YEDITEPE UNIVERSITY
GRADUATE SCHOOL OF EDUCATIONAL SCIENCES

A CURRICULUM DEVELOPMENT STUDY FOR NATURAL GAS HEATING AND GAS BURNER DEVICE SERVICE PERSONNEL TRAINING

Volkan Binici

Istanbul - 2024

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by
Volkan Binici

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ABSTRACT

THESIS: A CURRICULUM DEVELOPMENT STUDY FOR NATURAL GAS HEATING AND GAS BURNER DEVICE SERVICE PERSONNEL TRAINING

Companies tend to work with personnel who have both core competencies and are compatible with firm values. Therefore, they expect vocational education to equip learners, their future employees, to be equipped with the skills and knowledge required to reach their goals. Although public and private institutions tend to provide vocational training, they do not always equip the learners with all the necessary skills and knowledge, companies may not be able to meet the need for experienced technicians. The aim of this study is to develop a curriculum to train technicians to be equipped competencies related to the profession by taking advantage of academic knowledge, in-service training experiences and the features of the on-the-job training curriculum. In line with the protocol established between the firm and the university, about the profession; needs analysis, training of trainers, participant selection, training program goals, content, instruction, measurement-assessment and program evaluation processes were carried out. For this purpose, a program for "Natural Gas Heating and Gas Burning Device Service Personnel Level (4) Profession" was developed in cooperation in line with the firm's goals and needs. In the process of developing the curriculum; Of the 17 sustainable development goals; Five targets are directly (no poverty, quality education, gender equality, decent work and economic growth, reducing inequalities), and five targets are closely related (no hunger, health and quality life, sustainable cities and communities, responsible production and consumption industry, innovation and industry) was taken into consideration during the training program development process. In addition, firm expectations, industry needs and personal career expectations of technician participants were taken into account. During the curriculum development process, action research method was used. The developed curriculum was applied to six technician participants. Applications; it took place in the firm's training department, authorized services and the Istanbul Branch of the Contemporary Drama Association. During the curriculum development process, firm-specific situations were encountered. For this reason, a new model was developed by contributing to the feedback processes of the model used in the curriculum development

process. All data was obtained from needs analysis, desk-based design, implementation and evaluation processes. During the implementation phase, the development of the technician participants was monitored and evaluated qualitatively by the researcher, firm trainers, firm regional managers, authorized service managers and masters. In this study, the competency-based content approach and the spiral approach were used to observe the effects of these approaches on technician training and participants. Firm standard tests and firm evaluation system were used in the evaluation of the trainings for the participants. Vocational Qualifications Authority (VQA) examination system was used as an external evaluation element. Throughout the entire process, the firm's trainers were supported with theoretical and practical knowledge of curriculum development. The process of obtaining opinions from experts and firm managers for curriculum evaluation purposes was carried out with the program evaluation model developed for the profession. In summary, in this study; in cooperation with industry and academia; an effective training program and model for vocational education, employment and sustainable development has been developed, resulting in international accreditation.

Keywords: Curriculum development model, On-the-job training, Competency-based approach, Sustainable development, Vocational training

ÖZET

TEZ BAŞLIĞI: DOĞALGAZLI ISITMA VE GAZ BRÜLÖR CİHAZI SERVİS PERSONELİ EĞİTİMİNE YÖNELİK EĞİTİM PROGRAMI GELİŞTİRME ÇALIŞMASI

Firmalar, hem temel yeterliliklere sahip hem de firma değerleriyle uyumlu personelle çalışma eğilimindedir. Mesleki eğitim veren birçok kamu ve özel kurumu olmasına rağmen, öğrencilerin sektör için gerekli bilgi ve becerilerle donatılmasında, zorluk çekilmektedir. Bu nedenler firmalar deneyimli teknisyen ihtiyacını karşılayamamaktadır. Bu çalışmanın amacı akademik bilgi, firma hizmetiçi öğretim deneyimleri ve işbaşı eğitim programının özelliklerinden yararlanarak mesleğe dair tüm yeterliliklere sahip olabilecek teknisyen yetiştirmeye yönelik bir eğitim programı geliştirmektir. Firma ve üniversite arasında oluşturulan protolol doğrultusunda, mesleğe ait; ihtiyaç analizi, eğiticilerin eğitimi, aday belirleme, eğitim programının hedef, içerik, Öğretim yöntemleri, ölçme-değerlendirme süreçlerinin belirlenmesi ve program değerlendirme süreçleri gerçekleştirilmiştir. Bu amaçla, firma hedefleri ve ihtiyaçları doğrultusunda işbirliği yapılarak, "Doğal Gaz Isıtma ve Gaz Yakıcı Cihaz Servis Personeli Seviye (4) Mesleği"ne yönelik program geliştirilmiştir. Öğretim programı geliştirme sürecinde; 17 sürdürülebilir kalkınma hedefinden; beş hedef doğrudan (yoksulluğa son, kaliteli eğitim, toplumsal cinsiyet eşitliği, insana yakışır iş ve ekonomik büyüme, eşitsizliklerin azaltılması), beş hedef te yakından ilişkili olarak (açlığa son, sağlık ve kaliteli yaşam, sürdürülebilir şehirler ve topluluklar, sorumlu üretim ve tüketim sanayi, inovasyon ve sanayi) eğitim programı geliştirme sürecinde dikkate alınmıştır. Ayrıca, firma beklentileri, sektör ihtiyaçları ve teknisyen adaylarının kişisel kariyer beklentileri dikkate alınmıştır. Program geliştirme sürecinde, eylem araştırması yönteminden yararlanılmıştır. Geliştirilen program altı teknisyen adayına uygulanmıştır. Uygulamalar; firma eğitim depertmanında, yetkili servislerde ve Çağdaş Drama Derneği İstanbul Şubesinde gerçekleşmiştir. Program geliştirme sürecinde, firmaya özgün durumlarla karşılaşılmıştır. Bu nedenle, program geliştirme sürecinde yararlanılan modelin geribildirim süreçlerine katkı sağlanarak yeni bir model geliştirilmiştir. Tüm veriler ihtiyaç analizi, masa-başı tasarım, uygulama ve değerlendirme süreçlerinden elde edilmiştir.

Uygulama aşamasında teknisyen adaylarının gelişimleri, araştırmacı, firma eğitmenleri, firma bölge sorumluları, yetkili servis sorumluları ve ustalar tarafından izlenmiş, nitel olarak değerlendirilmiştir. Bu çalışmada, yeterliliği dayalı içerik yaklaşımı ve sarmal yaklaşımdan yararlanılarak bu yaklaşımların teknisyenlik eğitimine ve katılımcılara yönelik etkileri gözlenmiştir. Katılımcılara yönelik eğitimlerin değerlendirilmesinde, firma standart testleri ve firma değerlendirme sisteminden yararlanılmıştır. Dış değerlendirme unsuru olarak Mesleki Yeterlilik Kurumu (MYK) sınav sisteminden yararlanılmıştır. Tüm süreç boyunca firmanın eğitmenleri program geliştirmenin teorik ve uygulamaya yönelik bilgileriyle desteklenmiştir. Program değerlendirme amaçlı uzman ve firma yöneticilerinden görüş alma süreci, mesleğe yönelik geliştirilen program değerlendirme modeli ile gerçekleştirilmiştir. Özet olarak bu çalışmada; sektör ve akademi işbirliği ile; uluslararası akredite ile sonuçlanan meslek eğitimi, istihdam ve sürdürülebilir kalkınmaya yönelik etkili bir eğitim programı ve modeli geliştirilmiştir.

Anahtar Kelimeler: Program geliştirme modeli, İşbaşı eğitimi, Yeterlilik temelli yaklaşım, Sürdürülebilir kalkınma, Meslek eğitimi

DEDICATION

To all the women who strive to build the future and their own future...

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LIST OF ABBREVIATIONS

ACA	Authorized certification agency
İŞKUR	Input matrix
ISCO 08	Plant transfer matrix
EQF	European qualifications framework
TQF	Türkiye qualifications Framework
NOS	National occupational Standard
NQ	National qualification
VQA	Vocational qualifications authority
UbD	Understanding by design
OSH	Occupational safety and health
WEF	World economic form

1. INTRODUCTION

The two World Wars and the pandemics such as Spanish flu during the first half of the 20th century resulted in immense casualties of living things and nature as well as financial and physical devastation. As of the end of the Second World War universities, teacher education and vocational and technical education were reorganized. Since it was seen that skill level requirements of occupations were increasing due to technology and globalization and new jobs were being created. Transitions from traditional apprenticeship education to formal education in vocational and technical education began (Finch & Crunkilton, 1999). To cope with these volatile skill level demands sound generic skills, problem solving, and complex communication skills became very important (Autor, Levy, and Murnane, 2003). This prolific growth and demands required purposeful, deliberate, and systematic organization of curriculum, namely curriculum design. The curricula were designed to support the advancements in science, technology, trade and the volatile skill level demands of the labor market. Namely, the developmental abilities and needs of youth and scholarly structuralism have been guiding the design of the curricula at all levels and institutions ever since.

One of the challenges of vocational and technical education has been designing the curricula based on the forecasting of the requirements of the labor market. Since, forecasting the requirements of labor market has become very difficult considering the paste of evolving changes especially as of 21st century. Moreover, forecasts provide useful yet limited and not always reliable data in terms of specific skills (Richardson and Tan, 2007; Barnow, 2002; Neugart and Schömann, 2002; Sexton, 2002). Therefore, the challenge that vocational and technical schools have been facing has created a gap in fulfilling the demands of the labour market. For this reason, majority of the companies set up training departments to better meet both their manufacturing and service needs. Firms have turned to employing trainers in order to better meet customer expectations and provide quality training. In time the corporate training has been grounded in theory, curriculum been developed; different educational technologies and new teaching methods have been employed so that employees can generate new knowledge for the development of the organization. In addition, to ensure that these trainings are systematic and planned, they carry out curriculum studies by getting help from both their internal resources and the

academic world. In other words, the aim becomes sustainable development rather than maintaining the status quo. So, employees are expected to be open and ready to learn new specific skills during their career (Smits, 2007; Ghost, 2002).

While all these technological, scientific and commercial developments continued at a dizzying pace, the concept of "sustainable development" emerged in 1972. This concept has been defined as “development that meets the needs of today without compromising the ability of future generations to meet their own needs.” Sustainable development promotes development that is pro-poor, pro-jobs, pro-women and children and pro-environment; it does not focus solely on environmental issues (UNDP, 2015). One of the main goals of Sustainable Development is to enable the youth and adults with the relevant skills for employment and entrepreneurship via high quality Vocational and Technical education by 2030.

1.1. Background of the Study

Nowadays, the need for qualified technical personnel in industry-related sectors is an important phenomenon. All developed world countries are taking initiatives to benefit from human resources around the world in terms of qualified employees. Companies cannot reach technicians with the desired skills due to problems arising from the current vocational training system. Technicians who can gain qualifications by working within the sector cannot turn into qualified personnel as they used to, due to the intense need for knowledge and skills brought about by technological transformation. Training programs to be created in cooperation with the academy and the industry can respond to the solution of this problem. These collaboration initiatives between industry and academia; It can contribute to firm expectations, total training costs, optimality of the training period, and participant technicians reaching their expectations. Organized information is likely to contribute to companies with well-defined expectations.

Curriculum is very comprehensive in its scope. It touches all aspects of the life of the pupils- the need and interest of the pupils, environment which should be educationally congenial to them, ways and manners in which their interests can be handled and warmed-up, the procedures and approaches which cause effective learning among them, the social efficiency of the individuals and how they fit in with the community around. It is

intimately related with the individual as a member of the society. Curriculum design refers to the structure or organization of the curriculum, and curriculum development includes the planning, implementation, and evaluation processes of the curriculum. There are different approaches and models that could be employed in designing and/or developing curriculum.

1.2. Problem Statement

The interest of scholars and policy makers in university-business collaboration (UBC) has been increasing sharply in recent times (Abramo et al. 2011; Crespo and Dridi 2007; Perkmann et al. 2011) owing to its potential to provide benefits for society as well as advantageous outcomes for societal stakeholders (Schiller and Brimble 2009; Liefner and Schiller 2008; Mazzoleni 2008; Bercovitz and Feldmann 2006) in the face of increasing global competition, businesses are challenged to seek new methods for creating their competheive advantage (Tresserras and MacGregor 2005; Tucker et al. 2002). The ability to gather information, generates new knowledge, disseminate, and apply this knowledge to achieve improvement and innovation is an organization's knowledge productivity. Knowledge productivity will remain the dominant economic factor in a knowledge society and stresses the importance of a flexible and competent workforce. Creating powerful learning environments is crucial in this context.

Collaboration with industry is critical for academia **to create scientific knowledge and obtain industrial data**. In turn, collaboration with universities is crucial for organizations in joint, scientific-based research projects to develop solutions for production-sourced problems (Kaymaz & Eryiğit, 2011). Partnering improve the quality of curriculum, increase resources to students, and allow students to acquire both hard and soft skills that are highly sought after in the corporate world. Moreover, it provides the opportunity to merge theory with empirical evidence through interviews, surveys and research projects.

Collaboration in relation to curriculum design and delivery, in particular, has received very little academic attention (Siegel, 2007), despite its widespread practice (Davey et al. 2011) and its ability to enrich education (Forsyth et al. 2009; Siegel 2007). In line with the recent report examining the impact of university-business cooperation in the context of education (Healy et al. 2014), curriculum design encompasses the design of

university programs, courses and related content at all levels; while curriculum delivery is understood in this context as the delivery of programs, courses and content to students via a large range of mechanisms, such as lectures, live projects, placements and other (Davey et al. 2011). The lack of research in this context is particularly surprising in a European context, given the high rates of European unemployment (Eurostat, 2013), an urgent need to improve employability in European countries (Asderaki, 2009) as well as a need to develop the entrepreneurial behaviour that is critical to achieve progress (Reynolds et al. 2005; Dew and Sarasvathy 2007).

Studies on training technicians in general, and specifically on female technicians, have not been found in the literature to develop a curriculum for the purpose of training internationally accredited technicians in cooperation with the industry and academia. In addition, in limited efforts to train technicians, professions that did not require the employee to be accredited were preferred (technician assistant, etc.). There are companies that do not require complex qualifications for women's employment in industrial sectors and organize short-term (1-15 days) training (welding, air conditioning technician assistant, gas station personnel, etc.). Women employed as a result of these trainings stand out in the advertising and promotional activities of companies.

1.3. Purpose of the Study

In this study; a curriculum for the profession of heating and gas-burning deviceservice personnel was created and implemented, and the effectiveness of the curriculum was evaluated.

Within the scope of sustainable development goals, a curriculum focused on employment, sensitive to gender equality and giving importance to labor market expectations will be developed. While developing this curriculum; It is aimed to prepare, implement and evaluate a curriculum for the profession of "Natural Gas Heating and Gas Burner Device Service Person" by using the SUPSKY curriculum design model, understanding-based design (UbD) framework and action research method. The main aim is to help students obtain a profession and job by receiving a qualified education, thanks to the development of a competency-based curriculum for Heating and Gas Burner Device Service Personnel. The developed curriculum is aimed to have a positive impact on

women's employment in industrial sectors. However, in order for men and women to benefit from the curriculum, it is planned to be sensitive to gender equality, not sexist. For this reason, the term "woman" is not used in the thesis name.

1.4. Research Question

How can a curriculum be developed for natural gas heating and gas burner device service personnel training be developed?

Sub-Research Questions:

Research question sub-research questions are listed below and shown in Table 1.

Needs analysis

1. What kind of curriculum can be developed for training natural gas heating and burner device service personnel?

1.1. What are the unmet needs of natural gas heating and gas burner device service personnel for the design of curriculum for their pre-service training?

1.2 What are the expectations of the authorized service administrators from the natural gas heating and gas burner device service personnel?

1.3. What are the opinions of the senior natural gas heating and gas burner device service personnel about the knowledge and skills that the natural gas heating and gas burner device service personnel should be equipped with?

1.4 What were the facilitative factors and constraints encountered during the pre-service trainings experienced by the trainers who have been giving in-service training?

Design

2. How should the curriculum be designed for the training of natural gas heating and gas burner device service personnel?

2.1 What are the required competencies defined by the Vocational Qualifications Authority?

2.2. What are the opinions of consumers about the required skills and knowledge to be natural gas heating and gas burner device service personnel?

2.3. How should a curriculum be designed for natural gas heating and gas burner device service personnel training?

2.4. What should be the features of the model to be selected for curriculum development?

Implementation

3. Is it appropriate to implement and develop the designed curriculum?

3.1. How should the curriculum be implemented for the service personnel training of the natural gas heating and gas burner device?

3.2. Is the designed curriculum implemented in accordance with the model used?

Evaluation

Does the developed curriculum meet the training needs of natural gas heating and gas burner device service personnel?

4.1. What are the opinions of participants, trainers, and senior workmen about the implemented natural gas heating and gas burner device service personnel training curriculum?

4.2. Has the curriculum been developed in accordance with the model applied in its design?

Table 1

Research question and sub-research questions

Research Question: How can a curriculum be developed for natural gas heating and gas burner device service personnel training be developed?	1. What is the training need of natural gas heating and gas burner device service personnel? (Needs analysis)	1.1. What are the unmet needs of natural gas heating and gas burner device service personnel for the design of curriculum for their pre-service training?
		1.2 What are the expectations of the authorized service administrators from the natural gas heating and gas burner device service personnel?
		1.3. What are the opinions of the senior natural gas heating and gas burner device service personnel about the knowledge and skills that the natural gas heating and gas burner device service personnel should be equipped with?
		1.4 What were the facilitative factors and constraints encountered during the pre-service trainings experienced by the trainers who have been giving in-service training?
	2. How should the curriculum be designed for the training of natural gas heating and gas burner device service personnel? (Design)	2.1 What are the required competencies defined by the Vocational Qualifications Authority?
		2.2. What are the opinions of consumers about the required skills and knowledge to be natural gas heating and gas burner device service personnel?
		2.3. How should a curriculum be designed for natural gas heating and gas burner device service personnel training?
		2.4. What should be the features of the model to be selected for curriculum development?
	3. Is it appropriate to implementation and develop the designed curriculum? (Implementation)	3.1. How should the training program be implemented for the service personnel training of the natural gas heating and gas burner device?
		3.2. Is the designed curriculum implemented in accordance with the model used?
	4. Does the developed curriculum meet the training needs of natural gas heating and gas burner device service personnel? (Evaluation)	4.1. What are the opinions of participants, trainers, and senior workmen about the implemented natural gas heating and gas burner device service personnel training curriculum?
		4.2. Has the curriculum been developed in accordance with the model applied in its design?

1.5. Significance of the Study

Due to the increase in job opportunities for individuals who receive qualified vocational and technical education, companies want to meet the need for qualified personnel.

In general, there is a need for technician training, in particular, a heating and gas-burning device service personnel technician. Companies meet their technician needs from people who have been trained in the sector or who have received vocational training. However, due to the lack of trained personnel in the labor market and the lack of sufficient knowledge and skills of graduates from vocational training institutions, companies want to solve the qualified technical personnel they need through the training units they have created. The view that technicians who respect society and nature, have business ethics, can solve problems, have effective communication and persuasion skills, are suitable for teamwork, and have technological knowledge and skills related to their profession, can be easily employed in the entire sector. However, the units of the companies that provide training in this direction do not have curriculums that can provide technician training. It is stated by the companies that the trainings given within the scope of on-the-job training supported by İŞKUR are not able to sufficiently benefit from scientific-based curricula, teaching materials, learning and teaching techniques and strategies. With the help of this study; A curriculum preparation model can be created to develop a curriculum suitable for on-the-job training incentives for 614 professions internationally certified by VQA. The curriculum to be prepared can contribute to achieving quality education, sensitive to gender equality, decent work and economic growth in line with the objectives of sustainable development. Testing the SUPSKY model in technical and vocational education can both contribute to the development of the model and pave the way for the formation of a new model. Thanks to this study, it is important to contribute to the employment of individuals by preparing a qualified, academic and scientific curriculum by preparing a heating and gas-burning device service personnel education curriculum. It is important that vocational curriculums that are compatible with industry expectations contribute to creating economic value by positively affecting both employer and employee satisfaction.

