



# A Study of the Educational System for Opticians and Optometrists in Germany I

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(Received July 17, 2019; Revised August 7, 2019; Accepted August 9, 2019)

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**Purpose:** This study examined the general education system and the vocational education system of certification related to optometry in Germany. **Methods:** In this study, we obtained data on the basic educational system in Germany and collected data on the educational system that nurtures professional experts in the field of optometry through the homepage of ZVA, an advocacy group for the optometry trade in Germany, and various educational institutions. Through personal interactions with ZVA executives, we obtained the job enlargement plans, the education required, and legal data for occupations related to optometry in Germany. **Results:** Germany is training and producing optometric specialists through a variety of education and training programs, in response to various social changes and demands. Moreover, with the inauguration of the EU, Germany adopted a standardized optometry education system and has striven to train and produce optometrists according to these standards. Germany also provides standardized university education through continuing education, targeting opticians (Augenoptiker, or AOs) and optometrists (Augenoptikermeister, or AMs), thereby striving to nurture optometrists and expand the job scope. **Conclusions:** Germany has an educational system that provides high-quality eye health services for its people by offering various education opportunities and excellent human resources, through which it has been gaining the national trust. Korean optometrists need to come up with ways to receive national support through legal and administrative programs developed in accord with social changes and demands.

**Key words:** Dispensing optician, Refracting optician, Optometrist, Meister, Germany, Augenoptiker

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## INTRODUCTION

The Korean optometrist and optician system began in 1989 with the declaration of the Medical Technicians Act. Compared to when it was enacted, there have been increasing demands for eye health services due to many social changes, such as an increase in the number of patients with refraction error and visual dysfunction, as well as the need for new vision correction instruments, but the current law fails to reflect these social demands at all.<sup>[1]</sup>

At first the optician training institutes have operated a two-year program, but the training period was changed to three-to-four years to meet social changes and demands, and produce opticians with sufficient practical skills. Moreover,

master's and doctoral courses have also been established for the development of optometry based on academic research. Currently, colleges are training and nurturing not simply dispensing opticians but optometrists who can test and diagnose ametropia and visual dysfunction. However, due to the lack of long-term plans for the occupation of optometrist in Korea and the repeated training of human resources without legal support, Koreans are not able to receive various eye health services. In addition, an overabundance of optometrist training institutes and the poor working conditions of optometrists caused by regional imbalances are resulting in decreased preference for the optician job. (Here you seem to be conflating optometrists and opticians, when you have already defined them as two separate careers with different

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educations and qualifications.)<sup>[2]</sup>

Recently, there have been remarkable changes in optometry-related occupations in Germany, which has job categories very similar to those in Korea. Germany trains Augenoptiker (AOs) using a traditional apprenticeship education method. However, the educational system is changing with the introduction of the EU's universal standards and social changes. Traditional optometry-related occupations in Germany include AOs, AMs (Augenoptikermeister), and recently, optometrists that are produced by ZVA (Der Zentralverband der Augenoptiker und Optometristen) educational institutes and by universities.<sup>[3]</sup> The traditional apprenticeship curriculum is gradually changing into an optometrist training system of universities. The training period for each qualification or license is different, and the work scope is established differently depending on the curriculum, so people can become AOs, AMs, and optometrists using various education systems. In addition, according to the Handicrafts Code (Handwerksordnung),<sup>[4]</sup> AOs and AMs are approved as craftsmen, but there is no legal support for optometrists. However, there are colleges that are training optometrists, and graduates of these colleges are working at hospitals, clinics, and optical shops without legal sanctions.

Previously, in articles published about the German educational system related to optometry, there was no clear statement about the educational system in Germany.<sup>[5,6]</sup> In this study, therefore, we examined the education system of certification related to optometry in Germany. Studying the optometrist training system in Germany, which is implementing new occupations according to today's changing trends, will help Korea set a new direction for implementing the optometrist system.

