participated in the class, and includes learning activities, processes, and learning results [24]. Several studies on the factors affecting learning satisfaction in online classes have been conducted [25][26]. For example, Lee et al.(2020) confirmed a positive relationship between self-directed learning skills and learning satisfaction in online classes under COVID-19 [6], and Kim et al.(2020) identified that the learning motivation of university students participating in online classes under COVID-19 was a variable which has a positive effect on the class satisfaction [27]. Furthermore, Lee(2021) confirmed the significant effects of self-efficacy, self-regulated learning skills, and class participation as the variables affecting the online class satisfaction [28], Kwon and Ryu(2021) found that the interactions with the professor(feedback, question, and facilitator, etc.) had a great influence on the learning satisfaction of the university students who were participated in online classes under the COVID-19, and learning participation and interaction among students were also identified as significant variables [5]. To summarize the research results to date, since learning participation and satisfaction are important variables for learning performance, it is necessary to identify variables to increase students' learning participation and satisfaction in the online classes.

2.3. Relationships between the variables

The formation of rapport between the professor and the student may help to form a consensus with the student and improve the student's satisfaction and participation in the class, thereby helping to form a positive emotion for the student's class. Since few studies have been conducted on the rapport between the professor and the student in the online classes at universities, this study will be conducted by defining the rapport behavior as a human relationship formed through trust and friendliness based on the positive interactions between the professor and the student in the online classes. The importance of communication between the professor and the student is emphasized as a way for the university students who have taken online classes to increase their learning satisfaction in the context of COVID-19 [29][30][31], and as professors provide actively feedback, and students perceive interaction between the professor and the student, students' participation level in the class can be improved [32][33]. Examining the rapport related studies in the field of education, Song(2020) presented the result that the rapport level with professors perceived by university students had a positive effect on the learning satisfaction [34], and Han(2020) emphasized that the rapport level between students in online classes is important [35]. Examining the studies examining the positive effect of learning participation on the learning satisfaction in the online class environment, Jung and Joo(2019) confirmed self-efficacy as a significant antecedent variable for the learning participation in university freshmen, and presented that the learning participation has a significant effect on the satisfaction with liberal arts education [36]. In addition, Yoo(2003) found that the higher learning participation perceived by students in online classes, the more positive effects on learning satisfaction and achievement [37].

3. Research Model and Analysis

3.1. Research hypothesis and research model

This study intends to examine how the perception of rapport with the professor affects the learning participation and learning satisfaction among the university students taking online classes. To achieve the purpose of this study, research hypotheses and model were formulated based on the previous studies. First, Hypothesis 1 was proposed based on the studies which

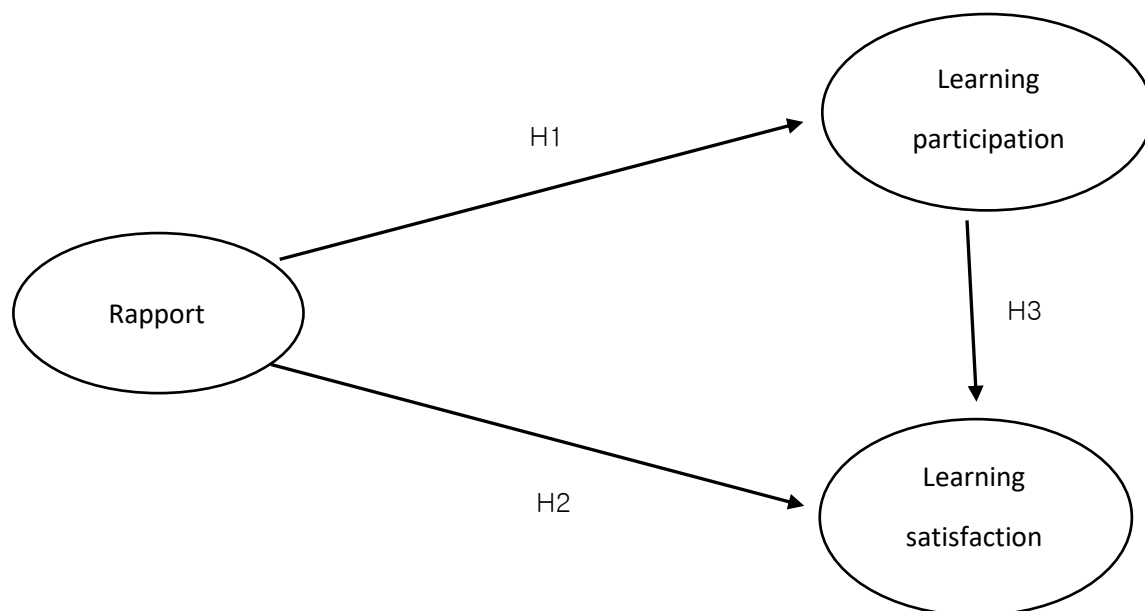
confirmed the relationship between the rapport with professors perceived by university students and their learning participation[20][38]. Second, Hypothesis 2 was established based on the studies which confirmed the relationship between rapport with the professors perceived by university students and learning satisfaction[19][29]. Third, Hypothesis 3 was formulated based on the studies which confirmed the relationship between the learning participation and learning satisfaction perceived by university students[36][37].

Hypothesis 1: Rapport with professors perceived by university students will have a significant effect on learning participation.

Hypothesis 2: Rapport with professors perceived by university students will have a significant effect on learning satisfaction.

Hypothesis 3: Learning participation perceived by university students will have a significant effect on learning satisfaction.

Figure 1. Research model.



3.2. Operational definition and measurement tools for the constituent concepts

The operational definitions and measurement tools of rapport, learning participation, and learning satisfaction, which are the major component of this study, have been presented. First, rapport means an intimate relationship and positive interaction between the professor and the student. Eleven questions were used by modifying and supplementing the measurement tools used in Yongmin Kim's(2019) study, which was reorganized based on the previous studies in line with this study. Second, learning participation refers to the extent to which they voluntarily participate in class[39], and the measurement tool used in the study of Hyegyeong Lee(2009) was modified and supplemented in line with this study, and 5 questions were used[40]. Third, learning satisfaction is defined as the overall satisfaction perceived by the students with respect to learning, and the measurement tool used in the study of Hyeyoon Lee(2015) was modified and supplemented to suit this study[41], and 7 questions were used, and each question was measured by using the Likert's 5 point scale(1 point: Absolutely not; 3 points: Normal; 5 points: Absolutely).

3.3. Data collection and the analytical method

The empirical survey of this study was conducted in May and June 2021. For 2 months, an online survey was conducted by using a convenient sampling method for the students at a two year university located in Seoul. The subjects of the survey were the students who participated in the online classes conducted via the recorded lectures and real time video lectures. The professors in charge of major classes and liberal arts classes were asked to give consent to the questionnaire, and a link to the questionnaire was delivered, and the professors shared the link to the questionnaire in the open chat room to ensure that they could voluntarily participate in the questionnaire. A total 213 data were collected and 207 copies were used for the empirical analysis. To conduct an analysis to test the hypotheses, the SPSS 21.0 statistical program was used to perform the analysis for hypothesis testing, demographic information of the sample was organized by performing a frequency analysis. Also, the exploratory factor analysis was performed to confirm the validity and reliability of the measurement items of each concept along with the reliability analysis, while regression analysis for each factor were performed to test the hypotheses.

4. Empirical Analysis

4.1. General characteristics of the sample

The demographic information of the sample participating in the survey of this study is as follows. The proportion of female students turned out to be large with 76 male students(36.7%) and 131 female students(63.3%), followed by 97 first year students(46.9%) and 110 second year students(53.1%), respectively. The majors were consisted of 6 people for Business Administration(2.9%), 34 people for Performing Arts(16.4%), 8 people for Art and Design(3.9%), 14 people for Languages and Cultures(6.8%), 44 people for Media Arts(21.2%), 6 people for Foodservice Industry(2.9%), 29 students for Music(14%), 15 people for Airline Service(7.2%), 50 people for Hotel and Tourism(24.2%), and 1 person for Others(0.004%).

4.2. Validity and reliability analysis of the constituent concepts

Before conducting the analysis to validate the hypothesis established in this study, the validity and reliability of the constituent concepts of rapport with the professor, learning participation, and learning satisfaction were validated. In order to confirm the validity of the constituent concepts, the exploratory factor analysis using principal component analysis was performed. The analysis was performed by applying the verimax orthogonal rotation method, and an eigen value of 1 or more and a total variance explanatory power of 60% or more were used as the factor extraction standards, and the factor loading value was 0.5 or more [42]. To measure the reliability of the constituent concepts, the internal consistency was validated by using the Cronbach's α coefficient of 0.6 or higher as a reference value [43]. First, the results of the analysis of rapport with the professor are presented in <Table 1>, and as a result of the factor analysis performed for the 11 variables of rapport with the professor, 1 factor was presented. As for the results of the KMO & Bartlett test, given KMO=.932, Chi-Square=2097.943, and Sig=.000, the KMO value was presented to be .5 or higher, and since the Bartlett's unit matrix test value turned out to be statistically significant, it is possible to interpret that the collected data are appropriate for the factor analysis [43]. Next, examining the results of the learning participation analysis performed, 5 questions were factored into 1, and the results are presented in <Table 2>, with KMO=.793, Chi-Square=424.624, and Sig=.000 presented. Lastly, examining the results of the analysis performed of learning satisfaction, 7 questions were factored into 1 and presented in <Table 3>, and the results of the KMO & Bartlett test were presented to be KMO=.914, Chi-Square=1114.989, and Sig=.000. As a result of the analysis performed for the reliability validation, the Cronbach's α coefficient was presented to be 0.6 or higher for all 3 factors, which may be interpreted as having no issue for reliability.