1.6. Assumptions

The assumptions of this study are as follows:

1. Participants of the study group gave sincere answers to the data collection tools.

2. The data collection tools in the research are valid and reliable.

3. Collaboration between curriculum and instruction departments and private sectors to design training prior to recruiment of the personnel can be beneficial in terms of equipping them with necessary skills and knowledge more effectively and efficiently and thus make sound evaluations.

1.7. Limitations

This study has limitations in terms of the study group. The limitation of the study group to a single institution may limit the generalizability of these findings to other technicians

1.8. Key Consepts

Authorized Service: A commercial organization authorized by Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Company that performs combi boiler sales, installation, maintenance and repair.

Competency-Based Teaching: There is goal-based learning and competencies are at the forefront at all stages of curriculum design. Learning objectives are determined according to competencies and the contents of the relevant discipline are prepared in accordance with these competencies**.**

Firm: Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Company

Gender equality: Gender equality is when people of all genders have equal rights, responsibilities and opportunities (https://www.vic.gov.au/gender-equality-what-it-and-why-do-we-need-it).

Natural Gas Heating and Gas Burner Service Personnel (Level 4): Natural Gas Heating and Gas Burner Service Personnel (Level 4); by taking occupational health and

safety and environmental precautions, organizing work within the framework of quality systems, receiving and planning work demands, installing combustible devices, commissioning these devices, performing maintenance and repair operations, informing the customer (user) and carrying out activities related to professional development is a person (VQA , 2016).

Occupational health and safety (OHS); These are systematic and scientific studies carried out to protect against conditions that may harm health due to various reasons during the execution of work in the workplace and to improve existing health and safety conditions.

On-The-Job Training Program:

On-the-job training is based on learning new knowledge, skills, practices and technologies that are needed by an individual having a profession, without departing from the work setting, under the guidance of an experienced specialist, by undertaking the duties assigned by him/her, experimenting and observing the practices of the expert (Dekeyser et al., 2005).

It is the training program carried out to enable the unemployed registered with İŞKUR to gain professional experience and increase their employability (https://www.iskur.gov.tr/is-arayan/aktif-isgucu-programlari/isbasi-egitim-programlari). These are the programs organized by the General Directorate of the Turkish Employment Agency (İŞKUR) in order to ensure that the unemployed registered in the Agency gain professional experience, see the implementation in the professions they receive theoretical training, and adapt to the working environment (https://meslegimhayatim.meb.gov.tr/egitim/isbasi-egitimi).

Profession: Natural gas heating and gas burning device service personnel level 4.

Program: Natural Gas Heating and Gas Burning Device Service Personnel Level 4 curriculum.

The Sustainable Development Goals: They are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection,

and job opportunities, while tackling climate change and environmental protection (https://www.un.org/sustainabledevelopment/).

UbD (Understanding by Design): It is an instructional design model that aims to develop the skills of explanation, empathy, personal knowledge, different perspectives, implementation and interpretation (Wiggins and McTighe, 2005).

2. LITERATURE REVIEV

In vocational and technical education, developing a competency-based on-the-job training program for adults and a program compatible with sustainable development goals constheute the general scope of this study. The other main aim of this study is to create a curriculum that can meet sectoral expectations in cooperation with the firm and the academy.

2.1.Sustainable Development

One of the expectations of companies, especially in recent years, is sustainable development. The concept of sustainable development emerged in the 1970s as a compromise between sustained economic growth and nature conservation. Originally used to respond to environmental concerns, sustainable development has expanded over time to include social and economic perspectives. Thus, it can be said that sustainable development is an effort to combine social and economic issues with ecological concerns. Sustainability is economic development that takes full account of the environmental consequences of economic activities and is based on the use of resources that can be replaced or renewed and therefore inexhaustible (Gedik, 2020).

Many institutions have made efforts to fully define and express sustainable development. The following statements can be shown as examples of these definitions and institutions:

Brundtland (1987) defined sustainable development as: development that meets the needs of the present without compromising the ability of future generations to meet their needs. According to the United Nations Environment Program Finance Initiative published in 1997 (https://www.unepfi.org/about/about-us/), sustainable development; It is based on a positive interaction between economic and social development and environmental protection to balance the interests of current and future generations. European Commission (2004) sustainable development; It defines progress as combining immediate and long-term needs, local and global needs, and viewing social, economic, and environmental needs as integral and interdependent components of human progress. (Bhanot at al., 2019: 43; Ahi ve Searcy, 2013: 331; Wiese at al., 2012: 321). The most widely used definition of

sustainability is development that focuses on sustainable development, meeting the needs of the present without compromising the ability of future generations to meet their own needs (Pitelis, 2013: 3).

2.1.1. Social Dimension of Sustainable Development

The concept of sustainable development has gained new dimensions over time. The social dimension is one of the important components of the concept of sustainable development. Sustainable development includes focus on both environmental concerns and economic and social concerns. Since economic activities in developed countries are closely linked to the problems of poverty and degradation in underdeveloped countries, a strategy that takes sustainable development into account should recognize this link and aim to reduce the environmental burden and increase economic benefits for less developed markets affected by the activities of businesses (Montiel and Delgado-Ceballos, 2014: 10).

Approaches to the social dimension of sustainable development are as diverse as approaches to the economic dimension. Social sustainability can be defined as the extent to which social values, social identheies, social relations and social institutions can continue into the future. Social sustainability requires preserving the integrity of society and its ability to work towards common goals. Health and well-being must meet such individual needs as nutrition, housing, education and cultural expression (Moldan et al., 2012: 5). A significant part of the sustainable development discourse now emphasizes the importance of social equality. Social sustainability is a development and/or growth compatible with the development of civil society, which creates an environment that allows culturally and socially diverse groups to live together in harmony, while at the same time promoting social integration by improving the quality of life of all segments of society. This definition considers social sustainability in terms of issues of the collective functioning of society and individual quality of life.

Urban social sustainability is the ability of a city to function as a long-term, livable environment for human interaction, communication, and cultural development. (Bramley and Power, 2009: 31). The stability of social sustainability relates to how social/cultural preferences, characteristics and the environment are maintained over time. The concept of sustainable development is based on three moral imperatives: meeting human needs, ensuring social equality and respecting environmental limits. (Holden et al., 2017: 4).

The World Commission on Economic Development (WCED) popularized the concept of sustainable development in its report Our Common Future (Brundtland). According to WCED, sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. WCED has argued that sustainable development requires the simultaneous adoption of environmental, economic and equity principles. Although this claim was initially met with skepticism because it challenged the long-established assumption that environmental integrity and social equity are incompatible with economic prosperity, over time the institutional commitment to sustainable development has changed significantly(Bansal, 2005: 197; Damtoft et al., 2008: 115). WCED's definition of sustainable development has been extremely influential in developing a global view of the future of our planet. The concept's influence has spread rapidly in national and international policy development, making it a key element of policy documents of governments, international institutions, and business organizations (Mebratu, 1998: 494).

Sustainability and sustainable development are one of the most critical issues to meet people's basic needs, balanced use of natural resources, long-term economic growth and to leave a better world to future generations. At this point, it is also important that all countries work in line with the 17 sustainable development goals that the United Nations last updated in 2015. Within the scope of the subject, Vyas-doorgapersad, S. (2019) and Güneş and Binboğa (2021); there are studies focused on gender inequality, women's poverty and sustainable development.

2.1.2. United Nations Sustainable Development Perspective

Sustainable development; It is a concept on a global scale, not just within country borders. Therefore, cooperation is required for the whole world to create common standards and action plans. At this point, the importance and function of the UN is important for the 17 basic sustainability goals. In 2000, in order to clarify the sustainable development goals on a global scale, the United Nations (UN) announced the development goals under the name "Millennium Development Goals", in which 193 countries and 23 international companies participated and which will end in 2015. The scope of the targets set on many issues such as poverty, hunger, women's rights, child deaths, epidemics and environmental problems has remained inadequate over time. In 2016, new targets were

determined and entered into force with the cooperation of 193 UN member countries. The 17 goals expected to be achieved by 2030 are announced under the thele "Sustainable Development Goals (SDG)" These are (https://turkiye.un.org/tr/sdgs, E.T: 19.07.2023): 1. No Poverty 2. No Hunger 3. Health and Quality Life 4. Quality Education 5. Gender Equality 6. Clean Water and Sanitation 7. Accessible and Clean Energy 8. Decent Work and Economic Growth 9. Industry, Innovation and Industry 10. Reducing Inequalities 11. Sustainable Cities and Communities 12. Responsible Production and Consumption 13. Climate Action 14. Aquatic Life 15. Terrestrial Life 16. Peace, Justice and Strong İnstitutions 17. Partnerships for Purposes

The term sustainable development was first defined in the report Our Common Future (also known as the Brundtland Report) by the United Nations' World Commission on Environment and Development (WCED), chaired by Gro Harlem Brundtland of Norway. In this report, the term sustainability development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Basiago, 1999: 148; Redclif, 2005: 212. The term sustainable development in the Brundtland Report essentially includes two basic concepts (Barkemeyer and Holt, 2014:2): 1) The concept of needs, especially the basic needs of the world's poor that should be prioritized and 2) It is the idea of the limitations that technology and social organization impose on the ability of the environment to meet current and future needs.

The United Nations World Summit on Social Development was held in Copenhagen, the capital of Denmark, in 1995. At the end of the meeting, with the participation of 186 delegates, ten commitments and a 100-page action program were announced in a 25-page declaration. Issues addressed at the summit included eradicating poverty, expanding productive employment, reducing unemployment and promoting social integration at international/national levels (Angus, 1995:1).

The decision to establish a set of sustainable development goals is considered the most concrete outcome of the 2012 United Nations (UN) Rio + 20 Conference on Sustainable Development. Sustainable development goals have the potential to serve as guides at multiple scales for shared and lasting prosperity. It also represents an important opportunity to move beyond the development agenda of the Millennium Development Goals (MDGs) towards a universally relevant agenda that integrates social, economic and

environmental objectives, and includes targets for both developed and developing countries. Therefore, the Sustainable Development Goals Open Working Group (OWG) has proposed 17 goals and 169 goals. These goals and targets formed the basis of formal negotiations that resulted in the adoption of the sustainable development goals by the UN General Assembly in September 2015 (Hajer, et al., 2015: 1652).

In September 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development (Transforming Our World: The 2030 Agenda for Sustainable Development), a resolution outlining a new framework that forms the cornerstone of the sustainable development agenda that will last until 2030.This new framework replaced the Millennium Development Goals (MDG) framework, which expired in 2015, by setting 17 universal goals and 169 goals called sustainable development goals.To measure progress towards achieving the targets, the UN Statistical Commission has prepared an indicator framework aligned with the targets and established the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDG). The IAEG-SDGs have announced a total of 230 indicators to measure achievement of 169 targets (GBD 2015 SDG Collaborators, 2016: 1813).

The SDG was established under the auspices of the Economic and Social Council in 1992, as a direct result of the United Nations Conference on Environment and Development. It covers the social, environmental, economic and institutional aspects of sustainable development. Although the main aim was to create a common set of country-level indicators that could be published as a comprehensive comparative time-series data set, the Sustainable Development Goals were designed for voluntary use by countries at the national level only and were emphasized to be appropriate to country-specific circumstances (Parris and Kates, 2003: 4-8).

In September 2015, world leaders adopted Agenda 2030 and the new Sustainable Development Goals at the United Nations (UN) in New York. Agenda 2030 replaced the Millennium Development Goals, which lasted until the end of 2015. The 2030 Agenda for Sustainable Development sets out 17 integrated and indivisible Global Goals (UN, 2015). Sustainable Development 2030 Agenda; It aims to reduce poverty (Global Goal 1) and inequalities (Global Goal 10), achieve gender equality (Global Goal 5) and promote inclusive and sustainable economic growth, full and productive employment for all, and human well-being (Global Goal 8). Nine targets and indicators have been set under Global

Goal 5 to achieve gender equality and empower all women and girls (http://www.kureselhedefler.org/hedefler/toplumsal-cinsiyet-esitligi/). Sustainable Development 2030 Agenda; In order to achieve the goal of gender equality, providing comprehensive and accessible public employment services, creating entrepreneurship training and support programs for women, preparing and implementing a women's employment plan for gender equality in working life, and empowering women for access to decent jobs have been identified as priority areas (Murat, 2017).

2.1.3. World Economic Forum Sustainable Development Perspective

The driving force for the creation and realization of sustainable development goals is the countries, multinational companies and local economic representatives that direct the world economy. Economic forces are the most important and determining function of the economic system. The World Economic Forum (WEF) uses many indices to understand how sustainable development affects the world economy. Many indicators developed by different institutions are used to measure whether sustainable development goals have been achieved.

Environmental Sustainability Index

The World Economic Forum's environmental sustainability index is also a composite index derived from 68 indicators for 148 countries. These indicators are collected into 5 components and 20 basic indicators. These; environmental systems (air and water quality, water quanthey, biodiversity and land), reducing environmental stresses (air pollution, water and ecosystem stresses, waste and consumption pressures and population growth), reducing human vulnerability (basic human nutrition and environmental health), social and institutional capacity (science and technology, freedom of debate, environmental governance, private sector responsiveness and eco-efficiency) and global governance - participation in international cooperative efforts to reduce greenhouse gas emissions and cross-border environmental pressures- (Parris and Kates, 2003: 4-8).

Indicators Used to Measure Sustainable Development

• United Nations Commission for Sustainable Development (UN CSD)

• Consultative Group on Sustainable Development Indicators (CGSDI)

• Welfare Index

• Environmental Sustainability Index

• Global Scenario Group

• Ecological Footprint

• Original Progress Indicator

• US Interagency Working Group on Sustainable Development Indicators (IWGSDI)

• Costa Rica Sustainable Development Indicators System

• Boston Indicators Project

• US Central Intelligence Agency

• Failure Task Force

• Global Reporting Initiative (Parris and Kates, 2003: 4-8).

2.2. Formal and Non-Formal Vocational Education in Türkiye

Vocational and technical education is especially affected by the integrated relationships of globalization, competitiiveness, employment, education, qualified workforce, labor laws and similar phenomena.

Globalization and Competitiveness

Developed countries of the world; they are restructuring their education systems by re-planning and constantly changing, and especially in order to create a qualified workforce (Gür, 2011). Here, both the government and the industry need to develop a model with joint work. The education system implemented just the country the industry can produce results that will provide competition advantage. It is seen that the countries that have achieved this advantage in competition became successful (Gür, 2011). There is a direct relationship between the lack of qualified labor force and the lack of vocational and technical education; This creates significant negative effects on businesses (Gür, 2011).

International Instheue for Management Development (IMD, 2005), National competttitiveness is defined in The World Competitiveness Yearbook as follows:

"A country's competitiveness is the ability that the creation of more value for the country's companies and growth and maintenance of an environment that sustains greater well-being for people."

IMD emphasizes the importance of developing investments to build competitiveness, especially at the secondary education level and what it includes in lifelong education (IMD, 2005).

There are many factors that affect competitiveness in the world. There are different rankings and naming of these, and priorities vary. Chief among these factors are; Human Resources - Qualified Workforce is coming (MESS, 1997). A country's manpower availability and its quality is an extremely important factor in terms of creating competheive power.

Here, areas such as, the population of the country, the structure of the population, the growth rates of the population, the working power, the ratio of the female workforce to the total workforce, the young workforce and its ratio to the total workforce, resources allocated to education and the amount of education investment per capita, brain drain, quality of life, health investments, development skils and information in education stand out in the evaluations (MESS, 1997) In achieving competitiveness on a world scale; it is of great importance to implement methods such as developing basic skills, supporting firm collaborations, enriching the quality of the workforce and developing leadership in businesses (Dulupçu, 2001). Having employees equipped with qualified knowledge and skills represent an important advantage in ensuring competitiveness and in performing the basic functions of businesses in the best way possible. The quality, speed and reliability of the activities carried out by experts in their field will increase and this process will directly or indirectly affect the competitiveness of businesses (Kayabaşı, 2010).

Skilled Workforce

Kincheole (1999; p. 14) stated that in a democratic society, the profession will never turn into a blind technical process, and that transformations are a form of self-realization. In the context of Qualified Workforce; it is important to make human capital investments

to increase the quality of the workforce. Factors such as equipping the workforce with capital, manpower and education planning can lead countries to enrich themselves in terms of qualified workforce and reflect this advantageous situation to international trade. Skilled workers are more flexible than unskilled workers and can adapt to new technologies at less cost. As a result this, as companies employ more skilled workers, their costs will decrease and they will subsequently be able to do more R&D, their market share will grow further and their profitability will be better (Booth and Snower, 1996). For sustainable economic development and competition, all productivity must be used in some way. In the development process, the human factor, which is at least as far more important as physical capital and even more important, has a very important place. The basis for the human factor to be effective in this process lies in improving and raising the quality of people through investment and education. If this cannot be achieved and the required quanthey and quality of labor force cannot be created, the expected progress in power development and competitiveness cannot be achieved (Ak & Bingül, 2011).

Failure to meet the demand for qualified workforce in working life also affects the expectations and future of those who demand the workforce. Businesses cannot find the qualified personnel they demand or cannot provide them in sufficient quantheies. As a matter of fact, according to İŞKUR's December 2010 statistics, 53.7% of those who requested personnel from the institution in December requested qualified personnel. On the other hand, when looking at job placements, only 39.3% of this demand could be met. However, at the same time, millions of people in this country are unemployed. (http://www.sp.gov.tr/upload/xSPRapor/files/dHLgO+2010_Y_l_Faaliyet_Raporu.pdf).

Change in the Quality of Work and Labor Force

In its projection for 2030, WEF predicts that radical changes will occur in both job quality and job rates. The world economy makes plans taking this data into consideration. WEF also shares in detail the expected changes in the cognitive, affective and psychomotor skills of employees.

The Increasing Importance of the Female Workforce

Greater economic equality between women and men indicates higher gross domestic product and better governance. Especially considering the age and education structures of developing countries, it is seen that women exhibit lower participation rates than they

should, despite their potential. It is stated that in such countries, if women's participation in the workforce can be increased to the expected levels according to their age and education levels, household incomes can increase by up to 25%, and this is extremely important in terms of reducing poverty and increasing the standard of living (World Bank, 2009).

From Türkiye's perspective, women's labor force participation rates are still quite low. In the Ninth Development Plan covering the period 2007-2013, it is aimed to increase the labor force participation rate of women from 23% to 29.6%. In order to achieve this, increasing the employability of women through education, especially vocational training and entrepreneurship, expanding child and elderly care services, taking measures against the discrimination that women face in working life, eliminating the income differences between men and women in terms of those working in similar jobs, increasing women's entrepreneurship. It is aimed to carry out studies such as the realization of legal regulations regarding gender equality (http://www.tuik.gov.tr). It has carried out empirical applications on the obstacles and solutions to women's participation in the workforce in Türkiye. Researches; It has been shown that education, marital status, economic resources, gender perception and place of residence are prominent factors in determining women's participation in the workforce (Kılıç and Selcen, 2014; Çetin Aydın & Aytaç, 2020).

2.2.1. Formal Vocational Education

Although there are different ways of defining it, in the most general sense, formal education is; provided regularly in schools to individuals in a certain age group and at the same level, with curriculums prepared for the purpose, in accordance with their structure and level (Türk, 1999). Formal education; It includes institutions of pre-school education, primary education, secondary education, special education, special education and higher education (Gültekin, 2018). The main purpose of formal education is; is to promote the transfer of learning, defined as the implementation of some knowledge learned in a particular context to a different situation. It should encourage transfer of learning, defined as the implementation of knowledge learned in one context to a different situation (Salmeron, 2013).