## METHODS

In this study, various educational systems, including the general educational system, vocational education, and optometry-related training (AOs, AMs, and optometrists) in Germany were examined. We gathered data and papers from previous publications, from the homepage of educational organizations, from the homepage of ZVA in Germany, and from high-ranking officials to check the data and obtain information on policy directions. The results were compared with those of current Korean optometrists.

## RESULTS

### 1. General educational system in Germany<sup>[7]</sup>

The educational system in Germany is organized and run based on the people's rights that are guaranteed in the Basic Law for the Federal Republic of Germany and state constitutions, with the fundamental principle of education policy that respects individual interests and abilities as educational rights for all people. Table 1 shows the German educational system. Approximately 60% of students receive vocational education at the secondary level, and 40% of them receive liberal arts or humanities education, indicating that the system was established with the focus on vocational education. Compulsory education in Germany is nine years of education from age six, starting with primary school, but this includes compulsory vocational education until the age of 18. No matter which form of school students are attending, they should receive vocational education if they do not go on to regular school after graduating from the ninth grade. These legal regulations lay the groundwork for the development of vocational education in Germany. As the Basic Law clearly defines the right to choose one's occupation, technical training, and the place of labor, everyone should participate in vocational training, and there is a system established for all jobs to obtain relevant certifications.<sup>[8]</sup>

#### 1) Primary school (Grundschule)

Primary school (Grundschule) is compulsory education that begins at age six and goes on for four years. Students who have completed elementary school can choose their future career and school type while attending the fifth and sixth grades.

#### 2) Secondary school (Sekundarstufe 1, 2)

Secondary school consists of lower, intermediate, and upper secondary school. Lower secondary school (Hauptschule) provides the basic knowledge everyone needs, and about 20% of Grundschule graduates attend this school. After ninth grade, they move on to vocational training (Ausbildung), and while receiving it, they can enter part-time or full-time vocational school.

Intermediate secondary school (Realschule) is a school between Hauptschule and Gymnasium (see below) that prepares students for intermediate-level jobs in economics and administration. It is a six-year program, and after graduating

Table 1. The general education system in Germany

Age	Further education					Third sector
	Further vocational training			Universities		
19	Dual system			Vocational school	High school	Secondary Sector II
18						
17						
16						
15	Special needs school	Hauptschule (secondary modern school)	Realschule (secondary school)	Integrated comprehensive school	Gymnasium (high school)	Secondary sector I
14						
13						
12						
11						
10						
9	Primary school					Primary sector
8						
7						
6						
5	Daycare/kindergarten					Elementary sector
4						
3						
2						
1						

tenth grade, students go on to full-time vocational school (Berufsfachschule) or specialized upper secondary school (Fachoberschule), where they receive upper-level vocational training, or go on to university by transferring to upper Gymnasium level (Gymnasium Oberstufe).

Upper secondary school (Gymnasium) is attended by about 50% of students who complete Grundschule, and it is a traditional academic school for students aiming to go to university. The Gymnasium of the former West Germany had a nine-year program from the fifth to the 13th grade. Moreover, students in 11th to 13th grade, the Gymnasium Oberstufe, mostly select courses that suit their aptitude or interest except for a few required courses. They can select and prepare for the field in which they plan to specialize, which helps them study for their university major in advance. Before graduating Gymnasium, students take the Gymnasium graduation examination to meet university admission requirements, which is called Abitur.

Comprehensive school (Gesamtschule) is a school that combines Hauptschule, Realschule, and Gymnasium, with curricula for the fifth to tenth grades. It was established to solve the problems that may occur when students decide on their career paths when they are too young.

### 3) Higher education (Tertiärbereich)

University, which is an institution of higher education, includes General University (Universität), Technical University (Technische Universität), University of Education (Pädagogische Universität), University of Arts (Kunsthochschule), University of Music (Musikhochschule), University of Applied Sciences (Fachhochschule, Hochschule), and Comprehensive University (Gesamthochschule), which combines technical and general university. There are no entrance quota limitations except in a few departments. Before the EU integration, diplomas in Germany were classified into Diploma, Magister, and Doctor, and students could proceed to the Doctor program after completing Diploma or Magister.