Table 1. Factor analysis and reliability analysis for the rapport with professors.

| Factor | Question | Factor load value | Eigen value | Explained variance(%) | Cronbach's α |
|---|---|-------------------|-------------|-----------------------|---------------------|
| Rapport with professor | Treat students in a friendly and friendly manner | .888 | 7.374 | 67.038 | .949 |
| | Have fun conversations with students | .887 | | | |
| | Find common interests and build consensus | .872 | | | |
| | Be kind to students and be empathetic | .869 | | | |
| | Have pleasant conversation | .856 | | | |
| | Start conversation and find common interests | .853 | | | |
| | Show interest in each individual student | .838 | | | |
| | Apologize for any issues related to the progress of lecture | .818 | | | |
| | Have respect for students | .704 | | | |
| | Remember the students' names | .702 | | | |
| | Provide useful information related to class | .681 | | | |
| KMO=.932, Chi-Square=2097.943, Sig=.000 | | | | | |

Table 2. Factor analysis and reliability analysis for the learning participation.

| Factor | Question | Factor load value | Eigen value | Explained variance(%) | Cronbach's α |
|--|---|-------------------|-------------|-----------------------|---------------------|
| Learning participation | Actively participate in the discussion | .831 | 3.080 | 61.599 | .842 |
| | Prepare assignments sincerely | .820 | | | |
| | Actively participate in Q&As | .797 | | | |
| | Faithfully participate in team activities | .757 | | | |
| | Attend lectures faithfully | .714 | | | |
| KMO=.793, Chi-Square=424.624, Sig=.000 | | | | | |

Table 3. Factor analysis and reliability analysis for the learning satisfaction.

| Factor | Question (Form of questions : Via major program related and liberal arts classes....) | Factor load value | Eigen value | Explained variance(%) | Cronbach's α |
|---|--|-------------------|-------------|-----------------------|---------------------|
| Learning satisfaction | Confidence in the learning process | .895 | 5.016 | 71.653 | .932 |
| | Improving self-lrarning skills | .866 | | | |
| | Widen interest and understanding of objects and so- cial phenomena | .858 | | | |
| | Helpful for getting a job, transfer for admission and advance to graduate school | .857 | | | |
| | Improve skills in building relationship with others | .830 | | | |
| | Obtain knowledge and information | .826 | | | |
| | Overall satisfaction with the university curriculum | .789 | | | |
| KMO=.914, Chi-Square=1114.989, Sig=.000 | | | | | |

4.3. Validation of hypothesis

In this study, the regression analysis was used to validate the relationship between the variables of rapport with professors, learning participation and learning satisfaction. First, in order to test Hypothesis 1 of this study, as a result of analyzing the relationship between the rapport with professors and learning participation, it was presented that there was a significantly positive(+) relationship of influence, and Hypothesis 1 was adopted <Table 4> accordingly. To test Hypothesis 2, and as a result of analyzing the relationship between the rapport with the professor and learning satisfaction, it was presented that there was a significantly positive(+) relationship of influence, and Hypothesis 2 was adopted <Table 5> accordingly. To test Hypothesis 3, and as a result of analyzing the relationship between the learning participation and learning satisfaction, it was presented that there was a significantly positive(+) relationship of influence, and Hypothesis 3 was adopted <Table 6>.

Table 4. Effect of rapport with professor perceived by university student on learning participation.

| Independent variable | B | Std. Error | β | t | p |
|---|------|------------|---------|-------|-------|
| Rapport with professor | .335 | .056 | .386 | 5.983 | .000* |
| $R^2=.149$, Adjusted $R^2=.145$, $F(\text{Sig})=35.801(.000)$ | | | | | |

Note: * $p<.01$.

Table 5. Effect of rapport with professor perceived by university student on learning satisfaction.

| Independent variable | B | Std. Error | β | t | p |
|--|------|------------|---------|--------|-------|
| Rapport with professor | .681 | .056 | .644 | 12.051 | .000* |
| $R^2=.415$, Adjusted $R^2=.412$, $F(\text{Sig})=145.234(.000)$ | | | | | |

Note: ** $p<.01$.

Table 6. Effect of learning participation on learning satisfaction.

| Independent variable | B | Std. Error | β | t | p |
|---|------|------------|---------|-------|-------|
| Learning participation | .681 | .071 | .559 | 9.652 | .000* |
| $R^2=.312$, Adjusted $R^2=.309$, $F(\text{Sig})=93.165(.000)$ | | | | | |

Note: * $p<.01$.

5. Conclusion and Implications

In a situation where the online classes were conducted without a choice given the COVID-19 situation, various problems have been raised, and studies have been conducted to address them. In this study, a study was conducted on the formation of rapport between the professor and the student in the online classes focusing on the part related to the interaction with the professor. To this end, a survey was conducted with the freshmen and sophomore students of a two year university who participated in the online classes for the first semester of 2021, and most

of the students may be considered to have spent the semester with only online classes without experiencing or participating in the ordinary classes upon admission. The study results are as follows. First, it was presented that the formation of rapport with the professor perceived by the student has had a significantly positive effect on the learning participation and learning satisfaction. This may be considered as a result having the same direction as the previous studies presented earlier[29]. It means that the students who perceive that the rapport with the professor is well in progress, demonstrate to have a higher participation in class and a higher satisfaction. Second, the learning participation turned out to have a significantly positive effect on the learning satisfaction. This result is in line with the previous studies related to the learning participation and satisfaction[37][36], and also means that the higher the level of learning participation, the greater the learning satisfaction.

In this study, it was confirmed that the student's learning participation in the online classes is a major antecedent variable in improving the learning satisfaction, the importance of forming a rapport between the professors and students was emphasized in order to increase the learning participation, and the academic significance of this study is as follows. First, by focusing on the formation of rapport between the professors and students, the relationship between learning participation and learning satisfaction was specified and articulated. It may provide useful information on the improvement of the interaction between the professors and students, which has been presented as a limitation of the online learning in numerous studies, and may also be a helpful resource for the professors to design the effective online classes. Second, in the case of the rapport investigated in the previous studies, a study has been conducted focusing on the relationship between service providers and consumers in the field of service, and given which, in this study, the concept of rapport was applied to the online classes at the universities by expanding the scope of the study. While the studies on the online classes at universities have been conducted, there are not adequate studies conducted on the rapport for online classes at universities. An academic significant is apparent given the fact that, at such point of time, the relationship of influence between the learning participation and learning satisfaction was validated by applying the concept of rapport and focusing on the relationship between the professor and student in the online classes.

The practical implications are as follows. First, this study provides useful information to identify the lack of interaction caused by the disconnection of the communication situation between the professors and students offline given the COVID-19 pandemic, and may provide useful information for devising a strategy to increase the student's learning participation and satisfaction for the professor. Second, in reality, it may be difficult to form rapport in the online classroom environment, and hence, an objective measuring tool is required to determine as to whether the individual and additional efforts of the professor for the rapport's formation would lead to the learning performance of the students. If rewards and incentives may be provided through such rapport measuring tools, the professors efforts for the rapport's formation may serve as a catalyst for the students' learning participation and satisfaction, and in the long term, may have a positive effect on the students' satisfaction with school and their academic achievement.

The limitations of this study and the future research directions are as follows. First, since this study was conducted with the students from two year universities located in Seoul, useful information may be secured for generalizing the research results if the research is conducted with two year and four year university students from other areas. Second, in the future research, if a research is conducted to identify specific antecedent variables which may form the rapport between the professors and students, the information which will help to improve the level of interaction between them.

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7. Appendix

7.1. Authors contribution

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

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The Influence of NCS-Based Curriculum on Learning Satisfaction of the Beauty Related Sector Learners for Job PROTECTION -Focusing on the Mediating Effect of Learning Immersion-

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Abstract

Purpose: This study is to analyze the mediating effect of learning immersion in the relationship between NCS-based curriculum and learning satisfaction of the beauty related sector learners. By doing so, it aims to present basic data for revitalizing the beauty education industry and job security and protection by studying the effects of sub-factors of NCS-based curriculum on learning satisfaction of the beauty related sector learners.

Method: This study collected 219 copies of answer sheets through an online survey method for learners of beauty related sector at NCS vocational training institutions. An empirical statistical analysis was performed using SPSS 25.0, PROCESS macro for SPSS. Multiple regression analysis and PROCESS macro model 4 were used. The significance of the mediating effect was confirmed through the bootstrap procedure.