The formal education process is called formal and non-formal education depending on whether it takes place in school or outside of school. Formal education is the education provided regularly under the roof of the school, through educational programs prepared for the purpose, for individuals in a certain age group and at the same level (Taymaz, 1992, p.3). Graduality and continuity are the determining factors in formal education. In non-formal education, the education process is carried out without adhering to a plan. Formal education: It is a process carried out by implementing a plan or curriculum in schools or institutions. Each educational level forms the basis for the next one, and a student who cannot successfully complete an educational level cannot move on to the next level (Gürkan, 2006). Those who successfully complete an education level are given a diploma or an academic degree. Courses opened on various subjects in public education centers and in-service training activities organized in public and private institutions and workplaces are included in this scope. What formal and non-formal education have in common is that educational activities are planned and programmed. In fact, formal and informal education cannot be separated from each other with clear lines. In some cases, the existence of both informal and formal education can be mentioned at the same time (Erden, 1998, p.16).

The issue of qualification of the workforce is included in the OECD's 2004 Türkiye Economic Research Report and subsequent reports. It is presented as a sub-suggestion that the improvement of the basic education system due to Turkey's young and rapidly growing population will be effective in this qualification (OECD, 2008:165). (OECD, 2008:165). In OECD Türkiye reports, the rigidity of the Turkish labor market and the emphasis on the need for reform has been the primary themes. In OECD Economic Surveys: Turkey 2004, the Labor Law, which came into force in 2003, is credited with removing restrictive regulations on temporary and part-time employment types. However, more regulations are needed for Turkey, which still faces rural-urban migration and especially youth unemployment. Increasing the level of qualifications in the labor market and opening new job areas are the priorities (OECD, 2004:82). (OECD, 2004:82). Turkey's employment and economic growth problem is addressed directly in connection with education reform. In order to increase the productivity of the workforce, general education as well as vocational education must be increased, because, strikingly, the report states that the unemployment levels of workers without education are lower (OECD, 2004:83).

In parallel with OECD policies, the Vocational Qualifications Authority (VQA), which was established in 2015 by Law No. 5544, is established as an important coordination center to observe the European Acquis on vocational education and vocational training and especially on vocational standards. The compliance of vocational training with international standards is determined within this framework by National Qualifications and certification processes are carried out within the İnstitution. In addition to existing as a coordinator, the institution contributes to the organization of the philosophy of acquiring a new profession in Turkey in the form of a network. Certification activities gaining momentum within non-formal education and lifelong learning are the elements of this new vocational education network, which is essentially motivated by "employability" (Pınar, 2016).

Within the scope of the transfer of OECD, WEF and Turkey's qualified workforce policies to vocational education, common components of qualified workforce have been determined. These components and the skills that individuals are expected to have; Adapts quickly to competheive conditions, can work with a team, has problem solving ability, is information literate, takes initiative, can establish two-way communication, is customer (user) oriented, constantly learns and develops, has general knowledge and skills in matters related to his profession, has at least It is defined as being expert and disciplined in a subject (MEB, 2012:53). Vocational and technical education aims to train a competent workforce that has national and international vocational competence, professional ethics and professional values, is innovative, entrepreneurial, productive and adds value to the economy, in cooperation with social and economic sectors. With vocational and technical education, it is aimed to create a vocational and technical education system that provides appropriate learning opportunities in line with the interests, abilities, and temperaments of individuals, is innovative, focuses on business and professional ethics, prepares people for employment, is developed according to the needs of the economic and social sectors and is constantly renewed in cooperation with stakeholders. (https://meslegimhayatim.meb.gov.tr/hakkimizda/mesleki-ve-teknik-egitimin-amaci).

2.2.2. Non-Formal Vocational Education

Non-formal education is the education provided in line with the interests and needs of people who have never been included in the formal education system, are at any level of this system, or have left one of these levels (Taymaz, 1992, s.3). Non-formal Education is an educational process in which various general trainings are given for a certain purpose in the light of the needs of the society, and these trainings are carried out in accordance with the calendar and time determined by the institutions, and if those who request it are successful, they receive a certificate in return.

Non-formal education covers all educational activities organized alongside or outside formal education in the field of interest and need for individuals who have never entered the formal education system, are at any level of the formal education system, or have left one of these levels. Non-formal education; it consists of two parts: general and vocational technical non-formal education. Non-formal education; It is out-of-school education provided to adults to teach them how to read and write, to provide them with basic information, to improve the knowledge and skills they acquired in their last education level, and to provide them with new opportunities to earn a living (Gültekin, 2018).

Non-formal education includes programs designed to address some of the problems seen in society. So it is goal oriented rather than just certification. It aims to eliminate the problem. In a non-formal education institution, information that is abstract and will not benefit human life is not taught. The information is mostly information that helps people continue their lives. Therefore, this point is extremely important. An individual who has received a certificate from a non-formal education institution is a person who has gained qualifications in a job. Therefore, at this point, it becomes easier for a person to get involved in a profession.Non-formal education can be shaped according to the needs of the individual. Whatever the individual thinks, wants, and aims on the subject; He/she can continue his/her education in accordance with these thoughts, wishes and goals. Likewise, this type of training program is continued with the active participation of the individual. An individual takes the same steps towards a career in a non-formal education institution. For this reason, they are programs that can provide expertise. Non-formal education is economical. The individual benefits from the opportunities available in non-formal education institutions. Therefore, there is no need to incur any expenses. Non-formal

education is an educational model that continues throughout life. When an individual is directed to a profession in line with the education he received after leaving the educational institution, his education for that profession continues at the workplace. Therefore, it continues to learn by constantly renewing itself (https://meslegimhayatim.meb.gov.tr/egitim/yaygin-egitim).

2.2.3. On-the-job training

On-the-job training (OJT) is a practical approach to acquiring new knowledge and skills required for a job in a real or near-process work environment. Graphics are used to learn how to play certain vehicles or equipment in a live practice, simulated or training environment (Bouchrika, 2023). On-the-job training is a practical method of imparting the vital knowledge, skills and competencies required for employees to bring detailed activities to their operations.According to Garavan et al., on-the-job training represents a set of processes involving the assimilation and acquisition of integrated sets of values, skills, knowledge and emotions that occur naturally to a particular learner and lead to fundamental changes in the behavior of employees or constheuents (Matsuo and Nakahara, 2013).

On-the-Job Training Program (OJTP) in Turkey; these are courses or trainings organized in registered workplaces to enable the unemployed to reinforce the theoretical knowledge they have previously acquired by practicing or to gain professional experience (Aktif İşgücü Hizmetleri Yönetmeliği, 2020). These trainings; Labor market research results, while vocational counseling is given in interviews with the unemployed; It is organized in line with the needs identified during workplace visits of job and vocational counselors or the demands from participating employers. OJTPs aim to increase the employability of participants by gaining professional experience (İŞKUR, 2019). On-the-Job Training Program is defined as an on-the-job learning program that aims to enable students to reinforce their professional knowledge by practicing in the workplace and to learn by seeing business and production processes firsthand. The problem of professional experience, which is one of the important causes of unemployment, is solved through On-the-Job Training Programs, and employers have the opportunity to train the people they want to hire without incurring any costs. On-the-job training, which plays an important role in personal economic, social and cultural development, also has an important share in

the growth and development processes of countries. (Yıldırım and Şahin, 2015: 77-78). Countries with strong human capital are open to change and development and have the advantage of high competitiveness (Goel, 2011).

The benefits of the on-the-job training program, which is an improved and unique structure of the concept known as internship, for job seekers; It can be expressed as gaining professional experience and skills, facilitating employment, eliminating the lack of experience, earning income during the program and enabling compulsory internships (Yazıcı, 2015; TÜİK, 2014; TÜİK, 2015; İŞKUR, 2015 Monthly and Annual Statistical Bulletins).

The curriculum has significant benefits for employers as well as for the unemployed. The main ones are; observing the professional development and experience of the people they plan to hire, training the people they plan to hire without incurring any costs, providing a competheive advantage by reducing labor costs, benefiting from incentives by employing participants, and deducting the extra payments they make to participants from the tax base. Moreover, they can be listed as observing the professional development and experience of the people they plan to hire, training the people they plan to hire without incurring high costs, providing a competheive advantage by reducing labor costs, benefiting from incentives by employing participants, and having a high level of harmony between the position and the employee due to personalized training (Yazıcı, 2015: 200; Kobes, 2013: 3).

Active Labor Market Policies (ALMP) and On-the-Job Training Program Among the arguments of İŞKUR in the fight against unemployment, perhaps the most important are active labor market policies. Although ALMP has a very broad definition and content in the world literature, it generally appears as policies that aim to integrate the unemployed into the labor market, adapt them and increase their employability.

In Turkey, İŞKUR provides vocational training courses, on-the-job training programs, entrepreneurship training programs, social benefit programs and other programs within the scope of active labor force services to help maintain and increase employment, improve the professional qualifications of the unemployed, reduce unemployment and bring groups that require special policies into the labor market. Organizes courses, programs, projects and special implementations.

Training that improves technical capacity, analytical ability and functionality provides opportunities for greater access to labor markets and livelihoods (Almeida ve De Faria, 2014: 21). However, theoretical training must be reinforced with real-life events in order to ensure its effectiveness against market needs (Nelson et al., 2012: 115). In order to make training effective and efficient, dynamic training programs should be created in which theoretical and practical knowledge can be combined (Alipour et al., 2009: 67). On-the-job training programs include theoretical verbal and written training as well as practical training that includes observations and practices (Saraf, 2017: 5). In this way, it is possible to eliminate people's lack of experience and work in harmony with the workplace and employers (Yıldız, 2016: 258). On-the-job training programs are considered a useful model in meeting the need for skilled workers in the rapidly changing and complex working life with the development of technology (Saraf, 2017: 4). In this context, on-the-job training also makes important contributions to determining the future strategy of organizations. With on-the-job training programs, employees can learn the job directly in the workplace, and employers can select their employees on the job based on performance without incurring high costs (Acar and Yabanova, 2017: 105). Benefits of on-the-job training programs for job seekers; these can be listed as contributing to the elimination of knowledge, skill and experience deficiencies, facilitating employment, generating income during the program and providing the opportunity to develop career opportunities (Yazıcı, 2015: 1999; Galindo, 1999: 21; Kobes, 2013: 3).

Moreover, they can be listed as observing the professional development and experience of the people they plan to hire, training the people they plan to hire without incurring high costs, providing a competheive advantage by reducing labor costs, benefiting from incentives by employing participants, and having a high level of harmony between the position and the employee due to personalized training (Yazıcı, 2015: 200; Kobes, 2013: 3).

On-the-job training programs are trainings given to unemployed people in their workplaces to enable them to reinforce the theoretical knowledge they have previously acquired by practicing or to gain professional experience. On-the-job training program: It is on-the-job training given in workplaces that meet the minimum conditions determined by the İnstitution, in order to provide participants with professional experience (https://www.resmigazete.gov.tr/eskiler/2013/03/20130312-7.htm).

Can the expected goals be achieved with current on-the-job training programs? What are the shortcomings of current on-the-job training programs? There are two important questions that need to be answered.

It is important that the on-the-job training program provides practical training opportunities and work discipline, contributes to knowledge and skills, provides the opportunity to meet new people and socialize, and provides a certificate. Negatively regarding the on-the-job training program; It can be said that the wage paid is insufficient, old-age insurance premiums are not paid in some practices, there is a wage difference between the participants, the duration of the on-the-job training program is long, and being referred to as an apprentice in the working environment creates pressure.

As a training program for students, OJT is designed to immerse students in work environments relevant to their field of work to learn about workplace knowledge, productivity, and respect for the workplace. Beyond helping students apply the principles, ideas and theories they learn in the classroom, OJT enables them to develop their technical skills, knowledge and attheudes towards work. In this way, it allows students to gain work experience, which in most cases (6 out of 10) translates into full-time employment (Adams, 2012). This is supported by recent research showing that 56.1% of interns become employees (NACE, 2019).

An interesting fact to note, however, is that various terms for on-the-job training for students around the world (e.g., apprenticeships, internships, and placements) are used and are not always clearly defined (Mulder, Messmann ve Konig, 2015). As a result, the circumstances may differ in terms of the aim and purpose of the training, its legal status and the liability of the trainee concerned.

A new graduate's probability of finding a job increases with the time that has passed since graduation (Garrouste & Rodrigues, 2012).This simply means that the transition from education to the labor market is particularly difficult immediately after graduation. To streamline this process, employers and learning institutions advocate for better implementation of students' on-the-job training.

The OJT coordinator, the institution through relevant departments, the partner OJT institution (workplace) and the field supervisor play an extremely important role in seeing this program through. OJT is generally carried out by the relevant department manager in

the firm. The consultant is responsible for assigning roles to trainees and determining the department in the organization where they can best apply the principles, ideas and theories acquired in the academy. Additionally, the OJT is responsible for supervising the student during the period and evaluating performance using the school's prescribed standards (Career, n.d). Additionally, the advisor meets regularly with the faculty internship coordinator to discuss observations and issues that arise during training. Upon completion of on-the-job training, the on-site supervisor prepares a detailed evaluation of the student and submits it to the practice coordinator for further action (Career, n.d).

On-the-job training is an active employment policy measure aimed at increasing employability and competitiveness in labor markets. However, as employability is a complex concept that blends many aspects such as motivation, knowledge, skills and attheudes (Crell, 2012). Students can approach OJT in a variety of ways. The most common methods of on-the-job training for students are; internships, apprenticeships, cooperative work experience, credit for prior learning (CPL), prior learning assessment (PLA) (Lumina Foundation for Education, 2010), entrepreneurship and other forms (job shadowing and in-service training) may be mentioned.

Simply put, students undertaking a work-based training program learn practical skills and procedures for their position or industry. But beyond that, there is a lot that students need to learn. OJT content generally includes complying with general workplace standards, adopting professional norms such as workplace dress code, productivity expectations, learning firm hierarchy and industry jargon, networking and building professional co-worker relationships, teamwork, problem solving, business ethics, adaptability, It can be expressed as gaining relevant social skills such as communication and time management.

The importance of OJT can be understood from the fact that in a modern workplace, on-the-job training is a highly effective policy tool used to shape the skills of existing employees and adjust them to the specific needs of the firm (Almeida & Faria, 2014). However, for students, OJT can be said as a rare opportunity to find a firm foothold in the industry or role they wish to pursue. It can give participants a sense of work and accomplishment without facing undue difficulties.

On-the-job training often takes place at a time when learners are at the bottom of their career ladder. During on-the-job training, trainees learn by observing, asking

questions, and taking measured risks to make the most of the opportunity. They also receive constructive criticism from their supervisors and co-workers. Feedback helps them learn more about their strengths and weaknesses, accept their mistakes, and gain relevant skills from eminent professionals in the industry. At the same time, social skills develop during this process. According to Petrone (2018), 57% of industry leaders agree that soft skills are more important than hard skills.

Building industry knowledge epitomizes the ultimate goal of pursuing professional training. The hands-on work experience interns gain during OJT is simply invaluable and cannot be gained in a classroom setting.

In general, trainees have the opportunity to apply the knowledge they acquire in school in a real business environment. They witness firsthand the daily tasks they will encounter in a real-world environment. Moreover, attending team meetings, completing small tasks, and collaborating with colleagues shows students how things work in a chosen field study. This process helps build relevant industry knowledge and enables learners to learn the roles and responsibilities of a particular position or career. As a result, it easies the experience gap and eases the transition into the workforce.

Business life with high qualifications and the opportunity to switch to people who already have options in a certain field can accelerate your career development. Unfortunately, many graduates leave school with little in the way of building a professional network. That's why on-the-job training is often the first real opportunity to meet others in the career field you want to pursue. The professionals you meet during OJT can be the most valuable stepping stone to a job you can replace. They can recommend you for open positions, and as you know, recommendations form the most successful job search strategies. You can also be a great source of advice to people in your field and help with current career conflicts.

In some cases, a student may be lucky enough to land an internship that offers some form of compensation. So, you will gain valuable work experience and earn money at the same time. The financial benefit is often a timely boost for cash-strapped students. If the training takes place after graduation, it helps students start their business life in a healthier way.

Even better, students who successfully complete on-the-job training and make a positive impression are viewed as attractive talent to employers. This is mainly because such students have excellent social skills, have exemplary study habits and demonstrate higher industrial and technical skills. They are also knowledgeable about general workplace standards and professional norms in their field. For this reason, many employers around the world prefer to hire young employees who have completed on-the-job training. To qualify, only in 2019, on-the-job training learners were hired on an entry-level basis (NACE, 2020).

On-the-job training can provide tremendous benefits, including providing a solid foundation for a successful career. However, to reap the benefits, the student must strive to do things right. In order for the trainee to get the most out of the on-the-job experience; They are expected to make the most of the transition period, comply with the code of conduct and be professional.

2.2.4. Adult Education

Adult education is a key component of lifelong learning. It covers all forms of education and training aimed at enabling all adults to participate in their communities and the world of work. It refers to all formal, non-formal and informal learning processes through which those who are accepted as adults by the society they live in develop and enrich their ability to live and work in line with both their own interests and the interests of their communities (UNESCO & UIL, 2016). Adult education, unlike child education, is a practice in which adults engage in systematic and ongoing self-education activities to acquire new forms of knowledge, skills, attheudes or values (https://www.right-to-education.org/issue-page/th -mes/adult-education-and-learning).

Having a profession has an important place in terms of individuals' lives, both economically and self-realization. For this reason, adults participate in various vocational trainings such as helping them work at various stages of their lives, finding a suitable job, gaining a career in their job, working in a new business field, and providing personal development. Adult vocational training; Developing an ability that is essential for individual and social life is a formal development process of personality shaped by mental, emotional, social, economic and personal characteristics by gaining knowledge, skills, attheudes and professional behavior. Nashashibi ve Watters (2003, 39), reasons for adults

to participate in educational activities; They put forward the individual's desire to realize himself, to obtain a certificate or diploma by developing knowledge and skills in different subjects, to keep up with the changes in science and technology, to have the necessary qualifications in business life, to benefit from family and social roles, and to socialize. UN (2015, p. 14) recommends ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. Youth and adults should be equipped with relevant skills, including technical and vocational skills, for employment, decent work and entrepreneurship (UN, 2015, p.15).

Although it dates back to the pre-World War II period (e.g., Lindeman in 1926, Yeaxlee in 1929), lifelong learning, which is now heavily associated with vocational education, was systematically considered within the scope of adult education, entered mainstream discourse, and became widespread in the late 1960s. And became under the auspices of UNESCO in the early 1970s (Bowl, 2017:23; Hake, 1999:53). In the early twentieth century, Eduard Lindeman and Basil Yeaxle laid the intellectual foundations of a comprehensive understanding that viewed education as "a continuous dimension of daily life" and went beyond the concept of limiting education to school. Thus, the understanding that education is lifelong has existed since the beginning of systematic studies in the field of adult education. (Bowl, 2017:10).

Economic Paradigm Change

Production is not limited to the production of physical goods that are consumed and used. It includes the production and reproduction of knowledge, social relations, values and institutions that are prerequisites for the production of physical goods (Cox, 1987).

Simply put, the economic policies of the state are determined on the axis of the international competition system, as a tool of capitalist commodity relations. This competheive system also includes different policy areas within capitalist relations. Today, education and training policy has become a function of economic policy.

As stated, this is a need arising from the change in the production regime and states compete to make their workforces wage and accessible to international capital, to the extent they can (Ashton ve Green, 1996: 40). In addition, training an educated, reasonable, sane and responsible structure is a very important choice depending

on the type of capital that wants to influence the financial statement (Ashton ve Green, 1996: 40). This choice can gain a hegemonic nature with a compromise in the capital accumulation strategy.