The EU countries each had their own unique higher education systems, which was why in 1999 the Ministers of Education gathered and agreed to promote the international exchange of students and researchers by establishing a diploma system used throughout Europe, and to secure qualitative excellence in education. This consensus was classified into six categories, such as reform of the school system, ensuring of the quality of higher education, equal opportunities of higher education, higher education achievement levels and employment, lifelong learning, and international

exchange.<sup>[9]</sup> Through this consensus, Europe implemented a standard credit scheme through the credit transfer system among universities, and introduced the National Certification System to ensure the quality of university education so that students could get a diploma in any of the countries. Higher education in Europe had a diploma standardization system established through a credit transfer system called the ECTS (European Credit Transfer System).<sup>[10]</sup> The ECTS enables students in EU countries to have the credits they earned by one evaluation standard approved by and transferred to the others, thereby promoting the academic exchange of students within Europe. With this agreement, the higher education system in Germany was reformed into three years for Diploma, two years for Magister, and three years for Doctor.

#### 4) Vocational education

Germany has various vocational education systems, because students can choose their occupations at a very early age compared to Korea. Aside from the traditional dual education system (Duale Ausbildung), there is also vocational education focused on school.<sup>[11]</sup> Those receiving vocational training are students who completed the first level of secondary education-adolescents not attending Gymnasium or other educational institutions. There are various types of vocational schools, and those providing vocational education include vocational schools (Berufsbildende Schule), full-time vocational schools (Berufsfachschule), specialized upper secondary schools (Fachoberschule), and vocational upper secondary schools (Berufliches Gymnasium), which have different names depending on the regulations of the education law by the state governments. At vocational schools, students can complete secondary-level programs. Among these schools, the highest percentage of students attend Berufsfachschule. The curricula provided by Berufsfachschule are mostly for occupations defined at the level of each state government, with assistant jobs in various specialized fields. These curricula are for two to three years, and students must have a diploma for first-level secondary education to be admitted by these schools. Here, the two-year curriculum is to obtain the entrance qualifications for technical universities, and the three-year curriculum is a comprehensive program (Fachhochschulreife, Allgemeine Hochschulreife) to obtain the entrance qualifications for both dual vocational training and technical universities (Fachhochschule, Hochschule). In other words, the business commercial management assistant

program certified by the government is a full-time program carried out at a full-time vocational school for two years, and students can also obtain the entrance qualifications for general universities in specialized fields or for other technical universities. The key element of vocational training in Germany is the dual educational system and vocational school. The place for vocational training in the dual education system (Duale Ausbildung) is vocational school (Berufsschule) and enterprise (Betrieb). The learning spaces in the vocational school are classrooms, workrooms, and laboratories, and in the enterprise it is workplaces, offices, and laboratories, or lectures in a company. Duale Ausbildung is strictly based on industrial cooperation in which the enterprise is in charge of on-the-job vocational training, while vocational schools provide theoretical knowledge related to the major. Students receiving vocational training with Duale Ausbildung receive training at the enterprise three to four days a week, and at the vocational school for one to two days. Enterprises cover the expenses required for training, and pay the training support to fund the trainees according to the wage negotiation rules in each occupational field. This fund is about one-third of the first month's salary of a specialized profession on average. The graduation examination for Duale Ausbildung is divided into theoretical and practical training. After obtaining the certification, students can build their career in their specialized profession through continuing education, obtain a license as a Meister or business manager through the next-level curriculum in the scope of the national certification system, or seek promotion or a higher position in specialized fields. Dual study (Duale Studium) is a curriculum that includes the training period at the enterprise within the university study plan. Education is provided in two places, just as in Duale Ausbildung: theoretical learning at the university, and practical training at the enterprise. The contents of education are closely linked to each other. Duale Ausbildung does not have formal entrance standards, whereas Duale Studium has university entrance requirements.<sup>[8]</sup>