Results: As a result of conducting multiple regression analysis to verify the effect of the sub-factors of the NCS-based curriculum on learning satisfaction, it was found that educational content, educational method, and educational environment had a statistically significant positive effect on learning satisfaction. It was found that learning satisfaction was affected in the order of educational environment ($\beta=.370$, $p<.001$), educational method ($\beta=.299$, $p<.001$), and educational content ($\beta=.142$, $p<.05$). In addition, the partial mediating effect of learning immersion was judged to be statistically significant in the relationship between NCS-based curriculum and learning satisfaction.

Conclusion: NCS-based curriculum was found to be a major factor in enhancing learning satisfaction in beauty related sector education, and it can be said that it indirectly affects learning satisfaction through learning immersion. Therefore, it is proposed to prepare an educational environment suitable for the characteristics of vocational training in the beauty related sector and develop suitable educational methods. In addition, if learning immersion is strengthened, it is expected to be of great help in achieving the goal.

[Keywords] NCS-Based Curriculum, Learning Satisfaction, Beauty Related Sector, Learning Immersion, Mediating Effect

1. Introduction

Gradually, an atmosphere in which ability is more important than academic background is being created. In other words, practical job skills will be in the spotlight in future society. In order to cultivate talented people who can deal with rapidly advancing technologies, it is necessary to break away from knowledge-oriented education and provide competency-oriented education[1]. Currently, various industries also want talent who can perform work with minimal education when put into the field[2], and it is known that education and training affect performance[3]. In order to meet these needs, NCS, or National Competency Standards, has been developed, and vocational training curricula based on this are drawing attention.

Since the introduction of NCS, there have been reports that competency-oriented recruitment has been made in companies and turnover has also decreased, so it can be considered that the educational effect centered on job competency is valid[4]. In addition, the NCS-based curricula are considered appropriate as educational programs to solve the economic difficulties, centering on workers with high dependence on earned income on the market[5] and multicultural families[6][7].

The Korean beauty industry continues to grow as people's income level improves and their desire to pursue health and beauty increases[8]. Among the beauty industries, especially the beauty service industry requires professional talents. Accordingly, NCS-based curricula are being developed in each field[9]. Learners who have completed these curricula have been shown to show excellent ability in the field[10] and encourage their willingness to continue learning to help them advance to the workplace for life.

According to previous studies, NCS-based curricula refer to the standardization of job competency required in industrial sites into knowledge, skills, and attitudes, and mandatory input into the curricula at technical colleges, Meister high schools, and specialized high schools[11].

Learning satisfaction is an individual's feelings about achievements, recognitions, rewards, etc. that are expected to be obtained in the learning process[12][13][14]. By checking the learner's level of satisfaction toward the learning experience, the quality of education can be evaluated, and an opportunity to reorganize the educational content can be provided[15]. NCS-based educational content and educational methods focused on practice were found to have an effect on the satisfaction of one's major, which induces an action to actively explore career paths. In other words, the NCS-based curricula can have an important influence on the learner's career path[16].

Since NCS-based curricula are closely related to practice, it has the effect of improving learners' learning immersion. Immersion refers to a state in which one is completely immersed in one's task and performs optimal functions[17], in which the learner's attention is focused only on the goal in the learning situation[18].

In particular, educational content and educational environment can significantly improve one's learning immersion rather than educational methods[19], induce learners to actively participate in classes, and increase their concentration[20]. Learning immersion is a factor that directly affects learning satisfaction[21], and positively affects the effectiveness of learning[22]. In addition, this is due to the fact that the highest level of learning experience and ability development is possible by inducing learners' interest and active participation[23]. This is based on the fact that the goal of the NCS-based curricula can be used immediately in the field.

Taken together, it can be assumed that learning immersion will act as an intermediate factor when the NCS-based curricula affect learning satisfaction.

NCS-based curricula are being conducted in various educational institutions, and there are previous studies on its effectiveness[24][25][26][27], but more realistic studies need to be conducted. In particular, research for learners at vocational training institutions in the beauty industry is very insufficient, so research on this is necessary. A lot of research is needed to produce competent talents through efficient education in beauty-related fields. These studies will be able to contribute to revitalizing the beauty education industry, stabilizing and protecting employment opportunities as well.

2. Research Method

2.1. The subject and scope of the study

The contents of the survey were modified and supplemented to suit the purpose of the study by referring to the results of previous studies. The sample collection was conducted with men and women with a history of taking NCS-based education in the field of hair design and beauty service at a vocational training institution located in Gyeonggi-do. The samples were collected

online from March 2nd to 10th, 2021, and a total of 219 questionnaires were used as analysis data.

2.2. Survey design and definition of variables

The questions consisted of a total of 53 questions and were measured on a 5-point Likert scale(44 questions) and Nominal scale(9 questions).

1) NCS-based curriculum

The NCS-based curricula were designed by standardizing the jobs required in various industry sectors. This study defined the NCS-based curriculum as an "education process/session/class that allows learners to directly connect education and the professional world based on NCS." Kim Min-jung's research tool was used to confirm learners' perception of the NCS-based curriculum[28]. The tool was set on a 5-point Likert scale, and the higher the score, the more positive the perception on the NCS-based curriculum. It consisted of 4 questions on educational content, 4 questions on educational method, 5 questions on educational environment, a total of 3 factors, and 13 questions.

2) Learning immersion

Learning immersion is defined as "a state in which learners focus only on learning activities and show optimal learning efficiency, and their actions and purposes coincide." This can be confirmed by the flow of class time and understanding of class content. In order to measure learning immersion, 14 questions developed by Jackson & Marsh(1996) and adapted by Kim Jin-ho[29] and used by Kim Eun-sook[11] were used. Learning immersion was measured on a 5-point Likert scale, and the higher the score, the stronger the learning immersion is.

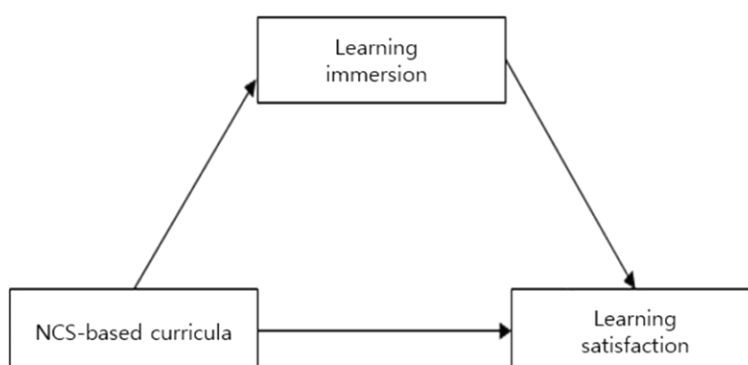
3) Learning satisfaction

Learning satisfaction is defined as the overall satisfaction perceived by learners after completing the NCS-based curriculum. This can be confirmed by the learner's recommendation intention, pride, willingness to contribute, and willingness to participate. In order to measure learning satisfaction, a research tool developed by Park Geun-hee[30] and used by Kim Eun-sook[11] was used. The tool consisted of four single-factor questions, with a 5-point Likert scale, and the higher the score, the higher the learning satisfaction.

2.3. Research model

The independent variable was defined as an NCS-based curriculum, and the dependent variable was defined as learning satisfaction. Learning immersion was set as the parameter. The research model is shown in <Figure 1>.

Figure 1. Research model.



2.4. Data analysis

For the data of this study, the following statistical analysis was conducted using the SPSS 25.0 program.

First, the feasibility analysis of the measurement tool was performed by performing exploratory factor analysis. In order to analyze the items constituting the factors, reliability was analyzed using Cronbach's alpha coefficient.

Second, frequency analysis was conducted to understand the general characteristics of the study subjects. Simple and multiple regression analysis were conducted to find out the effect of NCS-based curriculum and perceived interaction on learning immersion and learning satisfaction.

Third, an analysis using the SPSS Process Macro No. 4 model was conducted to verify the mediating effect of learning immersion in the relationship between NCS-based curriculum and perceived interaction and learning satisfaction.

In the statistical analysis, statistical significance was determined based on the significance level of 5%.

3. Results

3.1. General characteristics of the study subjects

For this study, a survey was conducted on 219 people, and the general characteristics of the study subjects are as follows.

There were 56 men(25.6%) and 163 women(74.4%). The areas where the high school is located were 79 in Suwon-si(36.1%), 19 in Hwaseong-si(8.7%), 36 in Yongin-si(16.4%), 38 in Gyeonggi-do(17.4%), 20 in Seoul(9.1%), and 27 in other areas(12.3%). The age was 44(20.1 percent) aged 17 to 18, 46(21.0%) aged 19 to 20, 17(7.8%) aged 21 to 22, and 112(51.1%) aged 23 or older. For occupations, 42 high school students(19.2%), 53 college students(24.2%), 49 office workers(22.4%), and 75 unemployed(34.2%). As for the intention to take additional classes, 5 people(2.3%) said "Strongly disagree", 10 people(4.6%) said "Disagree", 61 people(27.9%) said "Neither agree nor disagree", 84 people(38.4%) said "Agree", and 59 people(26.9%) said "Strongly agree."

3.2. Validation

Exploratory factor analysis was conducted to verify the validity of the measurement tool used in this study. Principal component analysis and Varimax rotation analysis were used. The conditions for factor classification should be an eigenvalue of 1 or more, and if the factor loading exceeds .40, it was classified as the corresponding factor.