Adult Education Policy

The main purpose of adult education policy is to develop suitable conditions for adult education and to establish education and training systems for adults. The main issues to consider are supports, development institutions and mechanisms. The key features of adult education policy are relevance, flexibility, efficiency and effectiveness, accessibility and sustainability (Despotovic & Pejatovic, 2005).

Adult education, which has had a strong international dimension since its inception, built on common values and aspirations (Rubenson, 2009: 415), and at the end of these developments, especially the United Nations (UN) and UNESCO, the Council of Europe, the Organization for Economic Co-operation and Development (OECD), the Food and in the days of such possibilities and dates as the Agricultural Organization (FAO) and the International Labor Organization (ILO), it began to place itself more in its programmes (Bowl, 2017: 25). We can see the historical change of the concept of adult education in Table 2 (Volles, 2016).

Table 2

Evolution of terminology (not taking into account meanings of words

	1940s	1950s	1960s	1970s	1980s	From the 1990s
UNESCO	Adult education	Adult education	Éducation permanente	Lifelong education	Lifelong education	Lifelong learning
OECD	--	--	Recurrent education	Recurrent education	Recurrent education	Lifelong learning
European Union	--	--	Permanent education & recurrent education	(mostly absent from agenda)	(mostly absent from agenda)	Lifelong learning

2.3.-Compedency-Based Education / Training (CBE/T)

The business world expects its employees to have basic competencies appropriate to the requirements of the job to be done. For this reason, it wants to define competencies and provide these skills to its employees. Legal legislation also requires employees to have these competencies documented. Competency-based education is a basic educational approach used in the vocational training of adults.

A distinctive feature of contemporary professional, vocational, and continuing education is the prevalence of the 'qualification' approach. So-called competency-based education or training (CBE/T) can be adopted as a basis for learning programmes, development frameworks within professions or national vocational training systems (Hodge et al., 2020b).

Competency-based training program implementations are observed in a wide range of professions, from gardening to teaching to aircraft piloting, and at various levels of expertise, from entry level to continuing professional development.

Competency-based education and training (CBE/T) is a distinctive feature of contemporary professional, vocational and continuing education. It is a modern approach. It took shape in the 1960s and 70s (Harris et all., 1995) and has now been celebrated as an acceptable mainstream option for those who want to design curriculums and frameworks for learning.

The competency approach is particularly prevalent in post-compulsory education, vocational and continuing education contexts (Mulder ve Winterton 2017). However, there are examples of CBE/T implemented in other settings, such as school (Spady and Mitchell 1977) and higher education (Bowden and Seniors 1993).

Besides implementation in different educational settings and fields, the approach is also flexible in other ways. It can be applied to learning in a single program or on a specific topic, whether it is a disciplinary area or a profession or an industry or extended to entire systems.

It is flexible not only in scope but also in terms of learning level. Thus, the competency approach is applied to entry-level programs through to continuing education of practheioners. The approach can be seen as a general option in contemporary education

and training with flexibility regarding educational field, programmatic scope and level of expertise.

Against such a unifying reading of CBE/T, it is a fact that there are profound differences in definition and implementation. Researchers attempting to articulate key understandings across national practices more than one distinguish major differences between, for example, behavioral, cognitive and generic (Mulder et all., 2007).

It has been documented that the term “competence” or “competence” has a long history dating back to the Babylonian civilization (Mulder et al. 2007) but entered academic discourse as a different focus in the mid-twentieth century. The debates point to the work of McClelland (1973) and others in psychology who sought to replace the concept of 'general intelligence' with the concept of competence. An extended account of the emergence of the idea of competence in the social sciences is offered by Bernstein (2000), who cites the work of Chomsky, Piaget, and others.

Bernstein's account is presented in the context of a sociological analysis of contemporary educational 'models', which finds that a new educational model has been established with the introduction of the concept of competence. What is new about the idea of competence is that learning is the achievement of an interaction between innate, personal factors and a complex environment.

What we know as CBE/T arguably dates back to efforts to reform teacher education in America following the “Sputnik Crisis” of the late 1950s (Tuxworth 1989).

Perceptions that the Russians were stealing leadership in science and technology during the Cold War led to several policy changes. One of these was the policy of restructuring education as a field for building science and technology capacity, and this reform effort extended to teacher education. One influential model that emerged from this crisis was called "Performance-Based Teacher Education," an explicitly behavioral approach that clearly embodies the principles of Bernstein's performance model. But in the early 1970s, the same system was called "Competency-Based Teacher Education" (Magoon 1976).

A similar development can be observed in the terminology used to refer to curriculums designed to reduce unemployment in Canada in the late 1960s (Joyner 1995).

This context saw the emergence of the 'Developing a Curriculum' (DACUM) method, where job requirements were quickly determined in consultation with a group of experienced workers. These requirements are explained behaviorally—again embodying Bernstein's performance model—but the result is labeled "Competency-Based Education" (Joyner 1995).

The advantage of positioning CBE/T in relation to the reproduction of social practices such as professions is that it makes clear that the focus of education and training is knowledge and skills in a practice, rather than knowledge and/or skills alone.

In this context, competence can be considered as full participation in a social practice characterized by the ease of operating under a particular identhey while being conscious of the historical mission of the practice. A social structure takes place that requires negotiation around competence, implementation of relevant knowledge and skills, sharing, teamwork, conflict, hierarchy, and leadership.

The implementation aspect of knowledge may be overshadowed by the spectacle of produced knowledge, which increases with the value societies place on it. Nevertheless, the disciplinary matrix of knowledge is a social practice, and the seniory of this knowledge is achieved through participation in the practice.

The competency approach is therefore an educational endeavor that takes learning about and participating in a valued social practice as the goal of the curriculum, instruction, and assessment. It may emphasize seniory of skills and knowledge, or it may emphasize the realization of individual capacities or a combination of the two.

Knowledge and skills are taught in practice as knowledge and skills as part of the educational endeavor, or individual achievements are monitored in relation to the enabling context. In these cases, the difference between the qualification approach and traditional education is very clear. The competency approach emphasizes the contextual acquisition and demonstration of skills, knowledge and capacities.

The practice of CBE/T assumes the need to repeat some ideal performance or realization that is not limited to a single aspect. With changes such as the industrial revolution, professions may have become massified (Billett 2011), and with this the

problem of promoting consistent skills, knowledge and their implementation in different environments with common equipment and production goals may arise.

Essentially, the same discipline or profession can be divided into fewer or more separate units. Not only that, a certain consistency in the focus, structure and quanthey of each unit is evident in the implementation of the approach.

Professional implementations of the competency approach have resorted to task as the basis for segmentation. Since Smith (1776/1981), it was conceivable to divide occupations into related but distinct tasks. This way of thinking was formalized by Taylor (1906) in her theory of "Scientific Management", which took the stance that workers' knowledge could and should be examined, analyzed and rationalized by management.

'Task' is an important unit of competence. The division of skills and processes related to a profession ensures that different units have consistency in quality. Competency-based practices are problem-solving focused approaches (Winterton 2009). A competency approach can be expressed as a type of decomposition that divides an implementation into sections for educational purposes.

In the German variant, identhey, processes and skills are taken to be what a professional practice actually means. It is important that ontological assumptions regarding a social practice come into play in the disruptive action of the competence approach.

An example of epistemological assumptions seen in competency texts is the adoption of ‘behavioral’ categories of knowledge about an educational objective (Kearns, Mavin & Hodge 2016).

The behavioral approach can produce texts containing a description of the desired behavior, an indication of the 'level' of performance and information about the conditions under which the behavior will be expected (Mager 1962). This type of presentation of knowledge in competency texts involves general epistemological assumptions – the important things that can be directly observed and that need to be taught about the target – and specific assumptions about the categories of knowledge that most effectively convey these important things. The behavioral approach characterized here is common, but other epistemological foundations have been adopted for the construction of qualification texts. An example is the German approach, which adopts different structures, concepts and

language depending on whether the unit of competence relates to skills, processes, or worker identhey.

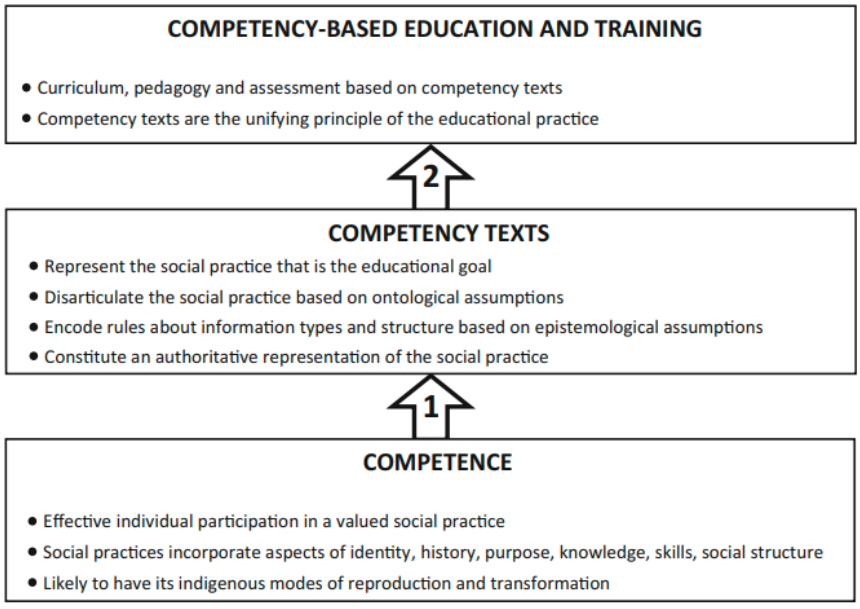
Experts contribute to the documentation process with validated techniques used to secure their insights, such as the DACUM technique (Joyner, 1995) and highly specialized methods such as 'Cognitive Task Analysis' (Clark et all., 2008).

The means of reproduction identified in traditional practices by Lave and Wenger (1991) may be sufficient to guide specialization. When internal training, consisting of knowing activity models that constheute the implementation, was combined with curriculum effectiveness, the competency approach became even more prominent.

Hodge et al. (2020b), a three-fold competency approach structure or model was prepared. The model is presented schematically (Figure 1):

Figure 1

Model of the competency approach (Hodge et al., 2020b)



The three parts of the model express what has already been said about the characteristics of the competency approach. The bottom box labeled 'Competence' draws

our attention to a valuable social practice and individual participation that is the educational goal of a competency-based system.

This practice can be a profession, profession or discipline. By making social practice the goal of education, knowledge, techniques, materials, etc. The purpose of the activity, which constheutes a complex activity that includes things called so-called and at the same time the 'magnet' that attracts it (Dewey, 1916), can be considered as a whole in the form of knowledge and other elements.

The middle box highlights the fact that in a competency-based system social practice must be represented in some way in documents containing rules and practices on: how practice can be decomposed, how knowledge and skills can be represented, and how the documents can be used.

Finally, the top box theled “Competency-Based Education and Training” refers to the important activity of creating, teaching, and evaluating learning programs within the competency approach.

Research shows that practheioners vary in their interpretations of the extent to which they adhere to competency texts or defer to previous experience of the target practice (Hodge 2014). For example, practheioners may highlight descriptors, elements, performance measures, or other categories of information as they develop their understanding of the text.

According to Miller (2001), competencies are divided into three main categories: basic, cross-functional and functional; they are all important, but there is a hierarchy among them.

Competency-based learning is an educational approach that puts the learning outcomes that the student is expected to demonstrate at the end of the training at the center of the learning process. It often focuses on observable skills or “competencies.” It is aimed for the student to specialize in the desired competence. It is concerned with the student progressing at their own pace and depth through the curriculum offered.

The competencies or skills to be acquired at the end of the teaching activity are defined in advance. Often working with a mentor, learners can acquire exactly the competencies or skills they feel they need (in online environments, gamification features;

badges, points are used in return) or they can earn a diploma or certificate by combining a set of competencies. If it can be demonstrated through an exam or some form of pre-learning assessment that the learner already has a particular competency or skill, it may be possible to move on to the next competency level without having to repeat the course required for that competency.

Since the value and importance of competency-based learning in developing practical or professional skills and competencies is much more evident, it has moved away from the programmed, planned classroom model in which students study the same subject at the same pace as their classmates. Although it can be offered as a degree program at an institution of higher education, it is increasingly used in online environments. One of the reasons behind this situation is that the majority of students attending such programs are working or looking for a job. Therefore, it can be said that competency-based learning implemented in online environments is suitable for adult learners who want to acquire certain skills or competencies for their profession or field of interest.

Competency-based education systems reach students where they are and support them to senior a predefined set of learning objectives at their own pace. This method is adapted to meet different learning abilities and can lead to more efficient student outcomes.

Competency-based learning focuses on the student as an individual.

It provides opportunities for each individual to develop skills at their own pace, collaborate with others, collect evidence of their learning, and become successful lifelong learners. The power of competency-based learning is in its flexibility, as learners can move at their own pace. This supports students with different backgrounds, literacy levels and other relevant abilities.

Learners who continue competency-based learning programs conducted in online environments; They can identify the competencies they need to specialize in achieving their goals, progress in their own learning processes without time constraints, carry out learning activities in collaboration with peer and mentor communities, demonstrate their learning outcomes, see on a progress map what they have seniored, what they still need to achieve and where they are.

Competency-based learning begins with well-defined learning outcomes. The skills and competencies to be acquired at the end of each program are predefined. Competency sets are created with learning analytics to monitor the performance of the student included in the program; Digital learning contents and assessments are prepared for these competencies. In an ideal online learning environment, Authentic assessments are used to prove competencies, risks that may reduce students' success are identified is ensured that the system implements appropriate interventions, and transparent analysis of outcomes at all levels of learning is supported.

Differentiation refers to competency-based learning practices that recognize the student individually and are offered according to his needs. For this, basically the student; They should provide different learning materials or assessments according to their level, offer learning activities that differ according to their interaction with the content, provide the freedom to choose among different learning resources and ways, provide relevant and timely communication opportunities and environments, appropriate interventions should be ensured to provide feedback, guidance, and help progress in learning paths.

The fundamentally targeted approach in online learning programs that use the competency-based learning method should be to strengthen an individual's development to have a positive and aware competence through "Knowing, Doing, and Being".

Regardless of the subject learned, the “knowing, doing, being” approach enables individuals to transform what they learn according to their own style. The knowledge they gain, like many things, does not remain in words. Having to apply what is learned directly to their daily lives ensures that the probability of acquiring the targeted skill is high. Because the information is personally modified and assimilated. It is no longer an abstract knowledge learned, but a practical personal implementation. Moreover, “knowing, doing, being” is not linear, it is a continuous process where, with regular use, the learning journey never stops but continues to evolve.

Employers and educators should work collaboratively to determine the required competencies when designing the curriculum. Online courses designed to develop each identified competency should be structured around these specific competencies. Competencies are based on what curriculum graduates need to know as a professional in their chosen professions. Assessments should be specifically designed to measure the

acquisition and development of each competency. Therefore, at the end of the evaluation, students pass or fail. Exams, portfolios, projects, student performance observations, rubrics and assignments can be used as evaluation activities. Which evaluation method to use depends on the suitability of the subject? For example; in fields such as teaching and health, the student's practice performance should be evaluated on-site by field expert professionals (such as teachers, nurses).

Determining and defining the competencies that will meet the needs of both learners and employers in a gradual (a competency is built on previous competencies and leads to more advanced competencies) and consistent (the sum of all competencies trains people equipped with all the knowledge and skills required by a profession) is perhaps the most important aspect of competency-based learning. This is the most important and difficult part.

How 'good' or 'bad' competency-based learning implemented in online environments is depends on the ecology in which it takes place. With well-defined systems of support in place and diverse support systems, robust assessment forms, and clear and manageable learning outcomes accessible to all students, competency-based learning can be an effective model that potentially reduces inefficiency and increases student achievement.

In conclusion; Competency-based learning, a relatively new approach to learning design, is becoming increasingly popular with employers. Meets the urgent needs of businesses and professions; if students are already employed, they can gain advancement within the firm by participating in these programs, or if they are unemployed, they are more likely to be employed once they qualify through these programs. However, it is not a suitable approach for all learners and may be inadequate for the development of higher-level and relatively more abstract knowledge and skills that require creativity, high-level problem solving, decision-making and critical thinking.

2.4. Literature review results

Companies prefer that vocational and technical education be provided through on-the-job training. Particularly, on-the-job non-formal training and government incentives encourage companies. Especially global companies attach more importance to sustainable development goals. For this reason, they turn to on-the-job training to reach competent

employees who can fit into the corporate culture. It is a legal obligation to certify the competencies of internationally competent employees. The company can provide this opportunity to adults through in-service training and on-the-job training. Companies' employment priorities are aimed at meeting the need for competent technicians compatible with corporate values. Companies can create opportunities for young people who have graduated from formal vocational education to complete their missing qualifications. Companies need training structures, training programs and teaching methods specific to adult technician participants. In this context, on-the-job training is a prominent phenomenon. Finding and training participants who are compatible with the unique goals of companies is becoming more important day by day.

Sustainable development: It is a process that combines short-term and long-term needs with local and global needs. This process; Social, economic and environmental needs are defined as integral and interconnected components of human-centered development.

Sustainable development; It also includes a focus on economic and social concerns. The economy in developed countries is closely linked to the problems of poverty and degradation in underdeveloped countries. A strategy that takes sustainable development into account should recognize this link and seek to reduce the environmental burden and increase economic benefits for less developed markets affected by the activities of businesses.

Social sustainability can be defined as the extent to which social values, social identheies, social relations and social institutions can affect the future. A social sustainability approach can be expected to meet individual needs such as health, nutrition, housing, education and cultural expression. Urban social sustainability is the ability of a city to function as a long-term, viable environment for human interaction, communication and cultural development. Vocational education is an important dimension of urban social sustainability.

For sustainable economic development and competition, all resources must be used effectively. In the development process, the human factor, which is at least as important as physical capital and even more important, has a very important place. The basis for the human factor to be effective in this process lies in improving and improving the quality of

people through investment and education. If this is not achieved and the required quanthey and quality of labor force is not created, the expected progress in development and competitiveness cannot be achieved.

Production is not limited to the production of physical goods that are consumed and used. It includes the production and reproduction of knowledge, social relations, values and institutions that are prerequisites for the production of physical goods (Cox, 1987). Vocational and technical education, globalization, competitiveness, employment, education, qualified workforce, labor-related laws, etc. It is affected by the integrated relationships of the facts. Developed countries of the world; they are re-planning and constantly changing and restructuring their education systems, especially in order to create a qualified workforce. In a democratic society, profession is never just a technical process, but rather a form of self-realization. In the context of Qualified Workforce; It is important to make human capital investments to increase the quality of the workforce. Factors such as equipping the workforce with capital, manpower and education planning can lead countries to enrich themselves in terms of qualified workforce and reflect this advantageous situation to international trade.

In its projection for 2030, WEF predicts that radical changes will occur in both job quality and job rates. The world economy makes plans by taking this data into consideration. WEF also shares in detail the expected changes in the cognitive, affective and psychomotor skills of employees. WEF resources emphasize that in developing countries, if women's participation in the workforce can be increased to the expected levels according to their age and education levels, household incomes can increase by up to 25%. It is stated that this change may be extremely important in terms of reducing poverty and improving the quality of life. It is an important expectation that the public authority and the sector develop new approaches to adult education.

Extended education; It is the education provided in line with the interests and needs of people who have never entered the formal education system, are at any level of this system, or have left one of these levels. Non-formal education; It is carried out through public education, apprenticeship training and distance education. Adult education is a key component of lifelong learning. It covers all forms of education and training aimed at enabling all adults to participate in their communities and the world of work. It refers to all formal, non-formal and informal learning processes through which those who are accepted

as adults by the society they live in develop and enrich their ability to live and work in line with both their own interests and the interests of their communities (UNESCO & UIL, 2016). Adult education, unlike child education, is a practice in which adults engage in systematic and ongoing self-education activities to acquire new forms of knowledge, skills, attheudes or values. The main purpose of adult education policy is to develop suitable conditions for adult education and to establish education and training systems for adults. The main issues to consider are supports, development institutions and mechanisms. The key features of adult education policy are relevance, flexibility, efficiency and effectiveness, accessibility, and sustainability (Despotovic, & Pejatovic, 2005).