#### 2. AOs, AMs, and the optometrist training system

In Germany, there are various occupations related to eye health such as ophthalmologists, AOs, AMs, optometrists, and orthoptists.<sup>[1]</sup> An orthoptist is someone who works under the guidance of an ophthalmologist and thus does not have a direct effect on primary eye health, which is

why it is excluded in this study. Systems related to optometrists in Germany have a long history, so the curricula are very complicated. This is due to the unique system called the Meister (master craftsman) system. Careers and curricula vary depending on whether one chooses to become an ordinary worker, a middle manager, or a senior manager or engineer. These various curricula may seem complicated, but the scope of work that can be done also varies depending on the curriculum and qualification. In addition, since students decide on their careers at a young age in Germany, such a variety in curricula also offers opportunities for students to change their careers or receive higher education. This is because various curricula enable students to improve their financial satisfaction and start their own business through continuing education depending on their capabilities, and provide guidance and education for trainees as well. Table 2 shows Augenoptiker and Augenoptikermeister educational institutions.

### 1) AOs training

In general, AO is a certification obtained by students who graduated from secondary school, received Duale Ausbildung for two to three years, and took the examinations.<sup>[8,11]</sup> Students can receive training only where there are AMs to educate the trainees. For three years, Augenoptikergesellen (journeymen) learn management, communication, the preparation of eyeglasses for vision correction, and the effects and characteristics of optical devices. To participate in the program, students must have qualifications for secondary education and higher (mitterlerer Bildungsabschluss) or full-time vocational school (Fachhochschulreife). In 2017 there were approximately 6,845 Augenoptikergesellen in all education institutions (including the 33 Berufsschulen für Augenoptiker), excluding universities.<sup>[12]</sup> They cannot open an optical shop with the certification obtained after the Augenoptikergesellen curriculum, but they can be employed for work. To open an optical shop, they must complete higher education and be registered as AMs.

There are 38 educational institutions, and there is no limit to the number of students enrolled.

### 2) Staatlich geprüfter AOs, AMs training<sup>[13]</sup>

The conventional way to enter the optical industry is to become an AM. The AM is generally characterized by three core jobs: a specialist for optometric services, an

entrepreneur, and a supervisor of trainees. Basically, Meister is a title earned after successfully completing the AM examination, not a curriculum. Due to the complexity and difficulty of the examination, many institutions provide courses-part-time, full-time, or block instruction-to prepare for the final examination. In general, the courses take about 12-30 months. The contents of education follow the regulations of the AM examination (Augenoptikermeisterverordnung), consisting of theoretical and empirical knowledge as well as experience in the fitting of eyeglasses and contact lenses, subjective and objective refraction, and testing and decision-making for vision defects and dysfunctions. In addition, courses in economy, commerce, communication, and pedagogy are also provided. These courses are provided at education centers such as ZVA and the education center of the optometrists' guild in Hankensbüttel.<sup>[3,14]</sup> There are 18 institutions providing these curricula.

Due to the long regional administration and influence of guilds, there is the Staatlich geprüfter AO certification, which is a regional optometrist certification. Courses to become Staatlich geprüfter AOs require, at minimum, a secondary education at a special institution (Fachschulen) for Augenoptikergesellen. The Handicrafts Code was amended in 2004 and this is no longer mandatory, but an additional year of field training is required to enter this curriculum. Four institutions, in Cologne, Munich, Jena, and Diez, provide these courses. The study period is generally two years, complete with a final examination prescribed by the state government and the AM examination. Since education is based on the curriculum controlled by regular performance measurements, the title of Staatlich geprüfter AO has a higher level than traditional AMs. Thus, one might assume that there is a difference in job performance due to the diversity of the training process between the two certifications, but actually there is no difference.

A typical Meister institution has no restrictions on the admission quota. However, Staatlich geprüfter AO schools have a limited admission quota.