1) NCS-based curriculum

In the NCS-based curriculum, factor analysis was finally conducted into nine items, excluding four items that hinder validity(educational content no. 2, educational method no. 1 and 2, and educational environment no. 1). As a result of factor analysis, the KMO measurement was .903, and Bartlett's sphericity verification result was also significant($p < .001$), so the factor analysis model was judged to be suitable.

The NCS-based curriculum was classified into three factors, and they showed 85.8% factor explanatory power. The first factor consisted of 4 items for educational environment, the second factor consisted of 3 items for educational content, and the third factor consisted of 2 items for educational methods.

2) Learning immersion

As for learning immersion, factor analysis was finally conducted into 13 items, excluding one item (learning immersion no. 13) that hinders validity. As a result of factor analysis, the KMO measurement was .952, and Bartlett's sphericity verification result was also significant ($p < .001$), and the factor analysis model was judged to be suitable.

Learning immersion was classified into one factor, and it showed 75.9% factor explanatory power.

3) Learning satisfaction

Factor analysis was conducted on learning satisfaction in four items. As a result of factor analysis, the KMO measurement was .854, and Bartlett's sphericity verification result was also significant ($p < .001$), so the factor analysis model was judged to be suitable.

Learning satisfaction was classified into one factor, and one factor showed 88.4% explanatory power.

3.3. Reliability analysis

Reliability means that the same result appears even when the target is measured several times, and there is consistency between the items constituting a certain indicator.

To verify this, Cronbach's alpha coefficient was used. The alpha coefficients of all variables were found to be 0.6 or higher, indicating high reliability, as shown in <Table 1>.

Table 1. Reliability analysis.

| Variables | No. of items | | | Cronbach's α |
|-----------------------|-------------------------|--------------------|-------------------|---------------------|
| | Subfactors | Original questions | Changed questions | |
| NCS-based curriculum | Educational content | 4 | 3 | 0.903 |
| | Educational methods | 4 | 2 | 0.881 |
| | Educational environment | 5 | 4 | 0.931 |
| | Total | 13 | 9 | 0.944 |
| Learning immersion | | 14 | 13 | 0.973 |
| Learning satisfaction | | 4 | 4 | 0.956 |

3.4. Effect of NCS-based curriculum on learning satisfaction

Simple regression analysis was conducted to verify the effect of the NCS-based curriculum on learning satisfaction, which is shown in <Table 2> below.

As a result of verifying the regression model, the regression model was suitable as $F = 259.769$ ($p < .001$), and the explanatory power of the model was about 54.5%. Meanwhile, the Durbin-Watson statistic was 1.952, which was close to 2, so there was no problem in assuming the independence of the residuals.

As a result of verifying the significance of the regression coefficient, it was found that the NCS-based curriculum had a significantly positive effect on learning satisfaction as shown in Table 2 below ($\beta = .738$, $p < .001$). In other words, it can be said that the higher the NCS-based curriculum, the higher the learning satisfaction.

Table 2. Effect of NCS-based curriculum on learning satisfaction.

| Variables | B | S.E | β | t | p |
|--|-------|-------|---------|-----------|-------|
| (Constant) | 0.792 | 0.203 | | 3.903*** | <.001 |
| NCS-based curriculum | 0.812 | 0.050 | .738 | 16.117*** | <.001 |
| F=259.769(p<.001), R ² =.545, Durbin-Watson=1.952 | | | | | |

Note: *** p<.001.

3.5. Effect of sub-factors of NCS-based curriculum on learning satisfaction

Multiple regression analysis was conducted to verify the effect of the sub-factors of the NCS-based curriculum on learning satisfaction.

As a result of verifying the regression model, as shown in <Table 3> below, the regression model was suitable with F=89.250(p<.001), and the explanatory power of the model was about 55.5%. Meanwhile, the Durbin-Watson statistic was 1.968, which was close to 2, so there was no problem in assuming the independence of the residuals. The tolerance was all 0.1 or higher and VIF(Variance Inflation Factor) was less than 10, so the multicollinearity problem did not appear.

As a result of verifying the significance of the regression coefficient, it was found that educational content, educational method, and educational environment had a statistically significant positive effect on learning satisfaction. In other words, it can be said that the higher the educational content, educational method, and educational environment, the higher the learning satisfaction.

It was found that the learning satisfaction was affected in the order of the educational environment(β =.370, p<.001), educational method(β =.299, p<.001), and educational content(β =.142, p<.05).

Table 3. Effect of subfactors of NCS-based curriculum on learning satisfaction.

| Independent variables | B | S.E | β | t | p | tolerance | VIF |
|--|-------|-------|---------|----------|-------|-----------|-------|
| (Constant) | 0.707 | 0.215 | | 3.290*** | 0.001 | | |
| Educational content | 0.14 | 0.068 | 0.142 | 2.068* | 0.04 | 0.437 | 2.288 |
| Educational methods | 0.331 | 0.089 | 0.299 | 3.703*** | <.001 | 0.317 | 3.155 |
| Educational environment | 0.357 | 0.073 | 0.37 | 4.887*** | <.001 | 0.361 | 2.772 |
| F=89.250(p<.001), R ² =.555, adjusted R ² =.548, Durbin-Watson=1.968 | | | | | | | |

Note: * p<.05, *** p<.001.

3.6. The mediating effect of learning immersion in the relationship between NCS-based curriculum and learning satisfaction

To verify the mediating effect of learning immersion in the relationship between NCS-based curriculum and learning satisfaction, an analysis was conducted using Process Macro No. 4 model proposed by Hayes(2012). The results are shown in <Table 4>.

First, in step 1, the NCS-based curriculum, an independent variable, had a statistically significant positive effect on the dependent variable, learning satisfaction($\beta=.738$, $p<.001$). The explanatory power of the NCS-based curriculum for learning satisfaction was 54.5%.

In step 2, the NCS-based curriculum, an independent variable, had a significant positive effect on the learning immersion, a parameter($\beta=.670$, $p<.001$). The explanatory power of the NCS-based curriculum for learning immersion was 44.8%.

In step 3, the independent variables NCS-based curriculum($\beta=.359$, $p<.001$) and the parameter learning immersion($\beta=.566$ and $p<.001$) had a significant positive effect on learning satisfaction. The explanatory power of NCS-based curriculum and learning immersion to learning satisfaction was 72.2%.

In the second stage, the NCS-based curriculum, an independent variable, had a significant positive effect on the learning immersion as a parameter, and in the third stage, the learning immersion had a significant positive effect on the learning satisfaction as a dependent variable.

In the third stage including parameters, the influence of NCS-based curriculum on learning satisfaction decreased from the first stage(.738, .359), so learning immersion partially mediates the relationship between NCS-based curriculum and learning satisfaction. In other words, it can be said that the NCS-based curriculum directly affects learning satisfaction and indirectly affects learning satisfaction through learning immersion.

Table 4. Verification of the mediating effect of learning immersion in the relation between NCS-based curriculum and learning satisfaction.

| Model | DV | IV | B | SE | β | t | p | F(R ²) |
|-------|-----------------------|----------------------|-------|-------|---------|-----------|-------|--------------------|
| 1 | Learning satisfaction | NCS-based curriculum | 0.812 | 0.05 | 0.738 | 16.117*** | <.001 | 259.769*** |
| | | | | | | | | -0.545 |
| 2 | Learning immersion | NCS-based curriculum | 0.655 | 0.05 | 0.67 | 13.260*** | <.001 | 175.825*** |
| | | | | | | | | -0.448 |
| 3 | Learning satisfaction | NCS-based curriculum | 0.395 | 0.053 | 0.359 | 7.443*** | <.001 | 280.507*** |
| | | Learning immersion | 0.637 | 0.054 | 0.566 | 11.732*** | <.001 | -0.722 |

Note: *** $p<.001$.

In addition, 5,000 samples were generated according to the bootstrap procedure to additionally verify the total effect, direct effect, and indirect effect on the learning satisfaction of the NCS curriculum at 95% confidence interval, and the results are shown in <Table 5> below.

The total effect($B=0.812$, $p<.001$) and direct effect($B=0.395$, $p<.001$) of the NCS-based curriculum on learning satisfaction were statistically significant. Since the confidence interval of the indirect effect of the NCS-based curriculum on learning satisfaction through learning immersion was 0.306 and 0.544, and 0 was not included in the meantime, the mediating effect of learning immersion was judged to be statistically significant in the relationship between the NCS-based curriculum and learning satisfaction.

Table 5. Total, direct, indirect effects of learning immersion in the relation between NCS-based curriculum and learning satisfaction through bootstrapping.

| | B | S.E. | LLCI | ULCI | t | p |
|-----------------|-------|-------|-------|-------|-----------|-------|
| Total effect | 0.812 | 0.05 | 0.713 | 0.912 | 16.117*** | <.001 |
| Direct effect | 0.395 | 0.053 | 0.291 | 0.5 | 7.443*** | <.001 |
| Indirect effect | 0.417 | 0.061 | 0.306 | 0.544 | | |

Note: *** p<.001.

4. Conclusion

This study was conducted focusing on the mediating effect of learning immersion to find out the effect of NCS-based curriculum on learning satisfaction. To this end, a survey was conducted on 219 people who participated in the NCS-based curriculum nationwide, and statistical analysis was conducted and verified based on the collected responses. The research results are as follows.