On-the-job training is an element of non-formal education that has gained importance recently. On-the-job training (OJT) is a practical approach to acquiring new competencies and skills required for a job in a real or near-realistic work environment. Observing the professional development and experience of the people they plan to hire and training the people they plan to hire without incurring any costs is one of the most important advantages of this approach. The fact that 56.1% of those who received on-the-job training turned into employees is supported by recent research (NACE, 2019).

At the point of providing better jobs for adults who want to receive vocational training, there is a need for an approach that can be used as an improved method for training program arrangements to develop both academic and vocational skills that will give the workforce advantages needed by the labor market. A distinctive feature of contemporary professional, vocational and continuing education is the prevalence of the 'competency ' approach. Competency-based education or training (CBE/T); acceptable as a basis for national vocational training systems, with the help of curricula (Hodge et al., 2020b). Competency-based training program implementations are observed in many professions and at various levels of expertise.

Competency-based education and training (CBE/T) is a modern approach that is distinctive of contemporary professional, vocational and continuing education, taking shape in the 1960s. It has reached the point where it can be considered a mainstream option for those who want to design curriculum. It can be applied to learning within a single program or on a specific topic, whether across a disciplinary area, profession, or branch of industry, or can be extended to entire systems. It is flexible not only in scope but also in terms of learning level. The approach can be seen as a general option in

contemporary education and training with flexibility regarding educational field, programmatic scope and level of expertise.

In conclusion; Competency-based learning, a relatively new approach to learning design, is becoming increasingly popular with employers. Meets the urgent needs of businesses and professions; if students are already working, they can gain advancement within the firm by taking part in these programs, or if they are unemployed, they are more likely to be employed when they qualify through these programs. However, it is not an approach suitable for all learners and may be inadequate in developing higher-level and relatively more abstract knowledge and skills that require creativity, high-level problem solving, decision-making and critical thinking.

3. METHODOLOGY

In this study; it is aimed to develop a curriculum for training natural gas heating and gas burner device service personnel. In this section, information about the research model, design, research group, data collection tools, data collection, data analysis and validity and reliability studies are included.

This study aims to develop a curriculum for the vocational education of adults in the context of adult education policies. In this context, it was aimed to understand and change the behavior of the participants by using the participatory action research method from interactive qualitative research. Action research conducted with educators working on a problem is called participatory action research (Leff et al. 2004). Yıldırım ve Şimşek (2008, s. 39) defines qualitative research as research in which qualitative data collection methods such as observation, interview and document analysis are used, and a qualitative process is followed to reveal perceptions and events in a realistic and holistic way in the natural environment. According to Merriam (2013), all qualitative research is about how meanings are constructed, how people make sense of their lives and worlds, and the primary purpose of basic qualitative research is to reveal and interpret these meanings. Action research, one of the applied qualitative researches, is pre-planned, organized and collaborative systematic investigations to improve the quality of life through critical reflection and questioning (Bogdan ve Biklen, 1998). The aim of this research aapproach, which is based on critical theory, is not only to understand the meanings and behaviors of the people being researched, but also to change them (Ekiz, 2003, Johnson, 2002). People share their thoughts, knowledge, solutions to questions and results on the subject. In this way, new action plans are designed to achieve the aims of the research (Mills, 2011). Stephen Corey, one of the first researchers to use action research in education, believed that this method would create change in education and that educators should participate in both research and the implementation of this information. (Uzuner, 2005).

McMillan (2004) McMillan (2004) stated that action research will help decide on solving a specific problem or developing an implementation by focusing only on a local area. Mills (2011) defines action research as a process of systematic inquiry conducted by teachers, administrators, counselors, or anyone else with an interest in the teaching and learning process to collect information about how teachers teach and how learners learn.

For this reason, action research allows teachers to self-evaluate in order to better understand their own classes and improve the quality of teaching (Mertler, 2017). Maximum effort was made to work with the institution's trainers at all stages of this study to ensure that they contributed to the entire process. Johnson (2002) and Schoen (2004) action research; It emphasizes that it is systematic, the research does not start with an answer, it does not have to be complex, the research should be adequately planned before starting to collect data, the length of the research project can be varied, observations should be regular, action research can be embedded in theory, and action research is a quantheative research.

Action research is a research approach that involves collecting and analyzing data to reveal problems related to the implementation process or to understand and solve a problem that has already emerged, carried out by the practheioner directly or with a researcher (Yıldırım and Şimşek, 2008). Action research, one of the applied qualitative researches, is pre-planned, organized and collaborative systematic investigations to improve the quality of life through critical reflection and questioning (Bogdan and Biklen, 1998).

In the process of developing the curriculum; Within the scope of sustainable development goals, an approach that is sensitive to gender equality, has an employment target, and focuses on quality education, decent work and economic growth has been adopted.

In this study; for the profession of heating and gas burner device service personnel; the curriculum was developed, implemented and program evaluation was carried out. Discourse analysis in the strategy documents determining vocational education policies for adults, document analysis of the vocational training courses opened, and content analysis of the interviews were carried out in order to investigate the problem in depth in determining the experiences of the participants of the developed adult vocational education curriculum and their reflections on their lives. In Table 3; The study design, showing the research question, sub-questions, data collection groups, measurement tools, analysis type and teams responsible for the processes, was shared.

Table 3

Design of the study

Main Research Question	Sub- Research Questions			Surveyed Group	Measuring Tool	Analysis Type	Group
How can a curriculum be developed for natural gas heating and gas burner device service personnel training be developed?	1. What is the training need of natural gas heating and gas burner device service personnel? (Needs analysis)		1.1. What are the unmet needs of natural gas heating and gas burner device service personnel for the design of curriculum for their pre-service training?	-Firm decision maker manager	Semi-structured survey	Content analyzing Document analyzing	Decision Making Committee
			1.2 What are the expectations of the authorized service administrators from the natural gas heating and gas burner device service personnel?	-Authorized Service Manager		Content analyzing	
			1.3. What are the opinions of the senior natural gas heating and gas burner device service personnel about the knowledge and skills that the natural gas heating and gas burner device service personnel should be equipped with?	-Senior Technician		Content analyzing	
			1.4 What were the facilitative factors and constraints encountered during the pre-service trainings experienced by the trainers who have been giving in-service training?	-Firm manager		Content analyzing	
	2. How should the training program be designed for the curriculum of natural gas heating and gas burner device service personnel? (Design)	2.1 What are the required competencies defined by the Vocational Qualifications Authority?		-ACA Official		Content analyzing Document analyzing	Desk-Based Design Team

4. Does the developed curriculum meet the training needs of natural gas heating and gas burner device service personnel? (Evaluation)		3. Is it appropriate to implement and develop the designed curriculum? (Implementation)				
4.2. Has the curriculum been developed in accordance with the model applied in its design?	4.1. Has the implemented natural gas heating and gas burner device service personnel curriculum met the firm's expectations?	3.2. Is the designed curriculum implemented in accordance with the model used?	3.1. How should the curriculum be implemented for the service personnel training of the natural gas heating and gas burner device?	2.4. What should be the features of the model to be selected for curriculum development?	2.3. How should a curriculum be designed for natural gas heating and gas burner device service personnel training?	2.2. What are the opinions of consumers about the required skills and knowledge to be natural gas heating and gas burner device service personnel?
-Curriculum and Instruction Specialist	-Firm decision maker manager	-Firm manager -Participants-Authorized Service Manager	-Firm manager	-Curriculum and Instruction Specialist	-Educator Profession / Field Expert -Firm manager	-Firm manager
Content analyzing Uzman Görüşü	Content analyzing	Content analyzing	Content analyzing	Content analyzing	Content analyzing Document analyzing	Content analyzing
Program Evaluation Team Experiment Evaluation Team		Trainer Training Planning and implementation Team and Experiment Evaluation Team				

Document Analysis

In the study, document analysis method was used to examine the current status of adult vocational training courses opened for the vocational training of adults in the public system in Turkey, the number of trainees attending these courses and their distribution among the courses. Document analysis includes the analysis of materials containing information about the phenomenon or phenomena targeted to be investigated (Yıldırım ve Şimşek (2008). Since the documents exist before the research and are not prepared specifically for the research, they are not prepared by disturbing the presence of the participant; therefore the documents are ready sources of information for researchers (Merriam, 2013). Like other methods used in qualitative research, document analysis requires examining and interpreting data to derive meaning, create an understanding of the topic, and develop empirical knowledge. (Corbin & Strauss, 2008: 169). Sources of social documents related to education are records of parliaments or congresses, articles of law, national reports, state or private sector reports, personal records, data banks owned by statistical centers, official minutes, evidence, documents, correspondence of school personnel, financial and budget records. Includes a wide range of official and unofficial documents such as regulations, circulars, training programme, etc. (Merriam, 2013).

Content Analysis

In content analysis; the data obtained through interviews, observations or documents were analyzed in four stages: (1) coding the data, (2) finding codes, categories and themes, (3) arranging the codes, categories and themes, and (4) defining and interpreting the findings (Eysenbach & Köhler, 2002; Miles & Huberman, 1994). The interview method was used to reveal the experiences of the participants who participated in the vocational training program prepared for adults regarding the training they received. According to Stewart and Cash (1985), interview; It is defined as a process of mutual interaction and communication based on the style of asking and answering questions for a predetermined and serious purpose. Interviewing is a form of research based on understanding. Through interviews, individuals' experiences, attheudes, thoughts, intentions, comments, mental perceptions and reactions are tried to be understood and interpreted (Yıldırım ve Şimşek, 2008).

3.1.Design of the Study

In Table 4; the stages of the research, its general structure, and the methods to be used, data collection tools, data analysis and working group are presented. Three main stages and sub-activities; theory, method, and techniques to be used in the research; was associated with data collection, data analysis and the study group.

Table 4

Procedures, methods, techniques and working group used in the research

	Theory / Method / Technique	**Data collection tools**	**Data analysis and interpretation**	**Working group**
Method	Qualitative: Participatory action research from interactive qualitative research, descriptive and exploratory approach, holistic single case design **Population and sample:** Criterion sampling from purposeful sampling methods			
Curriculum Design Model	SUPSKY Curriculum Design Model			
Stage One: **Needs Analysis**	**Needs analysis approach:** Analytical approach **Needs identification techniques:** Literature research Interview	Semi-structured interview form Literature research	Content analysis	Desk-based design team Review board Educator training planning and implementation team

Second Stage: **Creating the draft Heating and Gas Burner Divece Service Staff Curriculum of the research and planning the implementation process** **Heating and Gas Burner Divece Service Personnel curriculum study**	✓ Spiral Content Editing Approach ✓ Objective, Outcome, content, learning / teaching situations, measurement / evaluation ✓ Determining the time required for this study, ✓ Determination of the work schedule	Literature research	Expert opinion	İmplementation evaluation team
	✓ Action Study ✓ Process evaluation ✓ Implementation of implementations on days and hours in accordance with the work schedule ✓ Filling observation forms and conducting interviews ✓ Feedback and corrections ✓ Evaluation of the implementation	✓ Observation form ✓ portfolio ✓ readiness assessment ✓ End-of-unit proficiency tests ✓ Post-implementation proficiency test ✓ End-of-training observation forms	✓ Expert opinion ✓ Content analysis ✓ Collection and analysis of data from the implementation.	Implementation evaluation team
Third Stage: **Data analysis, final evaluation, training standards setting and reporting**	✓ Expert opinion			Program evaluation team
	Program Evalation Standarts	Literature research	Expert opinion	

SUPSKY Curriculum Design Model was used during the curriculum development process of this study. The stages of the model are presented in Appendix A. During the implementation process of the model, opinions and support were received from the theorists of the model.

SUPSKY Curriculum Design model is composed of the following three mainstages: "Planning Curriculum Design, Desk-Based Design, Evaluation and Development of Curriculum, and Pilot Experiment." SUPSKY Curriculum Design Model, curriculum design and curriculum development studies take place at different stages. However, at the beginning of the process, curriculum design studies can be seen more frequently while studies that can be called "curriculum development" are seen at later stages or steps in the model.

"Backward Design" as an instructional model is mainly based on two premises which are reverse of traditional practices and guides the implementation means and methods and raise instructors awareness especially process evaluation. Firstly, instead of beginning with textbooks, following the activities and setting the instructional goals, it starts with identifying the desired goals and objectives. Secondly, rather than designing the relevant activities it operationalizes these goals and objectives by deciding on the assessment and evaluation means and expectations. In other words, description of the performances via process approach expected to be the evidence of students' attainment of desired understanding and proficiency are focused on. Wiggins and McTighe (2005) describe the logic of this instructional method as:

...planning a big meal such as Thanksgiving starts with the time the turkey dinner must be ready, say 5p.m., then one plans backward to the starting, and in the order of events-in short, the most efficient way to have the stuffed bird, gravy, creamed onions, sweet potatoes, beans and cornbread all ready at the same time. What is a good recipe, in fact, if not an already worked out backward design?

The framework of Backward Design consists of three stages: identification of desired result, determination of acceptable evidence, and planning learning experiences and instruction. It is rooted in Tyler`s curriculum development model and can also be described as "task analysis" (Wiggins and McTighe, 1998). The main terms used in the backward design approach are curriculum, assessment, achievement target, and

understanding. The term curriculum refers to a specific plan with identified lessons in an appropriate for and sequence for directing teaching that is more than a syllabus. The act of determining the extent to which the curricular goals are being and have been achieved via multiple methods is termed as assessment. The intended outcomes or performance standards are the achievement target. Understanding is described as the sophisticated insights and abilities reflected in various performances and context which is beyond textbook knowledge. It is pointed out that even good students do not always display a deep understanding of what has been taught. So, the aim is to design the instruction in such a way that students will be engaged in exploring and deepening their understanding of important ideas and reflect explicitly (Wiggins and McTighe, 1998).

Content suitable for the competency-based approach has been created, and a sample plan of the UbD instructional design model has been created in face-to-face vocational training (Appendix B). On-the-job practical training was provided at the workplace. In these trainings, the creative drama method was used. Sample creative drama plans for this training are given in Appendix C. A hybrid teaching process was planned and the competencies to be used in the content of the developed curriculum are presented in Annex 3.

3.1.1. Reliability and Validity of the Research

Validity in qualitative research means that the researcher observes the researched phenomenon as it is and as impartially as possible (Kirk & Miller, 1986). In this context, validity is related to the accuracy of the data obtained. Reliability, on the other hand, is related to the ability to reproduce the findings obtained in the research (Merriam, 2013). The validity and reliability studies of the research are as follows:

3.1.1.1. Internal Validity (Credibility)

Internal validity is about whether research findings fit the reality in the outside world (Merriam: 2013). A comprehensive literature review was conducted before collecting data for each sub-objective of the study. Expert opinion was taken in the selection of the strategy documents in which the discourse analysis will be made and the ready-made materials that will be analyzed, and in the preparation of the questions to be included in the interview guide. By examining the documents, it was checked whether they contain data

suitable for the purpose of the research, and documents and documents that did not have data related to the purpose were excluded from the study. Interviews were also conducted to control the questions in the interview guide. In the reporting process, the information obtained from the relevant documents, documents and participant statements were given in the form of direct quotations without intervening.

3.1.1.2. External Validity (Transferability)

External validity is concerned with the extent to which the results of a study can be applied to different situations (Merriam, 2013). In other words, external validity is related to the generalizability of research results. In order to increase the external validity of the study, the model of the research, data collection tools, the documents and documents to be examined, the study group, data collection process and data analysis were explained in detail in the study. First-hand sources were obtained for the strategy documents and documents, and the sample size was increased by using the maximum diversity method within the interviews.

3.1.1.3. Internal Reliability (Consistency)

In order to increase the internal reliability of the research, expert opinion was taken at all stages of the research, in the selection of the documents, in the preparation of the interview guide questions, in the coding and in the determination of the themes. Interviews with the participants were recorded. During the data analysis phase, besides the researcher, two more experienced people in qualitative research examined the documents and coded the obtained data. Afterwards, three faculty members in the thesis monitoring committee and a faculty member in the field of adult education were consulted, and the data, codes and themes that emerged in the research were finalized.

3.1.1.4. External Reliability (Confirmability)

In order to ensure external reliability in the study, all the stages for each sub-goal of the research are presented in detail. The documents and participants in the research were clearly defined and the findings were written in detail. Firm officials were informed about all the studies and contributed to the progress of the process. In addition to these studies, the thesis advisor of the research evaluated the data obtained and the results obtained at each stage of the study.

3.2. Participants

The research group consists of people who are over 18 years old and at least secondary school graduates who want to be heating and gas burning divece service personnel. The working group consisted of individuals who wanted to receive heating and gas burning device service personnel training for employment purposes. Those who receive education constheute the universe. Purposive sampling method was used to determine the sample of the research.

Purposive sampling allows in-depth research by selecting information-rich situations depending on the purpose of the study. It is preferred when it is desired to work in one or more special situations that meet certain criteria or have certain characteristics (Büyüköztürk et. all., 2020). The study group of the research will consist of a total of 6 (N=6) heating and gas burning device service personnel participants. A working group was formed by consulting the opinions of sector officials during the selection process of participants. Heating and Gas Burning Device Service Personnel participants were informed about the working process and it was stated that participation was voluntary.

3.3. Data Collecting Instrument

In the second stage of the research, structured interview technique and observation form, which are among the qualitative research methods, were used to obtain the opinions of the students about the applied curriculum process. Interview is a data collection technique through verbal communication and can be divided into separate categories (Karasar, 2016). In the structured interview technique used in the qualitative part of the phase, questions predetermined by the researcher are asked to the relevant person in a short time and their answers are recorded. The respondent does not have the right to make any changes to the questions. It is a technique in which the researcher is active and the respondent is passive (Sönmez & Alacapınar, 2016).

In the research, Semi-structured interview forms were prepared for the purpose of collecting qualitative data. Opinions of field experts and measurement and evaluation experts were taken for the content and structure validity of the questions. Observation forms were used during the implementation phase. In Table 5, data collection stage, data type and the relationship of data collection tool is given.

Table 5

Research designs used according to sub-goals

Activities	Data Type	Data collection tool	Data Collection From
• Needs Analysis • Literature review	Qualitative	• Firm decision-making manager semi-structured interview schedule • Firm manager semi-structured interview schedule • Professional field expert semi-structured interview schedule • Authorized certification body (ACB) manager semi-structured interview schedule • Authorized Service manager semi-structured interview schedule • Senior technician semi-structured interview schedule • Document Review	• Firm decision-making manager • Firm manager • Professional field expert • Authorized certification body (ACB) manager • Senior technician • Document Review
• Creating a Draft Curriculum (Heating and Gas Burning Device Service Personnel Curriculum) • Planning the İmplementation Process • Creating a Curriculum • İmplementation	Qualitative	• Document Review • Firm manager semi-structured interview schedule • Professional field expert semi-structured interview schedule • Authorized Service manager semi-structured interview schedule • Senior technician semi-structured interview schedule • Participant semi-structured interview schedule • Participant observation form • Participant portfolio	• Firm manager • Professional field expert • Authorized Service manager • Senior technician • Participant
• Data analysis, • Establishing training standards, • Final evaluation and reporting	Qualitative	• Firm decision-making manager semi-structured interview schedule • Curriculum and Instruction (EPÖ) Specialist semi-structured interview schedule	• Firm decision-making manager • Curriculum and Instruction (EPÖ) Specialist

Semi-structured interview questions to be used in the needs analysis process are presented in Annex 4. Expert opinion was taken in preparing the interview questions. In

addition, all questions were examined by two experienced Turkish Language and Literature teachers to ensure reliability regarding the language and expression of the measurement tool.

3.4. .Achievement Tests

The order and evaluation methods of the exams to be administered to adult participants during the on-the-job training are in the following order.