### 3) Optometrist training

There are three ways to earn the title of optometrist. The first is to receive education at an ZVA academy run by AMs and take the examination. Since 2010, ZVA has provided continuing education for Weiterbildungsangebot Optometrists (HWK), targeting Meisters. The second way AMs can obtain

Table 2. The Augenoptiker and Augenoptikermeister educational institutions

Educational institution	Admission requirements	Education period	Certifications
Augenoptikerschule, Hankensbüttel, Fachakademie für Augenoptik	Acquisition of the 'KL-Anpasser-Schein 1', acquisition of the 'Refractometry certificate 1', acquisition of the extended secondary school diploma (advanced SEC I), experience in vocational and occupational training in other European countries	Three years (Duale Ausbildung)	Augenoptiker
Städtische Berufsschule für Augenoptik, München		Three years (Duale Ausbildung)	Augenoptiker, Hochschulreife
Akademie der Augenoptik / ZVA-Bildungszentrum e. V., Dormagen	Vocational education completion, at least Realschule graduation or Hauptshule completed through grade 10, graduation from vocational school, at least six months' experience in Augenoptiker	Two years	Staatlich geprüfter Augenoptiker, Meister, Optometrist (with HWK) Fachhochschulreife
Höhere Fachschule für Augenoptik, Köln	Vocational education completion, Realschule graduation or Hauptshule grade 10 completion, graduation from vocational school, at least six months' experience as an Augenoptiker	Four semesters	Staatlich geprüfter Augenoptiker
Augenoptikerinnung des Landes Brandenburg & Technische Hochschule Brandenburg	General and subject-related university entrance qualification, college entrance qualification, or vocational qualification. At least two years of work experience (Augenoptiker, Feinoptiker, Elektroniker, Mechatroniker, Fotograf)	Seven semesters (3.5 years)	Bachelor of Engineering, Option: Optometrist (HWK) Augenoptikermeister
Städtische Fachschule für Augenoptik (FFA), München	Graduation certificate of the general education school, diploma of vocational school, apprentice certificate, proof of at least 12 months of journeyman activity in the optician's trade, Certified Apprentice Certificate (for vocational training abroad)	Two years (full-time)	Staatlich geprüfter Augenoptiker, Augenoptikermeister, or General college entrance qualification, vocational school diploma, apprenticeship certificate.
Förderkreis der Fachschule für Augenoptik, Jena	Qualification for the Augenoptikergesellen, at least one year as an Augenoptikergesellen	Two years (full-time)	Staatlich geprüfter Augenoptiker, Augenoptikermeister, apprenticeship training qualification, Fachhochschulreife.
Staatlich anerkannte, private Fachhochschule des Mittelstands (FHM) :Handwerkskammer zu Köln	Abitur or an equivalent university entrance qualification	4-4½ years (Triales Studium, Ausbildung + Bachelor + Meister)	Augenoptiker, Meister, Bachelor of Arts
Ifb, Karlsruhe	Qualification for the Augenoptikergesellen or a different master craftsman certificate are admitted to the master exam. No Augenoptikergesellen time is required.	10 months (full-time), 18 months (part-time)	Augenoptiker, preparing master exam
Staatlich anerkannte Fachschule für Augenoptik im BFW, Karlsruhe	Certificate of passing Augenoptikergesellen examination	Meister course (10 months, full-time), Meister course (14-18 months, part-time)	Augenoptiker, preparing master exam

the optometrist title is through continuing education at Fachhochschule or Hochschule, or through a university associated with ZVA. The third way is to graduate from the University of Applied Sciences (Fachhochschule or Hochschule) to earn a Bachelor of Sciences in Augenoptik/Optometrie. The bachelor's degree program generally takes six to seven semesters, including one semester of internship. The bachelor's degree itself can be considered the certification of optometrists. The curriculum follows that of the ECOO (the European Council of Optometry and Optics)<sup>[15]</sup> and ECTS

(the European Credit Transfer and Accumulation System).<sup>[10]</sup>

Currently there are seven universities of applied sciences providing curricula. These curricula aim for British optometrist and ECOO degrees, including the AM examination and optometry courses. This higher education requires qualifications such as Abitur in addition to perfectly completing the program as an Augenoptikergeselle. ZVA provides bachelor's degree programs for students who do not have the right qualifications. If students with these bachelor's degrees join the Handwerkskammer, they have equal rights

to the AM designation as craftsmen do. Table 3 shows the baccalaureate institutions of Augenoptik/Optometrie (except for Technische Hochschule Lübeck and Technische Hochschule Brandenburg).