First, the NCS-based curriculum had a positive effect on learning satisfaction, and showed great influence in the order of educational environment, educational method, and educational content. A study by Kim Eun-sook on the effect of NCS-based education on education satisfaction for college students in beauty-related departments(2018)[11] showed that NCS-based education appropriateness consisting of educational environment, class content, textbooks, and teaching methods had a significant positive effect on education satisfaction. The educational environment, which is the factor that had the greatest influence on learning satisfaction, was also verified in the results of other researchers. For example, this was verified as a major factor in improving educational satisfaction in the studies of Yim Dae-gyu, Oh Won-jeong, Kim Na-young(2009)[31], and Lee Seok-jin(2016)[32][33].

Second, when the NCS-based curriculum affects learning satisfaction, it was verified that learning immersion plays a partial mediating role. This is the result of supporting the research of Kim Min-ji and Woo Mi-ok(2019)[34] and Kim Han-joo, Roh Seok-jun, and Yoo Byung-min(2015)[35] and suggests that learning immersion mediates the relationship between variables affecting learning satisfaction. In this study, it was analyzed that the influence of learning immersion was higher than the direct influence of the NCS-based curriculum on learning satisfaction. Therefore, in order to effectively improve the learning satisfaction of NCS-based curriculum learners, it is considered necessary to find a way to improve learning immersion.

Trainees in the beauty field can get a job or start a business by recognizing their abilities through NCS vocational training, breaking away from social prejudices that evaluate one's qualification according to the degree awarded by educational institutions. In addition, it is expected that employment will become more stable and protected through the development of beauty education. Therefore, it is proposed to prepare an educational environment suitable for the characteristics of vocational training in the beauty-related sectors and develop educational methods. In addition, if learning immersion is strengthened, it is expected to be of great help in achieving the goal.

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6. Appendix

6.1. Authors contribution

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

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A Study on the Risk Recognition and PROTECTION of Semi-Permanent Makeup in Female Students

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Abstract

Purpose: Since ancient times, the culture of putting on wounds or paints on the body like a tattoo has been carried on until now. In modern times, the interest, popularity, and market potential of semi-permanent makeup are increasing because it gives confidence and convenience as if wearing makeup. However, continuous research on safety is necessary because the risk factors for semi-permanent makeup are perceived in various aspects such as design, safety of ingredients, belief, worry, pain, and sanitary environment.

Method: The researcher used the questionnaire method to construct questionnaire items with reference to previous studies. The questionnaire was constructed using a 5-point Likert scale and checklist. The questionnaire consisted of questions about demographic variables, the status of semi-permanent makeup, and risk perception factors. The subjects of this study were set as middle and high school girls and female university students from all over the country. The results were derived using frequency analysis.

Results: The risk perception factors of semi-permanent makeup were design, eyebrow color, skin trouble, pain, and product and tool safety. However, there was an opinion(48.6%) that semi-permanent makeup should be performed by a beautician who is good at designing rather than a medical person. 46.4% answered that semi-permanent makeup is a type of makeup. However, as to the reasons for thinking that semi-permanent makeup should be regulated by the medical law, the highest responses were 'because it is more hygienic and the risk of infection is lower if it is done in a hospital' and 'the difference in trustworthiness' was the highest, and anesthetic cream was ranked next.

Conclusion: According to the results of the study on risk perception and protection for semi-permanent makeup, it is recommended that a beautician with design and technology perform the procedure, but in terms of hygiene, infection, trust, and use of anesthetic cream, it should be regulated by the Medical Act. It is presumed to think that Therefore, as in the case of other countries, beauticians are allowed to perform semi-permanent makeup, but thorough education and management on semi-permanent makeup procedures, hygiene management, and safe use of products and tools are required.

[Keywords] Risk, Recognition, Semi-Permanent Makeup, Student, Protection

1. Introduction

Humans have long had a culture of decorating themselves. With the oldest history of makeup, the Egyptians protected their bodies with makeup. It also became a means of expressing beauty and gradually became a make-up for women's beauty[1].

In modern society, as the income level increases due to active economic activities, the craving for beauty and health is gradually increasing. Women's economic activity increased[2], and changes began to take place in various fields such as beauty and hospitals. The increase in national income, the

increase in single-person households, changes in consumption patterns, changes in society and times through the Internet due to the development of information and science and technology[3], the diverse needs of modern people, and the idea of pursuing youth and individuality must have played a major role[4].

In modern society, appearance is recognized as one of the ways to get a good image in social life and to increase competitiveness through this. Modern people are making efforts to enhance their aesthetic, social, and psychological values by managing their appearance beautifully[5].

Semi-permanent makeup is attracting attention because it provides convenience and convenience to busy modern people who do not have confidence in their face without makeup, and is creating high added value in the recent beauty industry[6]. Therefore, despite the fact that semi-permanent makeup by the general public is currently illegal, the treatment area is diversified and the market size is growing[7].

Tattoo refers to a permanent color remaining on the skin by injecting pigment into the dermis layer[8]. Semi-permanent makeup is a new technique borrowing the form of tattoo. This type of makeup is a permanent and long-lasting makeup that is mainly applied to the face, and it is a procedure that uses natural ingredients to inject pigment into the skin layer. Semi-permanent makeup can be used to achieve cosmetic effects for 1-2 years.

The concept of semi-permanent makeup is called contour makeup, meaning that it corrects the contours of the face. It is also called long time makeup because it maintains a long time. And it is used as art makeup to express an artistic sense on the face. In the medical world, it is also called micro pigmentation[9]. Semi-permanents are not as permanent as tattoos and tend to fade or fade over time. To remove a tattoo, a laser is used to remove pigment from the skin[10]. Due to the development of various techniques for semi-permanent makeup, the names and techniques are mixed and used, such as emboss, resin, natural eyebrows, makeup eyebrows, 3D, and 4D. The technique is classified into machine technique and resin technique according to the existence and type of device use[9]. The purpose of this makeup can be divided into two main categories. First, the pursuit of beauty. Second, it can be classified as a medical purpose to overcome the complex. Recently, in the field of related education, various semi-permanent makeup techniques as well as product and dye development, customer service, marketing know-how, and service spirit are not only taught technical techniques, but also items and contents are exported. Therefore, the demand for it is expected to gradually expand[11].

Although the consumer demand and market for semi-permanent makeup and related products(online market including YouTube[12]) is expected to develop, there is still a need for manuals on related cosmetic safety, dissatisfaction factors, legislation, and compliance guidelines[13][14][15][16].

Looking at previous studies, it is reported that semi-permanent makeup only injects pigments up to the epidermal layer[17][18]. However, the results of studies in the medical field show that it is not limited to the epidermal layer. Tattoos or semi-permanent make-up cannot avoid capillaries and lymphatic vessels, and it is believed that it will not be able to prevent side effects such as bleeding and bluish discoloration[19][20].

In order to break away from the artificial shape, a semi-permanent makeup technique(natural eyebrow shape) was developed that draws slashes like a comb pattern between the eyebrows by hand without using an electric machine[21]. The need for safety is an intrinsic characteristic of all human beings, and the intrinsic need for safety is the same in all people [22]. For semi-permanent makeup, it is very important to use safe products and tools because anesthetic cream is used during the procedure, disposable blades are used, and wounds or bleeding can occur.

The most common performance risk perception of semi-permanent makeup is dissatisfaction with design or color. Among them, the most serious side effect is infection related to the procedure. The operator should prepare a hygienic environment by disinfecting the skin with an appropriate disinfectant before performing the procedure. In addition, the operator must fully inform the operator of the risk perception before proceeding with the operation and determine the health condition of the operator to reduce side effects[23].

Silicon(Si), sulfur(S) and sodium(Na) elements were detected in inexpensive semi-permanent cosmetic inks. As reported by Arl et al.(2019), these substances were added to control the

viscosity and brightness of the ink and to impart antibacterial properties, or it is thought to be derived from contaminants. In order to increase the safety of tattoo ink, it is necessary to use refined, high-purity metal to minimize contamination of toxic heavy metals and to have excellent manufacturing facilities and technology[24].

Semi-permanent laws overseas and domestic cases are as follows. In the United States, the government oversees the practice of tattoos and semi-permanent makeup. The color used in the procedure is made according to the FDA Cosmetics and Color Additives regulations. Each state has enacted and implemented regulations on procedures, operator's permission, and opening of business. In France and the Netherlands, the Ministry of Health implements a qualification system for tattoos and permits the general public to perform legally under strict regulations and procedures. In Germany, without a license system, according to the guidelines of the Tattoo Association, ordinary people have tattoos and follow hygiene regulations. In the UK, tattooing is allowed for the general public, but tattoos on persons under the age of 18 are criminalized. Ordinary people can legally apply tattoos as long as they follow the registration procedure and facilities and hygiene regulations in accordance with the law.