• Participant apprenticeship pre-training and online standard exam (Appendix D)

• Final standard exam sample after face-to-face training administered by the firm (Appendix E)

• Firm in-service technician evaluation system (Appendix F)

• Vocational Qualifications Authority exam prepared according to the National Qualifications (Appendix G). This exam has been prepared according to the National Vocational Standard (Appendix H).

3.5. Data Collection Procedure

Data for the content analysis of the study were collected through in-depth interviews. Interviewing, which is a data collection technique frequently used in qualitative research, "gives the interviewees the opportunity to express themselves first-hand, while the researcher also has the opportunity to deeply understand the semantic worlds, perspectives, feelings, thoughts and experiences of the special situations they are in, with the help of their expressions." presents (McCracken, 1988). In-depth interviewing, on the other hand, is "a data generation tool that makes it possible to get to the essence of many phenomena, processes and relationships in the social world rather than their appearance, to grasp their details and to understand them holistically." (Kümbetoğlu, 2017: 72). For this reason, in-depth interviews allow detailed answers to be obtained by asking open-ended questions covering all dimensions of the subject being researched, and information can be collected through interviews (Tekin ve Tekin, 2006: 101).

All data were collected in cooperation with the researcher; the manager authorized by the firm, the firm training officer and authorized service managers. The firm's training department took an active role in observing the participants and conducting their exams. Semi-structured interviews are defined as a type of interview in which open-ended questions are asked under predetermined question headings and the respondent answers the questions more freely in order to conduct in-depth interviews. Among these classifications, "semi-structured" interviews were preferred among the interview types in order to collect in-depth information in the research (Adıgüzel ve Berk, 2009). The documents examined by official institutions for technicians are listed below;

- Lifelong Learning Strategy Document (2009- 2013)
- Tenth Development Plan (2013-2018)
- Ministry of National Education Strategic Plan (2015-2019)
- Ministry of Labor and Social Security National Employment Strategy (2014-2023)
- Ministry of National Education 2023 Vision Document (23 October 2018)
- Vocational Qualification Instheute

Data on technician training and employment were collected using TÜİK, İŞKUR and Ministry of Education data. During the needs analysis phase, data was collected with semi-structured interview forms for the following groups;

- Authorized Service Manager
- Firm Manager
- Customer
- Senior Technician
- Educator Profession / Field Expert
- VQA-YBK Official
- Curriculum and Instruction (EPÖ) Specialist

During the implementation period; Data for technicians were collected from service managers, customers and the firm evaluation system.

Data for process evaluation was collected with the help of educators' observations and concept maps prepared by the participants. The data collection process was completed by taking the opinions of the desk design team, Review board, Educator training planning and implementation team, experiment evaluation team, implementation evaluation team, Program evaluation team.

3.6. Training

Practical face-to-face teaching of job-related competencies was carried out by two field experts assigned by the firm. In addition, within the scope of on-the-job training, the personal development of participant technicians was contributed with the support of field experts and managers from within and outside the institution. Within the scope of trainer training, a two-day training session was held in the firm's training department on 22-23 June 2022. The document regarding the content of the training is shared in Annex 9. Equipment, equipment and teaching materials for the training venue and vocational training were evaluated by both the researcher and İŞKUR. The implementation was carried out in the firm training department. Afterwards, the participants continued their practical on-the-job training in authorized services. Total duration of on-the-job training; It is a total of 180 days, including face-to-face training (6 working days), on-the-job training at the authorized service (110 days), refresher training (2 days), VQA exam reminder training (2 days). During this process, all studies regarding observations, interviews, tests and measurement and evaluation were carried out for all participants. Internal evaluations regarding the purpose of the training will be obtained as a result of the exams to be held by the firm during the implementation process. In addition, if the participants who complete the process take the VQA exam and pass it, they will have an internationally accredited professional certificate.

After shaping the design for the implementation and making the necessary arrangements, it was planned in stages and the implementations were carried out. In this context; Data were collected with the help of measurement of readiness levels, unit

proficiency exams, teaching practice outcomes, observation forms and interviews. In this context;

• Determining readiness before each unit,

• Unit evaluation through a proficiency test at the end of each unit (by the instructor, researcher and instructor),

• Sharing the results with the learners, self-evaluation of the learners,

• Informing learners about the VQA or proficiency test after completing the curriculum,

• Establishing a screening system for evaluation results and

• Interviews were held with the participants during the implementation process.

Analysis and evaluation of the data collected during the implementation phase of the on-the-job vocational training of heating and gas burning device service personnel participants were carried out. At this stage, process evaluation studies were carried out on the readiness of the participants, participant performance observation, expert educator opinion, end-of-unit proficiency test, participant interviews, implementation observation form, portfolio, post - implementation proficiency test exam results.

3.7. Data Analysis

Qualitative data from participant opinions were analyzed with Maxqda 2024 content analysis technology. Content analysis is a technique that let studying human behavior in indirect ways. Content analysis is an important technique most used in social sciences (Büyüköztürk et all., 2011). The main purpose of this analysis is to reach concepts and relationships that can explain the data obtained. Data summarized and interpreted in descriptive analysis are subjected to more detail processing in content analysis; as a result of this analysis, concepts and themes that are not noticed with a descriptive approach can be discovered. For this purpose, the data collected must be arranged logically according to the concepts that emerge as a result of conceptualization and the themes that explain the data must be determined accordingly. In other words, content analysis can be defined as

analyzing a written or spoken text or symbol, converting it into numbers and interpreting these numbers, in other words, converting numbers back into words (Şahin, 2010).

In the study, the collection of interview data and the analysis of the data were carried out simultaneously. In this process, first of all, the data obtained from the interviews were written down on a computer in Times New Roman character, 12 point font and 1.5 line spacing, by giving codes to the participants. The written version of the interviews was re-checked by the researcher and another doctoral student to determine whether the data had been transcribed correctly.

Thematic analysis method was preferred to analyze the data obtained from the interviews. Thematic analysis is the analysis of the content of a one-on-one interview by transcribing it to examine what the interviewer said (Güler et al., 2013). Thematic analysis focuses on analytical techniques to search for themes and patterns within the data obtained. (Glesne, 2015: 259). During the analysis process, the interviews were first transcribed, codes were created from the data obtained and the notes taken during the interviews, and the created codes were placed under possible themes. All interviews were transcribed, and the codes obtained from the data were reviewed, and care was taken to ensure that no data was left uncoded. The suitability of the codes with the finalized themes was reviewed; the data set and contents reflected by each theme were examined, the themes were finalized, and the reporting process began.

After the target group of the study was determined, the maximum diversity sampling method, one of the purposeful sampling strategies, was used to select the study group. "Maximum diversity sampling also makes it possible to study different situations that are similar in themselves, related to the problem examined in the universe, through these situations." (Büyüköztürk.vd. 2013: 90). In this context, when selecting the target group in the study, the year of the vocational training course, the field of vocational training, age, gender, education level and marital status were determined as diversity criteria. It was decided during the interviews how many people would be included in the study and data saturation was taken as basis. No new codes emerged in the analysis of the interviews, and the data collection process was terminated when the codes started to repeat.

3.8. Working Group

In the study, the groups that received support during the implementation of the model and the tasks of these groups are given in Appendix 10. Within the scope of the developed program, an adult vocational training working group was formed with six participants. Participants in the study were selected through purposeful sampling. In purposive sampling, the researcher decides who will be included in the study, taking into account the purposes of the research, and takes the most appropriate ones into the sample (Balcı, 2001: 102). The participants to be included in the study through purposeful sampling were determined as adults determined as a result of the interviews made by Bosch and the researcher. As a result of these interviews and studies, the institutions and organizations that were interviewed in the process of determining the participants are listed in Appendix İ. Within the scope of the developed curriculum, 6 participants to be determined in cooperation with the Bosch human resources department received on-the-job training before the service. The process of identifying the participants took place in accordance with the Bosch cooperation and legal framework.

Participant groups and their characteristics that contributed to the formation of data during the thesis process are presented below:

Participant: Among those who applied to receive training during the thesis implementation process, 10 female participants were selected by the company's human resources. In the participants; prerequisites were being over 18 years of age, being at least a high school graduate, being a woman, and participating in the practice voluntarily.

Firm decision-making manager: Two firm decision-making manager with at least 10 years of experience.

Firm manager: Department manager with at least three years of experience. (Consept Manager and After Sales Area Responsible, Training & Customer Communication Center Section Manager, Online Sales Expert, Human Resources Business Partner and Technician Training Process Coordinator).

Professional field expert: Three plumbing technology field experts who are actively working at the Ministry of National Education and have at least 10 years of education experience.

Authorized certification body (ACB) manager: 16 authorized service managers from different provinces, approved by the firm, were chosen. Authorized services had determined by the firm coordinator and regional managers.

Senior technician: Five VQA accredited seniors with at least three years' experience.

Curriculum and Instruction Specialist: Two academicians with at least 10 years of experience in the field of curriculum and instruction.

3.9. Curriculum Evaluation

Evaluation is the processes people use to collect data that will help them decide whether to accept, change, or discontinue something (Ornstein & Hunkins, 2004, s.330). In other words, evaluation; the systematic collection of information to inform decisions about curriculum features, activities, outcomes, and future (Patton, 1997). According to another researcher who looks at program evaluation differently, evaluation; instruction, program components, environments, administration, inspection, workforce, transportation, etc. it should include a process that includes variables (Oliva ve Gordon, 2013).

During the evaluation process of the curriculum; Evaluation was made in line with the opinions of program evaluation experts and administrators. After the implementation was shaped and the necessary arrangements were made, a program evaluation study was carried out with program evaluation experts by taking the opinions of the sector managers, the Heating and gas burning device service personnel participants, the opinions of the customers, the opinions of the managers and experts. According to the program evaluation standards, the Heating and Gas Burning Device Service Personnel curriculum evaluation standard has been created.

It can be thought that knowing whether the targeted changes have been achieved in the training programs created and making evaluations accordingly will contribute to subsequent program development and renewal efforts. After the study, the data collected during the implementation phase of the heating and gas burning device service personnel participants were analyzed and evaluated. At this stage, the participants' performance exam, performance observation, interviews and evaluation of the implementation were carried out.

SUPSKY curriculum development model consists of the following parts:

1. Planning Curriculum Design

1.1. Formation of Teams

1.2. Setting Work Schedule

1.3. Literature Review

2. Desk-Based Design, Evaluation, and Development of Curriculum

2.1. Context of Curriculum

2.2. Conducting Needs Analysis

2.3. Desk-Based Design of Curriculum

2.4. Formation of Tools and Materials

2.5. Evaluation and Development of Curriculum

2.6. Decision

2.6.1 Approval- Switch to Pilot Experiment Step

2.6.2 Partial Approval – Go Back to Incorrect Part

2.6.3 Rejection – Start over

3. Pilot Experiment

3.1 Training of Trainers

3.2 Preparation of Educational Environment

3.3 Deciding on the Pilot Experiment Conditions

3.4 Planning Pilot Experiment Procedure

3.5 Performing Pilot Experiment

3.6 Evaluation of Pilot Experiment and Developing Draft Curriculum

3.7 Decision

3.7.1 Approval – Dissemination Decision

3.7.2 Partial Approval - Go Back to Incorrect Part

3.7.3 Rejection – Start over

— Curriculum Dissemination

— Curriculum Evaluation during the process

— Curriculum Development during the process

The created Natural Gas Heating and Gas Burning Device Service Personnel (Level 4) curriculum was evaluated by firm decision-making managers and curriculum and instruction experts. In the evaluation, curriculum evaluation guide according to design principles prepared by Dilek Canlier was developed and used (Appendix Q). The scope, graduality, continuity, relatedness, balance and flexibility, and usefulness dimensions of the curriculum were evaluated.

3.10. Working Schedule

In Table 6 monthly activity planning for the preparation, implementation and evaluation of the Heating and Gas Burner Divece Service Personnel profession curriculum is given. The research is expected to be completed in a total of 18 months.

Table 6

Working schedule (Process *table for the preparation, implementation and evaluation of the heating and gas burner divece service staff curriculum*

Stage	**1**		**2**								**3**
Sub Stage	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Feedback	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	
Moon / Process	Creation of teams Review of literature Creating a work schedule	Context of the curriculum Needs Analysis – Determination of expectations of society, individual and firm / Sector Task Analysis, Job Analysis, Job Description Fundamentals / Components of the Profession	Trainer training	Educational environment Goals / Achievements / Competences	Determination of Measurement and Evaluation Criteria / Test Situations	Studies and content compatible with the Content Approach	Strategy, methods, techniques and approaches	Preparation of Learning Situations / Learning Environments and Learning Materials	Iplementation -Preparation of the Educational Environment -Deciding on Experiment Conditions -Planning the Experiment Procedure -Iplementation	Review of the implementation	Program Evaluation, Final Decision Making and Reporting about the Program
1											
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4. RESULT AND RECOMMENDATIONS

In this study, four sub-research questions and 12 related sub-questions were sought to answer the research question.

The research question and sub-questions are given in Table 7. In this section, data for the main research question and each sub-question are shared. The data are sorted according to the design specified in the method.

Table 7

Data headings collected for Natural Gas Heating and gas burner device service level (4) personnel curriculum development study

Research Question	Research Sub-Questions	
4. How can a curriculum be developed for natural gas heating and gas burner device service personnel training be developed?	4.1. What is the training requirement for natural gas heating and gas burner device service personnel?	4.1.1. What are the unmet needs of natural gas heating and gas burner service personnel in pre-service curriculum design?
		4.1.2. What are the expectations of authorized service managers from natural gas heater and gas burner device service personnel?
		4.1.3. What do senior natural gas heating and gas burner service personnel think about the knowledge and skills that natural gas heating and gas burner service personnel should have?
		4.1.4. What were the facilitating factors and constraints encountered by in-service trainers during pre-service training?
	4.2. How should the curriculum be designed for natural gas heating and gas burner device service personnel training?	4.2.1. What are the required qualifications defined by the Vocational Qualifications Authority?
		4.2.2. What are the opinions of consumers regarding the knowledge and skills required to become a natural gas heating and gas burner service personnel?
		4.2.3. What kind of curriculum should be designed for training natural gas heating and gas burner service personnel?
		4.2.4. What should be the features of the model to be chosen for curriculum development?
	4.3. Is it appropriate to implement and develop the designed curriculum?	4.3.1. How should the curriculum be implemented for natural gas heating and gas burner device service personnel training?
		4.3.2. Has the designed curriculum been implemented in accordance with the model used?
	4.4. Does the developed curriculum meet the training needs of natural gas heating and gas burner device service personnel?	4.4.1. What are the opinions of senior managers about the implemented natural gas heating and gas burner device service personnel curriculum?
		4.1.2. Has the curriculum been developed in accordance with curriculum development principles?
Note: Decision Making Committee opinions, suggestions and criticisms were used in all processes.		

4.1. How can a curriculum be developed for level (4) training of natural gas heating and burner device service personnel?

Research sub-question stages;

• Needs analysis phase,

- ✓ Problem identification
- ✓ Goals and objectives
- ✓ Identify the compedencies
- ✓ Performance group determination
- ✓ Prioritization and training needs
- ✓ Vocational training and
- ✓ Compedency-based curriculum
- ✓ Profession-related qualifications
- ✓ Firm's qualification expectations
- ✓ Grouping Competencies
- ✓ MYK – Compedency Eniteria

• Desk-based curriculum development / design phase

• Implementation phase of the developed curriculum and

• It consists of stages of evaluating the implemented curriculum.

In this thesis, competency-based teaching strategy was used.

4.1.1. What is the training requirement for natural gas heating and gas burner device service personnel?

Analytical approach was used to determine the needs analysis. The analytical approach is based on a careful examination of trends in changes based on national and international conditions.

It is the process of determining the need based on possible situations that may arise in the future (Demirel, 2020). In determining the need; Examinations were made regarding the general situation, data about the learners, and document contents. As a result of these investigations; Work begins by determining the goals of the curriculum, how to bring the

curriculum to a more effective and efficient level, and the need for a new curriculum (Demirel, 2020). In this context, interview techniques were used. Maximum importance was given to obtaining the opinions of all stakeholders.

Semi-structured interviews were conducted with the firm's decision-making senior management and firm department managers. In addition, data for the curriculum to be developed was obtained by examining the relevant curriculum of the Ministry of Education (MEB, 2023), national occupational standard (VQA, 2016a) and national qualification (VQA, 2016b) documents. The data are classified according to groups.

4.1.1.1. Firm Decision Maker Interview Data

Two basic questions were asked within the scope of firm senior manager interviews. In the first question; The firm's expectations from the curriculum regarding the technicians to be employed in the authorized service were investigated.

Firm top managers generally expect the following criteria from technicians to be employed;

• Having knowledge, skills and positive behaviors,

• Ability to establish strong communication with the customer,

• Ability to provide quality service and

• They expressed it as corporate belonging.

With the help of the second question, other expectations of the firm's senior management from the curriculum were obtained.

Other expectations of the firm's top managers from the program developed for training technicians;

• Respect and contribution to the value of internal diversity,

• Contribution to brand strength,

• Contribution to increasing authorized service satisfaction,

• Contributing to increasing the number of female technicians,

• In authorized services, male and female technicians can provide service to customers together and

• They expressed it as improving the distribution of service working hours throughout the day.

4.1.1.2. Firm Department Manager Interview Data

Data was collected on the expectations of firm departments from participant technicians during interviews with Firm Department Managers (Consept Manager and After Sales Area Responsible, Training & Customer Communication Center Section Manager, Online Sales Expert, Human Resources Business Partner and Technician Training Process Coordinator). Department managers have at least five years of working experience in the firm.

Question1: How is the participant technician selection process determined?

First of all, four basic criteria to be looked for in technician participants were determined before the interview. These:

• Being between the ages of 18 - 35,

• Being unemployed,

• At least high school level education and

• It is determined as having a class B driver's license.

During the interview process with technician participants who met the prerequisites, four basic characteristics of the participant were examined. These;

• Individual characteristics,

• Level of adaptability to business conditions,

• Motivation and

• Participant expectations.

However, in special cases, it has been suggested that these criteria can be reinterpreted and action taken to be flexible. In addition, the human resources department expects the participant technician to be open to development throughout his entire business life and to have a technician profile that adapts to the firm's diversity value. The most important expectations of firm department managers from technicians in general are; It can be stated as strong and effective communication skills, respect for diversity, being compatible with team work, constantly wanting to improve oneself, showing resistance in the face of difficulties, business ethics and problem solving skills. It was also emphasized that, if sufficient support is provided, female technicians working in the industrial sector can overcome obstacles in the education and employment processes.

4.1.1.3. Professional document review

International and national documents related to the profession were examined. These documents;

National Vocational Standard for Natural Gas Heating and Gas Burning Device Service Personnel, coded 09UMS0007-4, belonging to the energy sector of the Vocational Qualifications Authority (VQA, 2016a)

• National qualification for Natural Gas Heating and Gas Burning Device Service Personnel, code 11UY0032-4 (VQA, 2016b)

• Unites, course information forms (CIF) and framework curriculum (FC) of the relevant curriculum of the Ministry of National Education (MEB, 2023) were examined.

• ISCO 08: Classification (Occupational Code) 7126 standard (ISCO 08, 2016) was examined. Your job; purpose, learning environments, definition of learning outcomes, key competencies, measurement and evaluation methods, quality assurance, certification, validity period features, etc. has been defined. It has been observed that VQA documents are compatible with these standards.

The definition, scope, recommendation decisions and national reference reports of the European Qualifications Framework (EQF), (https://europa.eu/europass/en/europass-tools/european-qualifications-framework) were examined. It has been observed that the Turkish Qualification Framework (TQF) and AYF level 4 criteria are compatible.

• Turkish Employment Agency (İŞKUR); VQA has classified Professions Requiring Documentation for natural gas heating and gas burning device service personnel (https://media.iskur.gov.tr/42507/isparta_eplan_30-11-2020.pdf).