In addition, the European Diploma in Optometry was established in 2000. It is offered by a range of accredited universities and institutions throughout Europe, allowing students to graduate with the European Diploma in Optometry alongside their degree or diploma.

#### 4) Postgraduate training

Germany has various training programs to nurture specialists after being qualified as AOs, AMs, or optometrists. The aforementioned optometrist program is a post-graduate program for those with field experience or an AM-level background. This content is expanded beyond the scope of AM examinations, with a focus on courses such as slit lamp examinations, ophthalmoscopes, screening tests, and ocular anatomy and physiology. Moreover, students may also receive more advanced or intensified biomedical education. They also require training as optometrists according to Europe and the World Council of Optometry (WCO).<sup>[16]</sup>

Universities in Jena, Aalen, and Berlin are running master's

programs in optometry and vision sciences for students with a bachelor's degree, which generally take three semesters. They are striving to provide high education quality in cooperation with optometry schools overseas. Candidates with a bachelor's degree, AO, or AM can participate in seminars and courses provided by ZVA, and can receive advanced education and specialist training in fields such as sports vision, contact lenses, and low vision. Table 4 shows the education flow chart for AO, AM, and optometrist.

As such, this study examined the basic education systems in Germany and the education systems to train specialists in optometry-related occupations. Specialists in optometry can take various curricula with different job scopes, and have opportunities to receive more advanced and higher education. There are more and more education institutions and graduates in optometry due to an increase in the number of people with visual dysfunction and ametropia, which results in regionally even distribution of optometric specialists, optical shops, and clinics. Thus, people can receive eye health services for free in many different regions. Moreover, with the inauguration of the EU, Germany adopted a standardized optometry education system and is striving to train and produce optometrists. Germany also provides

Table 3. The baccalaureate institutions of Augenoptik/Optometrie in Germany

Educational institution	Admission requirements	Education period	Certifications, Degree
University of Applied Sciences, Aachen with ZVA	No arbitur, Meister, Augenoptikergesellen	7-9 semesters: four semesters master training, 3+1 semester FH studies, one year meister training + two years FH studies	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie, Meister
University of Applied Sciences, Aalen	Hochschulzugangsberechtigung (HZB), arbitur, Meister	Seven semesters (ECTs 210)	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie
University of Applied Sciences, Jena	Abitur or Fachhochschulreife, completed vocational training as an augenoptiker	Six semesters	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie
University of Applied Sciences, Berlin	Fachhochschulreife, Fachgebundene, secondary school certificate, Completed vocational training as an augenoptiker. Other requirements: Optometrist training required before beginning of studies	Seven semesters	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie
University of Applied Sciences, Munich	Completed vocational training, high school diploma, Fachhochschulreife or at least three journeyman years	Seven semesters	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie
	Master's certificate or diploma	Five semesters	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie
	Abitur or Fachhochschulreife	4.5 years (including 21 months vocational training)	Bachelor of Science (B.Sc.) in Augenoptik/Optometrie and Augenoptikergeselle

Table 4. The education flow chart for AOs, AMs, optometrist

Postgraduate training		
- Specialization in contact lenses, sports optics, magnifying optical aids - Master Optometry/Master of Vision Sciences - Optometrist (ZVA/HWK) - ECOO diploma		
↑		
Augenoptikermeister (refracting optician/ optometrist)	Staatlich geprüfter Augenoptiker (refracting optician/ optometrist)	Bachelor of Science Augenoptiker/Optom- strie (refracting optician/ optometrist)
↑		
General educational attainment (Allge- meiner Bildungsab- schluss)	Intermediate educa- tion certificate (Mittlerer Bil- dungsabschluss)	Advanced technical college certificate or Arbitur (Fachhoch- schulreife)
↑		
Augenoptikergeselle (journeyman, dispensing optician)		

standardized university education through continuous education, targeting AOs and AMs, thereby striving to nurture optometrists and expand the job scope.