In European countries, even the general public can legally apply tattoos, but it is known that they are strictly regulated by law or strict hygiene management. In Japan, like Korea, tattoos and semi-permanent makeup procedures are considered medical practices. However, in 2018, the Osaka High Court acquitted the defendant who was caught wearing tattoos and semi-permanent makeup. It was concluded that this was completely different from the work of a doctor, and that requiring a tattoo artist to have a doctor's license infringed upon the freedom of choice of profession guaranteed by the Constitution. Korea is the only country that stipulates that tattoos and semi-permanent makeup procedures are medical practices[25]. However, according to a study by Baek Kyung-hee and Kim Seong-eun, in 2019, the Korean government announced that it would allow tattoos and semi-permanent makeup procedures to be performed in beauty establishments such as skin care salons and beauty salons in the future[26].

Because of the natural, aesthetic effect and convenience of semi-permanent makeup, interest in it is continuously increasing regardless of age or gender. However, many are reluctant because of fears about product ingredient safety, permanent pigmentation, cost, pain, and risks to hygiene. In previous studies, semi-permanent makeup images and repurchase effects[27], appearance management and semi-permanent makeup studies[28], men's semi-permanent studies[29], and customer experiences and perceptions of semi-permanent makeup[30] were studied. Although female students have a lot of interest in makeup and make-up behavior, there is still a lack of awareness about the safety of semi-permanent makeup or studies on semi-permanent behavior. Therefore, this researcher intends to provide basic data to help the development of the semi-permanent makeup market and beauty by examining which factors of the semi-permanent makeup that female students perceive the most risk and identifying the problems.

2. Research Method

This researcher focused on questionnaire questions about risk perception and protection for semi-permanent makeup, and was written with reference to recent prior research[23]. The questionnaire was constructed using a 5-point Likert scale and checklist. The questionnaire consisted of general characteristic variables, semi-permanent makeup procedures, and risk perception factors for semi-permanent makeup.

Table 1. Questionnaire composition.

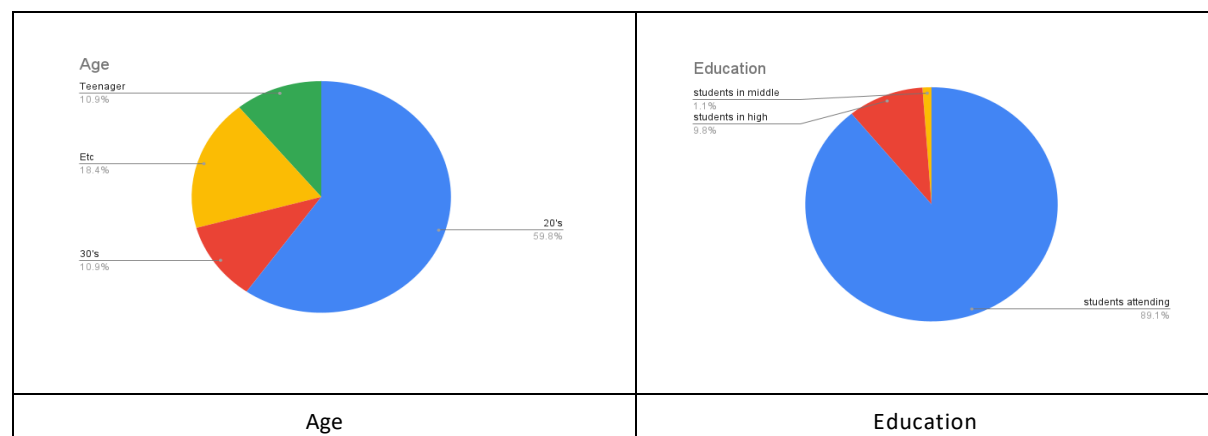
| | Division | Question | Measurement type |
|-------------------------|---|----------|--|
| General characteristics | Age, education, skin type | 3 | Check list |
| Treatment status | The reason for the procedure, the place of the procedure, the reason, the satisfaction considerations, whether it is different from the tattoo, whether it is a pigment, safety, the retouch doctor, whether to perform additional treatment, whether to recommend an acquaintance, the reason for refusal of the procedure | 11 | check list 5 points likert scale |
| Risk Perception factors | Design, color, allergy or side effect, trouble, cost, pain, use of safe tools and products, operator, makeup or medical practice recognition, reasons regulated by medical law | 11 | 5 points likert scale |

The survey period was conducted from October to November 2021. For the subjects, middle and high school girls and university students across the country who were interested in makeup were asked to respond. A total of 181 questionnaires were obtained and the data were used as results. The results were derived using frequency analysis.

3. Research Results

3.1. General characteristics

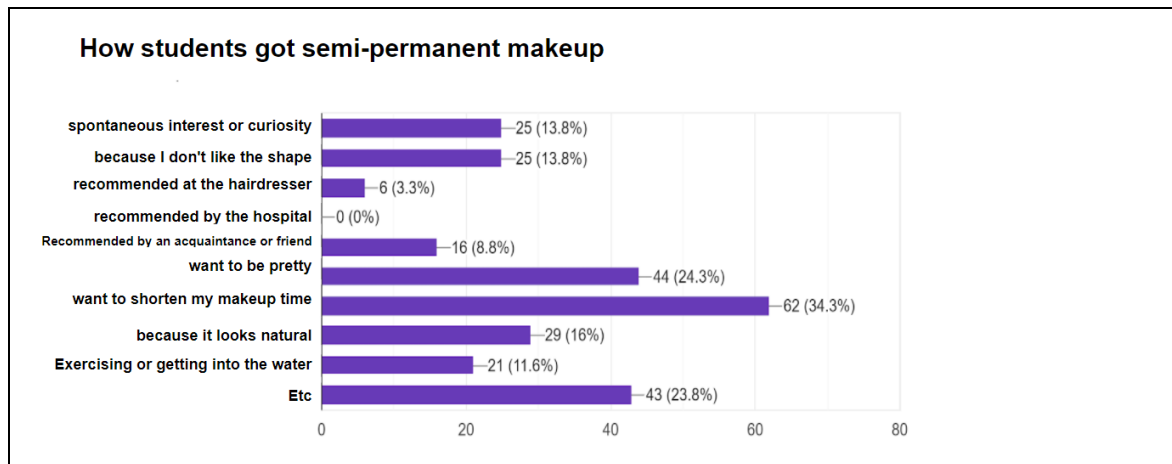
As for the age of the study subjects, college students in their 20s accounted for the most at 59.8% and those in their teens were the least at 10.9%. In an interview with people who actually run semi-permanent makeup shops, they said that even elementary and middle school students these days do a lot of semi-permanent makeup, so they expected interesting results. However, as a result of the survey, it was found that finding the actual sample subjects is not an easy task.. As shown in the following <Table 2>.

Table 2. General characteristics.

3.2. Treatment status of eyebrow semi-permanent makeup

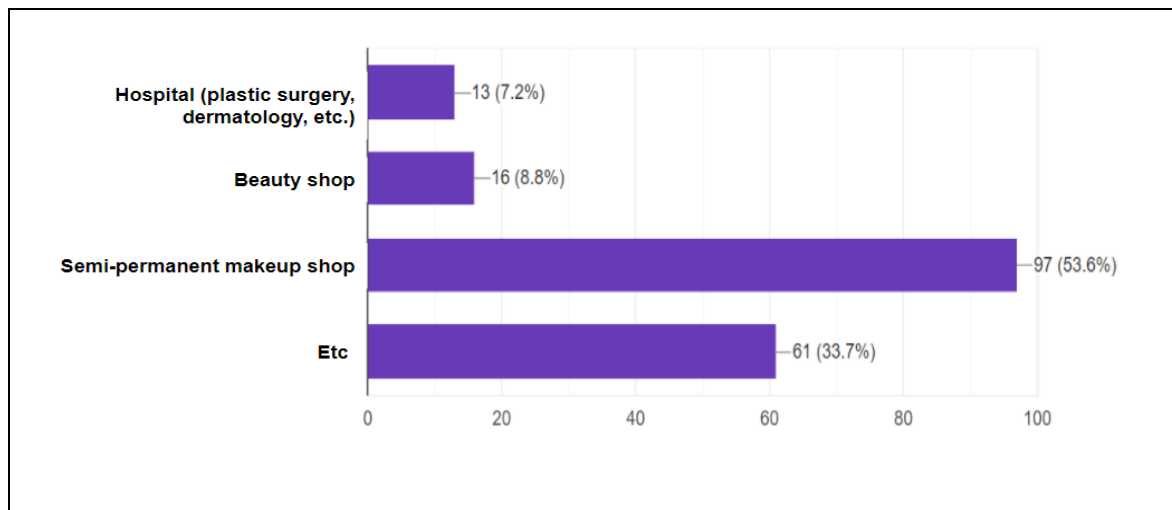
The proportion of female college students(89.5%) was high among the students who participated in the survey. 34.3% of people received semi-permanent makeup because they wanted to shorten their makeup time. As shown in the following <Table 3>.

Table 3. How students got semi-permanent makeup.