• The curriculum implemented by the firm for current employees was examined.

As a result of the document review, table 8 was created to compare the qualifications. Qualifications that do not have a corresponding qualification are left blank.

Table 8

Comparative Qualifications for Natural Gas Heating and Gas Burning Device Service Personnel Level (4) Profession

Qualification / Curriculum	Competencies included in the firm's pre-curriculum development program	National qualifications within the scope of the Vocational Qualifications Authority examination	Ministry of National Education Plumbing Technology and Air Conditioning Field (Sanitary Plumbing and Heating Branch) qualifications
Basic Definitions and Units	Having an idea about heating devices		Supplying the Air Required for Combustion, Calculating the Heat Loss, Selecting the Heater
	Having an idea about natural gas		Gas Burning Devices Workshop Equipment
	Having an idea about Basic Electricity and Measurement		Electrical Concepts and Conductors, Circuit Concept, Measurement, Power and Heat Effect, Electric Motors, Simple Automatic Control Circuits
	Having an idea about Basic Plumbing		Heating and Natural Gas Workshop Equipment, Heating Installation Project, Heating Installation Pipe Diameter Calculation,
Occupational health and Safety	Analyzes legal and workplace rules regarding occupational health and safety.	It defines the legal and workplace rules regarding occupational health and safety.	Takes occupational health and safety measures and uses personal protective equipment.
	Analyzes measures to reduce harmful factors that threaten occupational health and safety.	It describes reducing risk factors related to occupational health and safety.	Uses tools and equipment in line with occupational health and safety measures.
	Analyzes emergency procedures in case of danger within the scope of occupational health and safety.	Complies with OHS rules in the work it carries out.	Explains emergency procedures in situations of danger.

	Analyzes emergency exit routes and methods within the scope of occupational health and safety.	Applies quality requirements in the work it carries out.	Takes environmental safety measures according to the characteristics of the work area.
Business Organization	Analyzes the characteristics of the work area.	Identifies workspace features appropriate for the job.	Organizes work according to the characteristics of the work area.
	Prepares the necessary machinery, equipment and materials for work.		
	Cleans the equipment and work area at the end of the job.		Cleans the equipment and work area at the end of the job.
Business Planning	Reviewing the request from the authorized service unit	Explains how to review historical service information of the device.	
		It describes creating the most appropriate route/sequence for transportation according to business demands.	
	Preparing for service delivery	Lists the preparation processes for service delivery	
Burner Device Installation	Checking the suitability of the installation site	It checks the suitability of the installation site.	It checks the suitability of the installation site.
	Make installation	it makes installation	It makes instalation in accordance with the installation manual.
	Conducting tests and checks	Conducts tests and controls.	Conducts tests and controls of the burning device.
Commissioning the Burner Device	Checking the "Installation Compliance Certificate" of the Natural Gas Distribution Firm	It checks the "Installation Compliance Certificate" of the Natural Gas Distribution Firm.	It checks the installation conformity certificate issued by the gas distribution firm.
	Checking the installation connections of the burning device	It checks the installation connections of the burning device.	Checking the installation connections of the burning device
	Making heating and burning device connections when necessary	Makes gas burning device connections when necessary.	It commissions the service in accordance with the installation.
	Converting natural gas	It converts natural gas.	It performs gas conversions of combustion devices.
	Making final checks and reports	Performs natural gas tightness test. Makes final checks and reports.	It performs the natural gas tightness and strength test inside the flat.
Maintenance of Heating and Burning Devices	Inspect the heating and burning device	Explains the process of examining a gas burner device.	Inspect the heating and burning device
	Prepare for maintenance	Makes maintenance preparations.	Prepare for maintenance
	Make maintenance	Make maintenance	Performs maintenance in accordance with the

			manufacturer's instructions.
Repair of Heating and Burning Devices	Inspect the heating and burning device	Burner device fault detection	Burner device fault detection
	Prepares for repairs.	Prepares for repairs.	
	Do repair work	Does repair work.	Performs fault detection in accordance with the manufacturer's firm instructions.
Informing the Customer		Provides information about the device.	Provides information about the use of devices.
		Makes reports about the device.	Makes reports about the device.
Environmental safety measures		Describes applying emergency procedures in case of danger.	Explains how to act economically in the consumption of natural resources.
		It describes the reduction of environmental risks. Applies environmental protection requirements in the work it carries out.	
Quality management system		It describes the efforts to eliminate errors and malfunctions detected in the processes.	Explains the quality requirements of the job.
Curriculum Duration	Five days (Total 40 hours). Technicians receive continuous professional and personal development training after employment.	Individuals who have received formal or non-formal vocational training or have industry experience can take the exam.	The curriculum duration is four years.

Firm and authorized service manager expectations have been determined regarding the knowledge and skills that a senior technician should have for natural gas heating and gas burner device service personnel. Firm managers; It has been observed that it emphasizes corporate culture, belonging and diversity. Authorized service managers, on the other hand, focus on the senior technician's ability to manage relationships with customers and solve problems, as well as her/his basic job competencies. It is desired by all stakeholders that senior technicians have professional and technical skills. They expressed their opinions about the shortcomings of the current senior training system. All stakeholders are of the opinion that increasing the number and rate of female technicians will positively contribute to the quality of the job.

4.1.2. What are the expectations of authorized service managers from natural gas heater and gas burner device service personnel?

In order to determine the technician expectations before the implementation, the opinions of a total of 16 authorized service managers from different provinces, approved by the firm, were taken. Authorized services were determined by the firm coordinator and regional managers. Care was taken to ensure that the companies were from different regions. The opinions received from a total of 16 authorized service managers were analyzed with the MAXQUDA 2024 qualitative analysis program and the data in table 9. A sample Maxqda 24 page is presented in Appendix J.

Table 9

Authorized Service Manager Interview Data

Categories	Theme	Code Frequency 202
Technician Expectations of Authorized Service Managers • Expectations regarding personality traits • Expectations regarding knowledge and skills • Expectations regarding attheude • Other expectations	Opinions about what kind of technician the services expect	68
Opinions of Authorized Service Managers on the Employment of Female Technicians • Positive • Negative • Abstains	Opinions on the employment of women in the service as Heating and Gas Device Service Technicians	33
Advantages of Male Technicians According to Authorized Service Managers • Physical advantage • Advantage regarding business outlook and assumptions • Advantage regarding working conditions	Advantages of male Heating and Gas Device Service Technicians over female technicians	28
Opinions of Authorized Service Managers on the Advantages of Female Technicians • Customer Advantage • Communication Skills Advantage • Attheude Advantage	Advantages of Female Heating and Gas Device Service Technicians over Male Technicians	25
Authorized Service Managers' Opinions on the Employment of Technicians • Economic conditions	Difficulties you face in employing a Heating and Gas Device Service Technician	48

• Work conditions • General Situation Regarding Education • Situation Regarding Vocational High Schools • Social Perception • Legal Status		

Authorized service manager data categories and codes are presented in Table 10.

Table 10

Authorized service manager data categories and codes

Categories	Code
Expectations from the technician (*The expectations of authorized services from the technicians they want to employ are shown in four main groups. These can be grouped as personality traits, knowledge and skills, attheude and other expectations.)*	*Technician Expectations of Authorized Service Managers* *Expectations about personality traits* • Enjoying doing one's job • Being respectful to his job and colleagues • Being honest • Being disciplined • Being true to his word • Being reliable • Being respectful • Being happy and smiling • Embracing his job as his own • Being self-confident • Being patient *Expectations regarding knowledge and skills* *Metacognitive skill expectations (Collaboration, Communication, Teamwork, Problem solving)* • Senioring the product range within the scope • Having a technical command of his job • Having high persuasive ability • Performing its work accurately and without errors • Having sufficient technical knowledge • Doing the job in a secular manner • Having strong style and diction • Ability to communicate bilaterally • Giving importance to mutual communication • Having high persuasive ability • Ability to communicate effectively • Providing practical solutions • Completes the job in one go • Establishing respectful communication with customers • Being compatible with the team he works with • Being innovative *Expectations regarding attheude* • Being open to learning • Self-improving

	• Respectful, patient and understanding towards customers • Prioritizing customer satisfaction • Loyalty to the workplace • Ownership of the job • Compliance with workplace rules • Using time efficiently • Completing the assigned work on time and on time. • Acting in accordance with business ethics • He cares about his job *Other expectations* • Class B driver's license and good driving skills
Opinions on employment of female technicians	*Employment of Female Technicians by Authorized Service Managers* *Positive Comments* • I think that a female technician would be more advantageous. • I think female employees should definitely work in a technical service. • I believe that just as a male technician can do it, a female technician can also do it. • By forming a team of two with a male technician who is experienced in the job and a female technician who is just starting out, the job adaptation process can be accelerated and the society can be instilled that women have a place in this sector. • Recently, we see women working in every field. This shows that most jobs are not done only by men, and that women can be as successful as men if desired. • We believe that they can also be successful in the technical service business. • We believe that working with a female technician within our firm will also provide advantages. • After all, for this job, which is dominated entirely by men, it is important to work by knowing the environment in which one is working and acting accordingly. • For some reason, there are no female technicians in this sector. Must be. The door should be open to everyone. • I think it would be more efficient in terms of customers, employees and service if I employed a female technician. • If he reaches a good level in terms of technical knowledge, he can make great contributions to the firm. • Expands our firm vision. • I think it will be preferred especially by our female customers who live alone. • They can be an example to male technicians with their meticulousness. • There are no female technicians in our firm or region. Of course, if it happens, we look at it very favorably. • In some parts of the service, we provide; It can be used in services such as commissioning and promotion, provided that the principle of volunteering is predominant. • I think women can also do this job properly. • We are happy to see and support women in every field. • It will make us a different and innovative firm. • I think positively. • We can say that when we first heard about the issue, it excited our service. First of all, we think that a great awareness will be created in the field and in the eyes of our consumers. We believe that when we start working with female personnel, the loyalty of our team will increase and the example it will set for other personnel in the field. • We think that, in terms of consumer satisfaction, technicians will be careful about their appearance, attire, vehicle order and many other personal issues. • We think that if she works in our service, she will set an example for other staff members and our male staff members will also pay attention to this issue in parallel. *Negative Comments*

	• Unfortunately for our current sector, I think that making room for women in Türkiye's conditions may be a long-term process. • I am always in favor of supporting women in all areas of business life, but I think that they may be harmed by the work done for the benefit of women in this sector. I think that women cannot exist in this sector for long due to both their attheudes and behaviors when they are guests of people's homes and the heavy workload. *Abstaining Opinions* • Society has a highly prejudiced approach. • In order to break prejudice, we will first need to know the value of our women. • Individual education level needs to increase. • Since the service area is in a closed and narrow area for the work area, it can be scary for our female technicians who will work alone with the end consumer. • In the future, customer contexts established through mutual communication will perhaps increase the selection of female technicians to receive service at the next appointment. • The region I live in is a community of people from different communities. For this reason, while some regions welcome it very positively, some regions may act very conservatively. • However, many segments of our society may have a negative perspective towards female employees. • Society's perspective on female technicians may be negative. • It would be very positive. I just have some reservations about the acceptance of society, which is called peer pressure. • As female technician employees increase, quality and customer satisfaction will increase significantly. But it takes a lot of effort to make this generally accepted. • I think the conditions are not very suitable.
Opinions on the Advantages of Male Technicians	*Advantages of Male Technicians According to Authorized Service Managers* *Pphysical advantages* • Fiziki olarak daha güçlü oldukları için tek başlarına servis hizmeti vermesi (kombinin duvardan indirilmesi veya takılması gibi durumlarda) *Advantage regarding business outlook and assumptions* • Providing faster service • Their technical skills and knowledge are better than women (since they have been dealing with these jobs for a long time). • Faster adaptation to work • Male technicians may have been directed to repair and maintenance work by their parents since childhood. That's why men are in an advantageous and conscious position. They can accept these repair and maintenance works more easily and without prejudice. • Work efficiency may be higher. • Can perform job analysis better. • Male technician always gives confidence • It is believed that he does his job properly. • It has high credibility according to the customer. • Social norms are in favor of men. • It is generally accepted in society. • Some heavy tasks go much more smoothly. • Work stress is very high in the society we live in. I think men can deal with this more astutely. *Advantage regarding working conditions* • Adaptation to weather conditions, especially in winter • Can work even in very late time zones
Opinions on the	*Advantages of Female Technicians Compared to Authorized Service Managers*

advantages of female technicians	*Customer Advantage* • Can increase customer satisfaction • Agreement with the customer • Becomes more successful in dialogues with customers • A more polite approach may be more positive in terms of customer satisfaction. • In human relations, they can be warmer and more sincere in their behavior towards customers than male technicians. • Female customers can feel more comfortable when they are alone at home • Especially women living alone are always worried when they call a service to their homes, but if they knew that there were female technicians, I am sure they would prefer them and feel safe, on the other hand, the female technician would create sympathy for our firm. • Especially in our society, since women mostly stay at home, it is easy for female technicians to communicate. • The advantage of female technicians may sometimes be for users who do not accept male technicians at home. • I think our relationships with customers will improve. • I believe that female technicians can communicate with customers more quickly • It provides advantages especially for the firm and the service during the first commissioning. *Communication Skills Advantage* • I am sure that your communication and persuasion skills could be higher. • Women may communicate faster than men • They will be more advantageous in solving the problem • Communication with people can be stronger and more persuasive • They can speak more sweetly and show a smiling face *Attheude Advantage* • "Women have different perspectives." • In general, I think female employees will do it in detail. • I think they will work more meticulously. • Thanks to his meticulousness, I think he can bring an advantage to our business if he is skilled in technical work. • Since we provide services in a home environment as part of our business, a warmer environment can be created. • "Female technicians attract more attention and are more meticulous because of what they can do in the service, both in terms of appearance and information communication."
Difficulties in employing Heating and Gas Device Service Technicians	*Difficulties encountered in the employment of Heating and Gas Device Service Technicians* *Economic conditions* • Problem caused by economic inadequacy • Current economic conditions. • Encountering resignations, especially due to economic reasons, in the employment of technicians. • Economically, the salary amounts requested by employees cannot be met due to today's economic problems. • Being economically insufficient to meet the needs of the trained technician and this profession not being seen as a lucrative profession. • Economic situations and the problems we experience make it very difficult to find new employment. We are trying to continue with our current number. *Work conditions* • Problem caused by long working hours

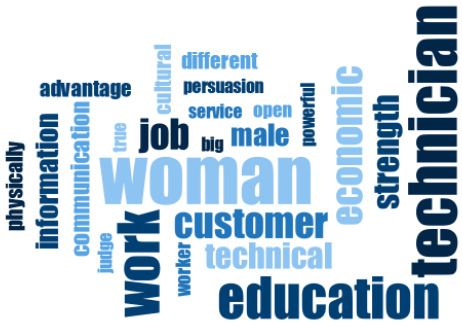
	• Problem caused by technicians turning to pirate service due to market conditions • Since unofficial working conditions are very easy in our sector (availability of spare parts, low equity budget), it is very difficult to employ technicians who are loyal to their job and work for a long time. • There are also layoffs due to lack of sense of belonging. • Office conditions • Dislike of work • We train our employees with great effort, but it is very difficult to retain them. • There is a demand for factory jobs with more comfortable hours. *General Situation Regarding Education* • Nowadays, since university graduation is very easy, the tendency towards sub-professional branches has decreased to the point of almost non-existent. • Decreasing importance given to technical high schools, vocational high schools or apprenticeship schools. • Lack of information skills • Inability to find trained, ready-to-work employees • While training is provided, training should be given not only in technical terms, but also on diction, business ethics and labor law, so that individuals can improve themselves in this direction. • Although vocational high schools and vocational training centers provide individuals with a certain education and graduate them, people who participate in the training need to be sure that they are doing the right job and be aware of the job they will do. It is necessary for him to do his job lovingly and knowingly so that he can use his knowledge and skills correctly in business life. • I think that training centers should pre-screen whether the people applying for training have the skills for this job or not. • Even if the person is unable to complete the training, if he/she really deserves this document at the end of the training, he/she should graduate and be given a diploma. I think that today's educational conditions are inadequate. • There are problems in training technical personnel. There are not enough and competent technicians trained in all branches. • They don't want to take responsibility. • There is generally no sense of ownership of one's job. *Situation Regarding Vocational High Schools* • I think that in the past years, there was a great deal of inadequacy in raising professional or individual awareness in the vocational high schools and colleges from which most of us graduated. Right now, let alone finding female technicians, we are having extreme difficulty in finding technicians from vocational high schools and colleges with a 90% male capacity. • Inability of vocational high schools to train sufficient competent personnel • We think that vocational high schools and vocational training centers should provide students with a better education process in this regard. • Although many students come from our schools, we witness that they do not choose our side and go to different sectors after their student status ends. • As the day goes by, things come to an end in his mind. I myself am a vocational high school graduate. My senior and his senior were both vocational high school graduates. Vocational high schools should definitely be supported seriously. *Social Perception* • Don't underestimate the technician profession. • Cultural reasons • Of course, it is natural for employees to be from different cultures. However, in some cases, these cultural problems can cause problems between employers and customers. • Young people do not attach much importance to the profession

	Legal Status • Although I applied to vocational training centers and İŞKUR, unfortunately we did not receive a single response. • SGK expenses put a strain on the firm.

In Figure 2, the needs analysis word cloud for authorized services is presented.

Figure 2

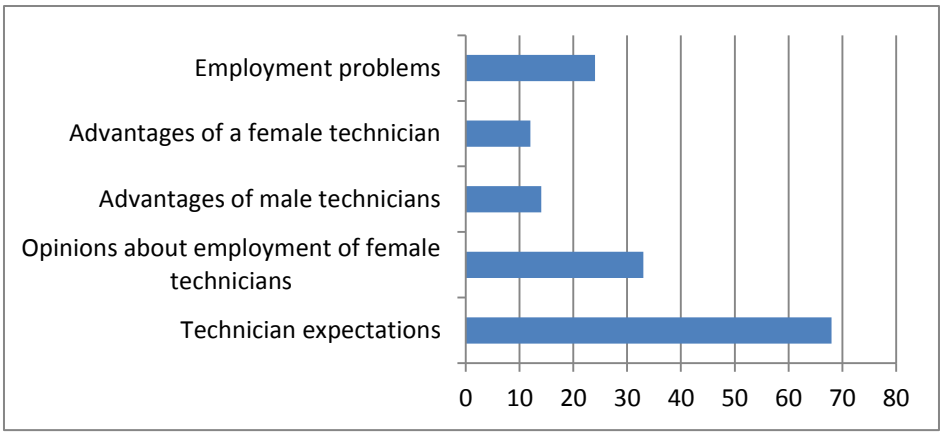
Authorized service manager – needs analysis - word cloud



In Table 11, the opinions and categories of the authorized service manager are presented in a tabular form.

Table 11

Authorized service manager opinion categories table



4.1.3. What do senior natural gas heating and gas burner service personnel think about the knowledge and skills that natural gas heating and gas burner service personnel should have?