Currently, ophthalmologists, AMs, and optometrists are the ones providing primary eye health services in Germany. In this system, the AMs and optometrists send the patient to the ophthalmologists if ophthalmological abnormalities are discovered in patients during an eye examination. This system was not established in a short period of time. The prescription rate of eyeglasses for vision correction by AMs in 1972 was only about 5%. However, by 1996 the rate of prescriptions by AMs and optometrists had grown to 45%, and by ophthalmologists to 55%, and by 2016/2017 it had grown to 82% by AMs and optometrists, but only 18% by ophthalmologists.<sup>[16]</sup> This change began in 1972 because of the decision to allow AMs and optometrists to perform refractions, internal and external eye examinations, and in 2000, glaucoma and screening tests as well.<sup>[17]</sup> These decisions are made to contribute to the improvement of eye health for the people, not for the benefit of a certain organization or group.

Concerning the range of activities performed by AMs and optometrists, it is notable that they offer health services (such as subjective or objective refractions, or screenings for glaucoma) rather than simply handicraft services. However, the allocation to the handicrafts sector restricts the performance of medical activities, such as the diagnosis or treatment of eye diseases. Only the detection of eye health abnormalities is allowed, without medical assessment. This restriction is

the main reason for several attempts by the ZVA to release the Augenoptiker profession from the handicraft sector and establish it as a healthcare profession. These tendencies have been accompanied by initiatives to acknowledge the optometric profession officially in the German eyecare system, with an independent law for optometrists.<sup>[18]</sup>

Ametropia and glaucoma are classified as diseases in Germany as well. However, at optical shops, many patients receive free examinations such as refraction, examinations for contact lenses, visual function examinations, and screening tests. This is in line with the reform of health insurance in Germany. Financial support for optical devices for vision correction was abolished in 2004 with the reform of health insurance. In general, health insurance does not cover refractions for optical devices for vision correction even when it is prescribed by ophthalmologists.

Both professions perform primary eyecare services to an appreciable extent, and for the patient, there is no formal difference with regard to access to care. Regarding the costs of optometric and ophthalmologic services, in the statutory health insurance (SHI) program, financial support for optical appliances was widely abolished with the healthcare reform of 2004. Consequently, the share of costs borne by the statutory health insurers decreased from 16.4% in 2003 to 1.3% in 2009.<sup>[19]</sup> Moreover, since AM is an occupation that follows the Handicrafts Code and there are no laws supporting optometrists, health insurance does not cover overall eye examinations or other services provided by AMs and optometrists.

According to the Korean Ministry of Health and Welfare,<sup>[20]</sup> there are 2.1 doctors per thousand of the Korean population, which is half the number (4.4) in Germany. In addition, the annual number of medical checkups by doctors per capita in Korea was 14.9 in 2014, which is the highest level among OECD countries. This is 2.2 times the OECD average (6.8 cases). In 2017, the number of AMs and optometrists in Germany was 48,400,<sup>[16]</sup> and the number of ophthalmologists was 7,497,<sup>[21]</sup> while the number of optometrists in Korea was 42,398<sup>[22]</sup> and the number of ophthalmologists was 3,236.<sup>[23]</sup> The ratio of ophthalmologists to population is 9.1 (Germany)/6.3 (Korea) per hundred thousand, and that of optometrists is 59 (Germany)/82 (Korea). As such, Germany has many more ophthalmologists and fewer optometrists per capita than Korea. However, the ratio will be similar if the number of optometry university graduates in Germany is added. In 2014, among adults aged 18 and above in Germany,<sup>[16]</sup>



the rate of wearing eyeglasses was approximately 50% (excluding age 60 or above), and the rate in Korea was approximately 55.4% in 2015.<sup>[24]</sup>