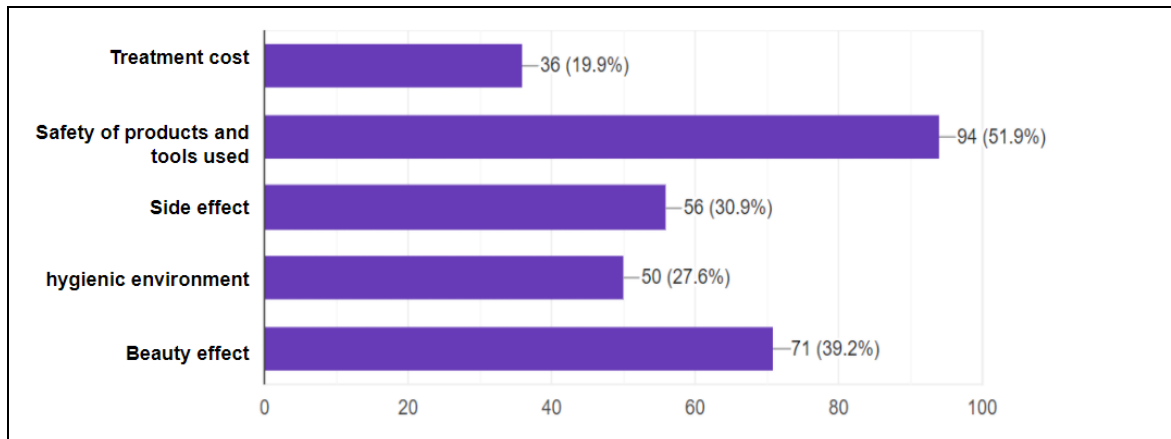
It was found that semi-permanent makeup was most frequently used in specialized shops(53.6%). As shown in the following <Table 4>.

Table 4. Semi-permanent makeup place.



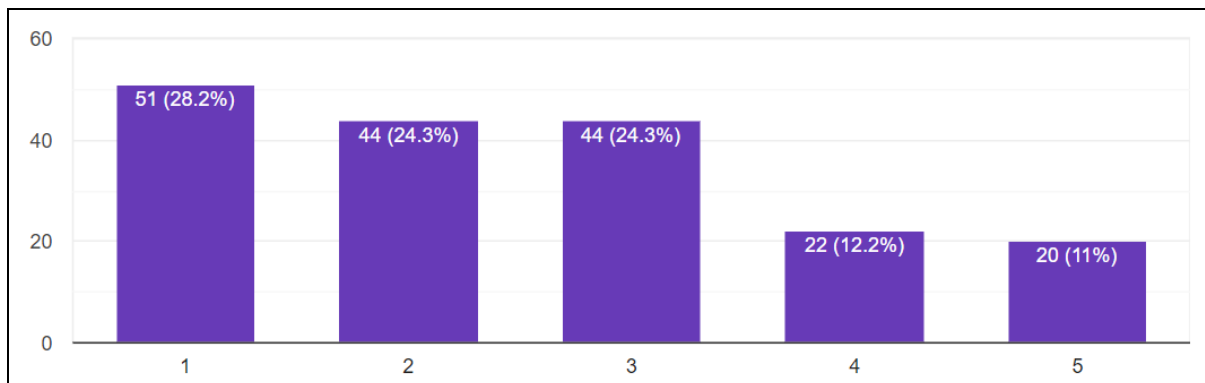
The most important factor to consider in order to increase satisfaction with semi-permanent makeup was 'safety and stability of tools'(51.9%). As shown in the following <Table 5>.

Table 5. The most important factor to consider to increase the satisfaction of semi-permanent makeup.



It was found that 52.5% of people did not know about the pigments used in semi-permanent makeup. As shown in the following <Table 6>.

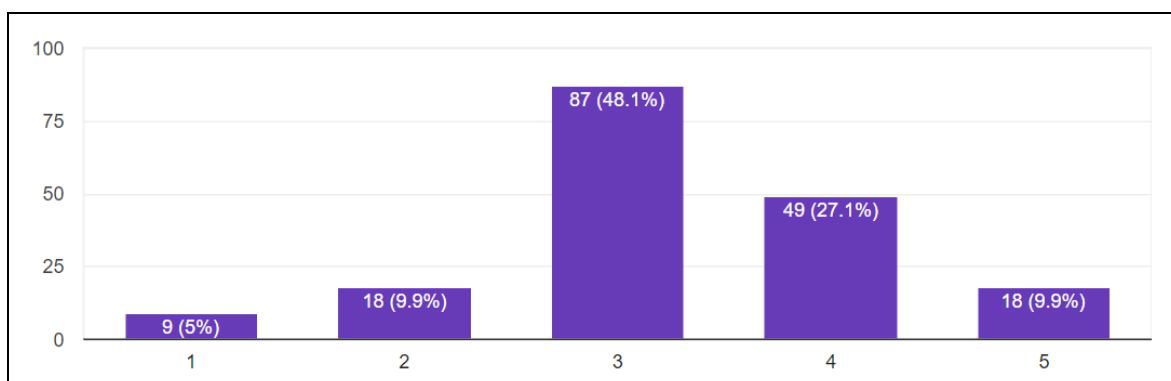
Table 6. Whether the pigments used in semi-permanent makeup are safe.



Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

When asked whether semi-permanent makeup is safe for health, 37% of people said it was safe. As shown in the following <Table 7>.

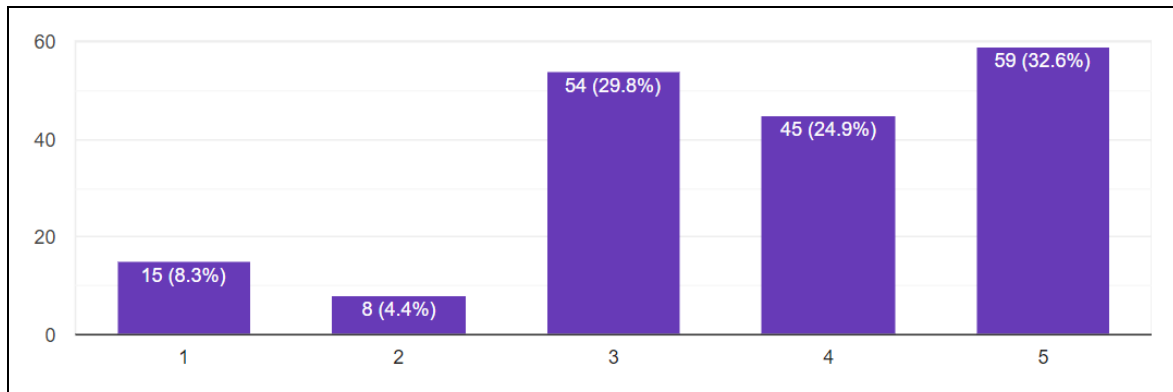
Table 7. Whether semi-permanent makeup is safe for health.



Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

57.5% answered that they want to continue using or retouch semi-permanent makeup. As shown in the following <Table 8>.

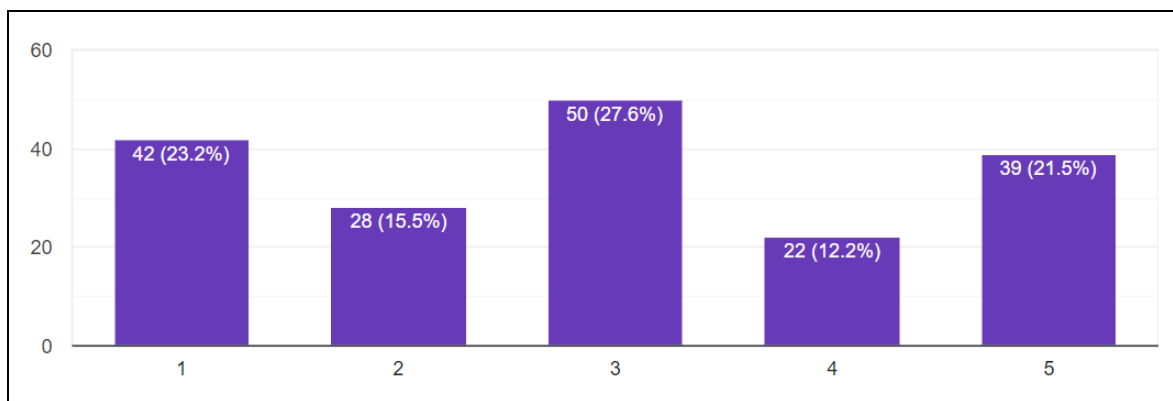
Table 8. Continued use and retouch.



Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

The opinion that they want to do semi-permanent makeup on eyeliner or lips was also found by 33.7%. As shown in the following <Table 9>.

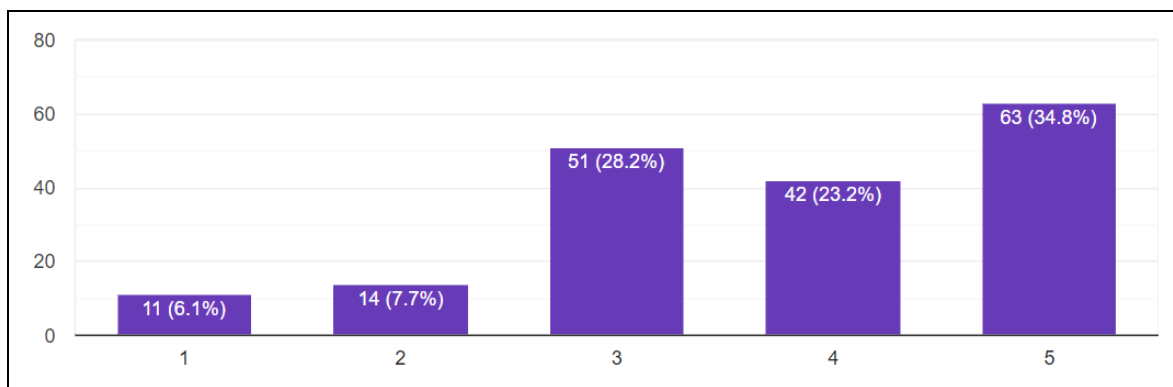
Table 9. Semi-permanent makeup on eyeliner and lips.



Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

The opinion that they want to recommend semi-permanent makeup to people around them was found to be 58.0%. As shown in the following <Table 10>.

Table 10. Recommended to friends.

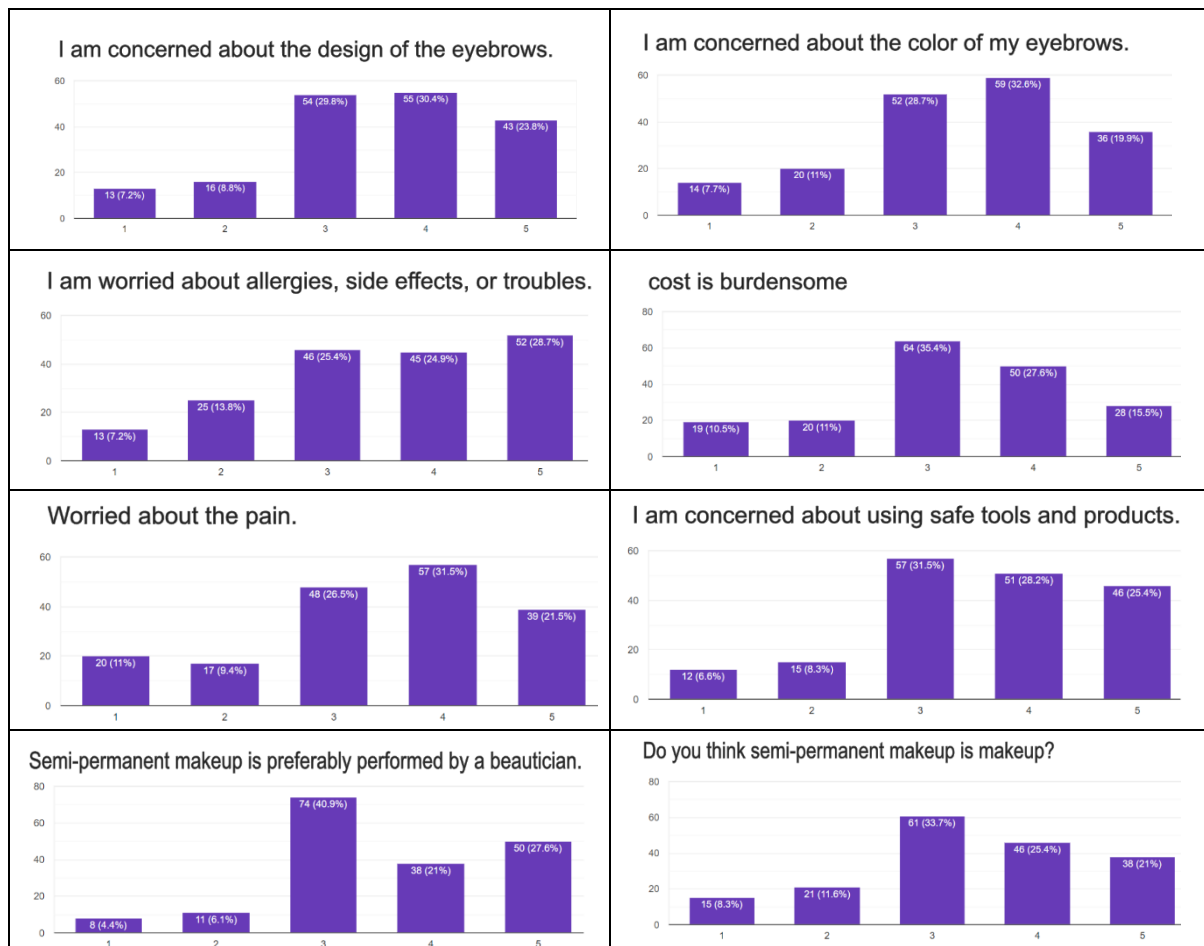


Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

4.3. Risk perception factors of semi-permanent makeup

The risk perception factors of semi-permanent makeup were design, eyebrow color, side effects or skin troubles, pain, and product and tool safety. However, the opinion that semi-permanent makeup should be performed by a beautician who is good at designing rather than a medical professional was preferred by 48.6%. 46.4% answered that semi-permanent makeup is a type of makeup. As shown in the following <Table 11>.

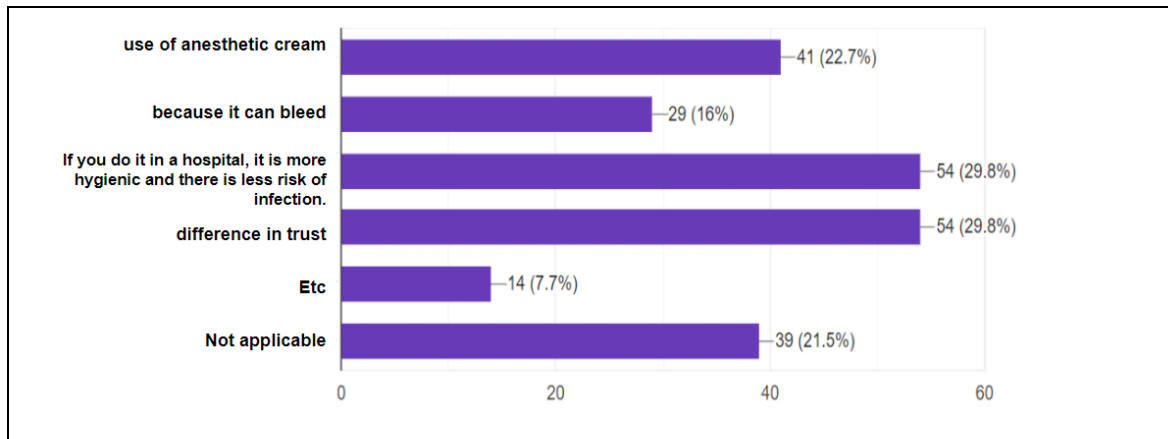
Table 11. Risk perception factors of semi-permanent makeup.



Note: 5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree.

Regarding the reasons for thinking that semi-permanent makeup should be regulated by the medical law, the highest responses were 'because it is more hygienic and less risk of infection if done in a hospital' and 'difference in trust' were the highest, followed by anesthetic cream. As shown in the following <Table 12>.

Table 12. Why semi-permanent makeup should be regulated by medical law.



5. Conclusion

This study investigated the risk perception and protection of semi-permanent makeup using a questionnaire method for female students. Most of the students who participated in the survey were female students in their 20s(88.5%).

The most common reason for receiving semi-permanent makeup was that they wanted to shorten the makeup time(34.3%). For the places where semi-permanent makeup was applied, the highest number was at specialty shops(56.9%). The most important factor to consider in order to increase the satisfaction of semi-permanent makeup procedures was 'safety and stability of the tools used'. It was found that 52.5% of people did not know about the pigments used in semi-permanent makeup. 37% answered that semi-permanent makeup is safe for health.

The risk perception factors of semi-permanent makeup were design, eyebrow color, side effects or skin troubles, pain, and product and tool safety. However, the opinion that semi-permanent makeup should be performed by a beautician who is good at designing rather than a medical professional was preferred by 49.1% of the respondents. 48.6% answered that semi-permanent makeup is not a medical procedure but makeup. However, what should be noted is that semi-permanent makeup should be regulated by the Medical Act due to factors such as 'because it is more hygienic and the risk of infection is less if done in a hospital', 'difference in trust', and 'anesthetic cream'.

In conclusion, in terms of design, it is desirable to have a beautician perform the procedure, but in terms of hygiene and reliability, it is considered desirable to do it in a hospital. However, when the general public applies semi-permanent makeup, it is considered to be desirable to thoroughly apply the semi-permanent makeup treatment education, environment, and hygiene management laws from the institutional point of view, as in the case of other countries. In follow-up studies, as the interest in makeup among men and the elderly is increasing, a detailed study on the perception and risk perception of semi-permanent makeup among men and the elderly is needed.

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7. Appendix

7.1. Authors contribution

| | Initial name | Contribution |
|-----------------------|--------------|---|
| Lead Author | DK | -Set of concepts <input checked="" type="checkbox"/> |
| | | -Design <input checked="" type="checkbox"/> |
| | | -Getting results <input checked="" type="checkbox"/> |
| | | -Analysis <input checked="" type="checkbox"/> |
| Corresponding Author* | JL | -Make a significant contribution to collection <input checked="" type="checkbox"/> |
| | | -Final approval of the paper <input checked="" type="checkbox"/> |
| | | -Corresponding <input checked="" type="checkbox"/> |
| | | -Play a decisive role in modification <input checked="" type="checkbox"/> |
| Co-Author | EL HO | -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"/> |