As such, Germany has a lower rate of wearing eyeglasses than Korea but is still producing more ophthalmologists, AMs, and optometrists per capita than Korea. However, Germany is trying to expand the job scope of AMs and create new optometrist jobs. This is due to the change in the social perception of optometric specialists. Recently, in a reliability survey about AMs and optometrists, about 74% of respondents gave them scores of between 8 and 10 (out of 10).<sup>[16]</sup> This is direct evidence of the fact that people trust AMs and optometrists. Of course, they have been gaining national trust as craftsmen for a long time, but what is gaining national trust more than anything is the process of expanding the job scope, as well as the changes in practical curricula to provide a greater variety of eye health services for the people, along with social changes. This national trust is increasing the possibility of expanding the job scope of AMs and optometrists by acknowledging them as health personnel instead of craftsmen. In Korea, the ratio of examinations for vision correction instruments is 66.2% for optical shops and 28.3% for ophthalmologists. And according to a survey by the Korean Optometric Association (2017), 46.5% of respondents referred to Korean optometrists as ‘sellers of eyeglasses, sunglasses, and contact lenses’. The reality is that almost half the people perceive optometrists more as vendors than as eye test specialists (26.7%) or eye health specialists (12.5%).<sup>[25]</sup> This result is due to the lack of legal and administrative support, which falls behind the trend.

## CONCLUSIONS

In this study, we examined the optometry specialist training and education system in Germany, which has a similar system and work scope as Korea. Germany is training and producing optometric specialists through various educational and training programs according to social changes and demands. Germany has an educational system to provide high-quality eye health services for its people by providing various educational opportunities for excellent human resources, based on which it is gaining greater national trust. Therefore, it is necessary for Korean optometrists to come up with ways to receive national support, legally and administratively, according to social changes. In our next paper, we will discuss

the optometry curriculum of WCO, ECOO, and Germany.

## ACKNOWLEDGMENT

This work was supported by the research year program of 2018 Gwangju Health University. The authors would like to thank Dip. Mr. Dirk Schäfermeyer for his helpful discussions.

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## 독일의 마이스터와 검안사 교육시스템에 관한 연구 I

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투고일(2019년 7월 17일), 수정일(2019년 8월 7일), 게재확정일(2019년 8월 9일)

**목적:** 본 연구에서는 독일의 일반적인 교육시스템과 검안관련 자격들의 직업 교육시스템에 대하여 연구하였다. **방법:** 독일의 기본적인 교육시스템과 검안 관련 직종의 전문가를 양성하는 교육시스템에 대한 자료를 ZVA와 각 교육기관의 홈페이지를 통해 얻었다. 그리고 ZVA의 임원들과 개인적인 교류를 통하여 독일에서 검안 관련 직종의 직무 영역 확대 계획, 교육과 법률적인 자료를 얻었다. **결과:** 독일에서는 사회적 변화와 요구에 따른 다양한 교육, 훈련과정을 통하여 검안관련 전문가들을 양성, 배출하고 있다. 그리고 유럽연합의 출범으로 인해 공통된 검안사교육과정을 도입하여 검안사들을 양성, 배출하려는 노력을 하고 있고, 기존의 AO와 AM들을 대상으로는 계속교육을 통해 대학의 표준화된 교육과정을 제공함으로써 검안전문가 양성과 직무영역 표준화를 꾀하고 있다. **결론:** 독일에서는 우수한 인재들에게 다양한 교육과정의 기회를 제공함으로써 국민들에게 질 높은 안보건서비스를 제공할 수 있는 교육시스템을 갖추고 있다. 이를 바탕으로 국민의 신뢰를 얻고 있다. 그러므로 한국 검안사들이 사회적 변화에 따른 법률적, 행정적 지원을 바탕으로 국민적 지지를 받는 방안을 마련하는 것이 필요할 것으로 보인다.

**주제어:** 조제안경사, 굴절안경사, 검안사, 마이스터, 독일, Augentoptiker