Interviews were held with five senior technicians who are experts in their fields and have at least three years of experience. All senior technicians are accredited by VQA for international operability. Opinions were received from senior technicians on the working environment, expectations from technician participants and technicians who will start working, their views on the sector and technician training. In this context, the following data was collected:

- Expectations from one the heating and gas burning device service technician who will newly start working in the service,
- Problems encountered in the knowledge, skills and attheudes of the heating and gas burning device service technician who newly start working in the service,
- Problems encountered in the knowledge, skills and attheudes towards work of existing heating and gas-burning device service technicians,
- Your opinions about the Heating and Gas Device Service Personnel 4th Level VQA exams and their results • What are the advantages of male heating and gas burner service technicians who are new to work in the service compared to female technicians?
- Advantages of female heating and gas burner service technicians who are new to work in the service compared to male technicians,Sektörde çalışan kadın teknisyenlerin, iş piyasasındaki deneyimleri hakkında görüşler (Cinsiyet farklılığı, fiziksel güç, iş yapma biçimleri, firmalara katkıları, öğrenme yetenekleri, sınav başarıları),
- Opinions about employing women in the firm as heating and gas device service technicians,
- Effects of on-the-job training programs on technician employment.
- As a result of these interviews, the expectations of male technicians were collected under nine basic headings. The theles are:
    - Being in harmony with its senior,
    - Having basic knowledge and skills,

- Giving importance to time, making work-oriented planning,
- Preparing for the Heating and Gas Device Service Personnel 4th Level VQA exam,
- Male technicians have better physical strength than female technicians,
- Female technicians have better communication and persuasion power than male technicians,
- Female technicians working in the sector may have difficulties in the job market and need support in this regard (difference in cultural perspective, gender difference, physical strength),
- A completely positive view on the employment of women in the firm as heating and gas-burning device service technicians,
- Effects of on-the-job training programs on technician employment.

In table 12, the codes and categories of senior technicians regarding the program expectations are given.

Table 12

Senior technicians' opinions on curriculum expectations

Code and Category	Explanation	Frequency 165
Senior Technician Expectations • Expectations regarding personality traits • Expectations regarding knowledge and skills • Expectations regarding attheude	Expectations of the senior technician from the heating and gas burning device service technician who will start working in the authorized service	40
Problem Encountered with the Participant Technician • Cognitive problems • Motor problems • Affective problems	Problems encountered in the knowledge, skills and attheudes of the heating and gas burning device service technician who newly start working in the service,	16
The Problem Encountered with the Senior Technician • Cognitive problems • Motor problems • Affective problems • Other problems	Problems encountered in the knowledge, skills and attheudes towards work of existing heating and gas-burning device service technicians,	23

Opinions about VQA Exam • Exam qualification status • Exam inadequacy status • Exam content • Other exam elements	Opinions about the "Heating and Gas Device Service Personnel (4th Level VQA)" exams and their results	15
Advantages of Male Technician • Physical advantages • Behavioral advantages	Advantages of male "Heating and Gas Burner Device Service Technicians" who are new to work in the service compared to female technicians	8
Advantages of a Female Technician • Communication advantages • Behavioral advantages • Advantages for the customer • Other benefits	Advantages of female "Heating and Gas Burner Device Service Technicians" who are new to work in the service compared to male technicians	12
Female Technician Experiences • Positive experiences • Difficulties encountered	Opinions about the labor market experiences of female technicians working in the industrial sector	10
Women's Employment • Positive opinion • Abstaining opinion • Other opinion	Opinions about employing women in the firm as "Heating and Gas Device Service Technicians"	15
Effects of Return to Work Program • Positive opinions • Advantages of on-the-job training in services • Participants' learning readiness	Effects of on-the-job training programs on technician employment	19
Special Experiences • Economic conditions and career • Vocational education perspective • Difficulty • Equality	Special experiences and insights into the lives of the seniors	7

In table 13, the opinions of senior technicians regarding the curriculum expectations are given.

Table 13

Codes and categories for curriculum expectations of senior technicians

Explanation	Code and Categories
Expectations of the senior technician from the heating and gas burning device service technician who will start working in the authorized service	*Senior Technician Expectations* *Expectations about personality traits* • Being calm • Being curious • Be careful • Being aggressive and enterprising *Expectations regarding knowledge and skills* • Prior knowledge of electricity • Knowing the combi boiler operating system and combi boiler types. • Having knowledge about natural gas • Knowledge and ability to use basic tools and prepare materials • Knowing the occupational safety rules • Problem solving skills • Being regular • They should know how to ask for help • Durability *Expectations regarding attheude* • Being willing • Strives to improve himself • Being respectful • Expressing the desire to learn • Having business ethics • Being compatible • Wanting to take responsibility
Heating and gas burning device service technicians who are new to the job; problems encountered in their knowledge, skills and attitudes towards work	*Problem Encountered with the Participant Technician* *Cognitive problems* • Having difficulty in interpreting and finding a solution when faced with a different situation. • Difficulty solving many real problems • Not being productive *Motor problems* • Not being practical and fast enough • Lack of mechanical skills • Difficulty understanding the boiler system • Even if they come from a technical school, they do not have very poor electrical knowledge. • Having insufficient knowledge about the combi boiler operating system *Affective problems* • Inability to maintain interest for long periods of time • Lack of patience • Being give up instead of dealing with the difficulty, when faced with a difficulty, • Having problems adjusting to work • Adapting to working hours

Problems encountered in the knowledge, skills and work attitudes of natural gas heater and gas burner service technicians	*The Problem Encountered with the Senior Technician* *Cognitive problems* • Even those who previously worked in different companies experience compatibility problems when starting to work with firm products. • Not being able to senior old systems as well as new systems. • Lack of general working knowledge of the boiler • Lack of teamwork and cooperation *Notor problems* • Lack of practical work *Affective problems* • Bringing daily problems to the workplace • I do not have the patience to become a good senior after two or three years. • Not willing to work • Resistance to learning new things • •aving difficulties because they cannot improve themselves • Believing that you are a senior without learning the job thoroughly • Not focusing on doing the job better • The job may be difficult for some people. *Other problems* • Excessive working hours and quitting the job due to working hours • Don't leave your job when you receive a good offer from different companies. • Quitting the job due to financial reasons, workload, etc.
Opinions about Heating and Gas Device Service Personnel Level 4 VQA exams and their results	*Opinions about VQA Exam* *Qualification Status* • VQA exam is an exam that proves that you have learned this job and are a senior. • Those working in a service in the market can pass this exam with a little effort. • Although theoretical exams are difficult, those working in this job do not have difficulty in taking the practical exam. • Every technician participant who is interested prepared and working in the service can receive the VQA seniory certificate within one year at the latest. *Insufficiency Status* • Just having a certificate is not enough to show that you are a senior. • After all, everyone in the market has a seniory certificate, but the quality of each is different. *Exam Content* • Theoretical parts are difficult • You should be well prepared for the theoretical part of the exam. • You should be well prepared for the practical part of the exam. • Understanding the problem in the exam and explaining what you understand • Selecting a tool, detecting and fixing the malfunction • Feeling like some questions in the theory exam are unprofessional issues. • Having difficulty with theoretical questions such as natural gas.

	Other exam elements • Excitement control during the exam
Advantages of male, heating and gas device service technicians who are new to work in the service compared to female technicians	*Advantages of Male Technician* *Physical Advantages* • Being strong *Behavioral Advantages* • Being assertive (attacking) • Preferring male technicians to be more comfortable • Preferring male technicians when speaking during the journey • Preferring male technicians in the service to ensure less control.
Advantages of female, heating and gas device service technicians who are new to work in the service compared to male technicians	*Advantages of a Female Technician* *Communication Advantages* • A safer and better communication can be established with the customer when he/she goes to the service. • Persuasive power *Behavioral Advantages* • Causing more positive behavior within the firm • Decrease in negative behaviors such as swearing • Men within the firm cause us to speak and act more carefully. • Paying more attention to attheudes and movements *Customer Benefits* • A more sincere and trusting relationship can be established with the customer. • It may have advantages in giving confidence to customers. • Giving customers confidence in daytime services • Customers are happy to see female technicians • Positive approach in explaining the technical problem to the customer • Making female customers feel safer *Others* • It is available in the firm as a separate color and difference. • Having thin hands may be an advantage • It is positive for the employer
Opinions about the labor market experiences of female technicians working in the industrial sector	*Female Technician Experiences* *Positivi experiences* • "If there can be very good female engineers, there can be technicians too." • "I saw those who are experts in solving the problems of the machines" *Challenges* • "They may have a little difficulty." • "They may have problems with disassembly and assembly, especially in matters that require strength." • "It is also possible that they may have difficulty doing this job from time to time." • "I worked with intern female technicians. "There may be problems with power."

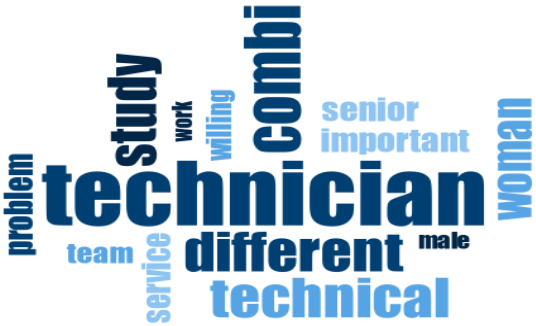
Opinions about employing women in the firm as "Heating and Gas Device Service Technicians"	*Positive opinion* • "There should be at least one female technician in every firm." • Giving opportunity to everyone • Anyone who is willing and interested can work as a technician • "They may have difficulty doing this job alone. However, this difficulty can be overcome with teamwork." • "They may have a little difficulty, but why not." • "I haven't encountered many of them. But there are female engineers. "They can be successful too." *Abstaining opinion* • So, it may be difficult for a female technician to be successful in this service. • This job has some difficulties. *Other opinion* • There are female employees in workplaces, but I have not met anyone working as a technician.
Effects of on-the-job training programs on technician employment	*Women's Employment* *Positive opinions about on-the-job training* • "I look at it positively." • "I think it would be good." • "This job is learned on the job." • "I learned this job on the job." *Advantages of on-the-job training in services* • Current machines and real problems in workplaces are opportunities for technician participants. • Machinery, materials, tools, etc. equipment is up to date and complete • Chance to examine many types of combi boilers • Those who want to should be given the opportunity to try this job. • Whether the participant is suitable for the job is determined by both the technician and the firm. • You have the opportunity to learn the way the workplace works. • If they learn, they have a chance of getting hired. • Making it easier to get a job • They have opportunities to show themselves • During this process, he always goes to the service with the senior technician, sees the implementations and then applies them. • First of all, we go to maintenance services and then we send it to maintenance services. *Participants' learning readiness* • "No matter how much some parts of it are taught at school, people learn better while doing the job." • "Currently, even technician apprentices and journeymen coming from technical schools are having difficulty in service." • "If the technician participant has a technical background, he can be better and learn faster."
Seniors; specific experiences and insights in	*Special Experiences* *Economic conditions and career* • No one leaves and works in different jobs. • If you are good at it, you will make money. • Currently, many of the authorized service owners have worked hard and

their lives	established their companies. *Vocational education perspective* • Technical school-based and willing technician participants can learn this job at twice the speed. • If he doesn't know anything but is very willing, he can go into service within a year. If there is a technical infrastructure, this time can be halved. • If he/she has a technical high school background, he/she will learn in a shorter time. • Even vocational high school graduates have difficulty when it comes to doing this job. • Students coming from vocational high schools are not sufficient in terms of knowledge and skills. • Those coming from vocational high schools do not have general combi boiler knowledge. *Difficulty* • If ten people come, only two can become seniors. • It is difficult to find good personnel. Students are not like they were in my period. • Customer can behave adversely *Equality* • The boiler was in the closet, the male technician could not disassemble it because there was a boiler inside the cabinet, another male technician went and solved it. • Even though I am a man, there may be a problem in terms of strength. Sometimes even I cannot disassemble the rusty joints. • I go to places like Kadıköy for service. There is no difference in technical matters. However, they can be more positive in bilateral relations. • Women and men can achieve equal success in boiler and burner repair and maintenance exams or in different environments. • When I go to the service, I can go with a male or female technician. • However, it would be better if it was a little taller because the combi boilers are a little higher. • I think anyone who is willing and interested can become a technician. • Employees are productive in a work environment that supports employees. • Will be successful if given the opportunity

In Figure 3, the Maxqda word cloud obtained from the senior technician interviews within the scope of the needs analysis is presented.

Figure 3

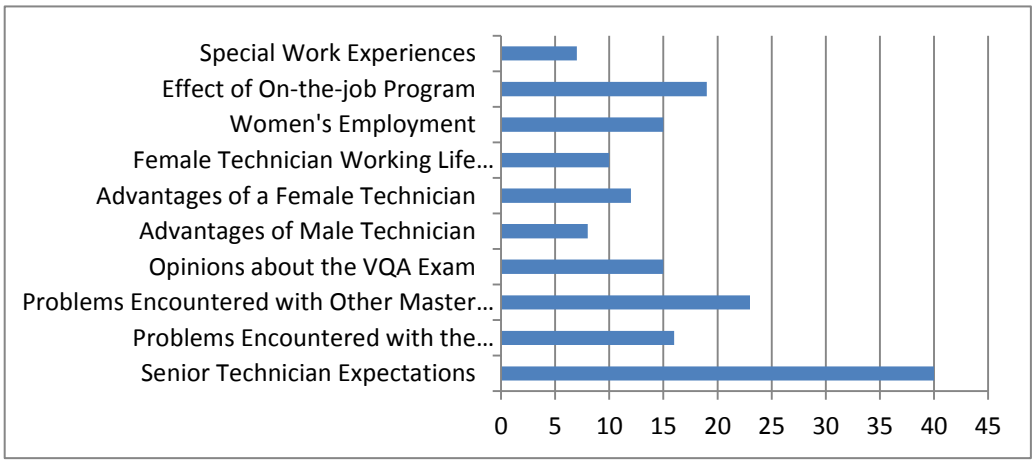
Senior technician – needs analysis - word cloud



In table 14, the codes and categories for the needs analysis of senior devices are presented in a table.

Table 14

Senior technician needs analysis codes and categories



4.1.4. What are the facilitating factors and constraints faced by in-service trainers during pre-service training?

Data was collected by taking opinions about educators' expectations from the developed curriculum and participant expectations. Educators have engineering and teaching training. The opinions received from the firm trainers who are responsible for the training process of participant technicians and carry out the training process are presented below;

Question 1. What are your expectations from the curriculum?

Instructors expressed their expectations from the curriculum as follows;

• Covering all competencies of the VQA exam,

• Correctly highlighting the targets,

• Includes knowledge and skills that can be used in business life,

• Being an implementation-based training,

• Meeting participant expectations,

• Being not reduce motivation of participant and providing focus

• Having interaction in the classroom,

• Having a good structure between the subject and course duration.

Question2. What are the attheudes and behaviors you expect from the participants towards the training?

Trainers' attheudes and behavioral expectations towards participants;

• Participation in class,

• Being motivated for the lesson,

• Trying to carry out the implementation procedures and not giving up,

- Complying with occupational safety rules
- They expressed it as complying with time and planning.

4.1.5. Results for Training Needs

Analytical approach was used to determine the needs analysis. An analysis was made by taking into account the tendencies of changes based on national and international conditions. In determining the need; Examinations were made regarding the general situation, data about the learners, and document contents. As a result of these investigations; Studies were carried out by determining the objectives of the curriculum, how to bring the curriculum to a more effective and efficient level, and the need for a new curriculum. In this context; interview techniques were used. Stakeholder opinions were taken.

Based on the possible situations that may arise in the future, the need for Natural Gas Heating and Gas Burner Device Service Personnel Level (4) professional training has been determined.

Semi-structured interviews were conducted with the firm's decision-making senior management and firm department managers. In addition, data for the program to be developed was obtained by examining the relevant curriculum of the Ministry of Education, NOS and NQ documents.

Firm department managers suggested updating the criteria for determining technician participants. It has been concluded that firm training should be carried out in the region where technician participants live, as much as possible, in order to reduce the problems experienced by women, especially those arising from family relationships. It has been adopted to use local governments (municipalities and muhtars) more effectively in determining technician participants. It has been observed that central structures (İŞKUR, Governorship) have problems in reaching participants. It has been concluded that the Class B driver's license will no longer be a prerequisite for the participants and that the firm and the authorized service will support them in obtaining a driver's license.

Human resources department; It has been concluded that the selected participant can be more successful in the process if the participants work more intensively on their individual characteristics, level of adaptability to job conditions, motivation and participant expectations.

International and national qualifications were classified as a result of examining documents related to the profession. These competencies were used as data regarding the contents in the developed curriculum. The professional objectives / achievements / qualifications of internationally accredited institutions such as Ministry of Education, ISCO 08, European Qualifications Framework (EQF), and Turkish Qualifications Framework (TQF) were examined. As a result of the review, a revision was made in the developed curriculum towards the sustainable development goals. It has been observed that Turkish Employment Agency (İŞKUR) documents are compatible with Ministry of Education, NOS, NQ and ISCO 08.

In order to determine the technician expectations before the implementation, the opinions of a total of 16 authorized service managers from different provinces, approved by the firm, were taken. Authorized services; It was concluded that the study focused on the participant's personality characteristics, expectations regarding knowledge and skills, and expectations regarding attheude. The emphasis on personality traits is striking. Technicians' compliance with working conditions, perseverance, patience, collaborative work and a sense of belonging to the authorized service have been the top priority expectations of authorized services. However; Doing your job fondly, being respectful to your job and colleagues, being honest, being disciplined, being true to your word, being reliable, being respectful, being happy and smiling, embracing your job as if it were your own, and being self-confident are also priorities. On the other hand, customer satisfaction is one of the most important expectations of authorized services.

The expectations of the senior technicians from the technician participants who will come to the authorized service are especially focused on compliance, knowledge and skills. Considering the working areas of authorized service operations, the importance of these expectations is understood. The adaptability and skill of the colleague affects the quality of the work done and the happy working environment. From the senior technician to the participant technician; she/he expects him/her to be calm, curious, careful and aggressive. The fact that senior technicians encounter many different people due to the nature of their work increases the importance of these characteristics. Solving the encountered problem once and correctly is seen as the main goal.

Data was collected by taking opinions about the expectations of in-service training instructors from the developed curriculum and the participants' expectations. It is a great advantage that the working environment meets the elements of vocational education at a

high level. Deficiencies in the content of the curriculum and problems arising from lack of time were identified. Instructors emphasize the importance of practice-based education. On the other hand, he is aware that the measurement and evaluation of the education provided needs to be improved. The prevailing idea is that classroom efficiency can be increased with better technician participants. It has been observed that the instructors are open to development and are open to more efficient methods and techniques.

4.2. How the curriculum should be designed for natural gas heating and gas burner device service personnel training?

Nationally and internationally valid occupational standards were examined in order to determine the content and qualifications of the curriculum. Vocational documents of the Vocational Qualifications Authority and the Ministry of National Education were examined and semi-structured interviews were held with field experts.

4.2.1. What are the national and international qualifications defined for the profession?

Interviews were held with NQ, MoE and ACA officials to determine national and international qualifications. The data obtained from these documents and interviews are presented below.

4.2.1.1. Document review of Vocational Qualifications Authority National Qualifications (NQ)

National qualifications of VQA Natural Gas Heating and Gas Burning Device Service Personnel are shown in table 15. In order to receive the certificate for the profession, theoretical and practical exams consisting of the following two units must be passed. Within the scope of national qualifications;

• 11UY0032-4/A1 Occupational Health and Safety, Quality, Environment and Work Organization, (Compulsory Unit)

• 11UY0032-4/B2 Individual Heaters (Capacity Less than 70 KW) Installation, Commissioning, Maintenance and Repair (Elective Unit) (VQA, 2016b) documents were examined.

Table 15

National qualifications for the profession within the scope of VQA

Competence	Job-Task
Occupational health and Safety	It defines the legal and workplace rules regarding occupational health and safety.
	It describes reducing risk factors related to occupational health and safety.
	Complies with OHS rules in the work it carries out.
	Applies quality requirements in the work it carries out.
Business Organization	Identifies workspace features appropriate for the job.
Business Planning	Explains how to review historical service information of the device.
	It describes creating the most appropriate route/sequence for transportation according to business demands.
	Lists the preparation processes for service delivery
Burner Device Installation	It checks the suitability of the installation site.
	Makes assembly.
	Performs tests and controls.
Commissioning the Burner Device	It checks the "Installation Compliance Certificate" of the Natural Gas Distribution Firm.
	It checks the installation connections of the burning device.
	Makes gas burning device connections when necessary.
	It converts natural gas.
	Performs natural gas tightness test. Makes final checks and reports.
Maintenance of Heating and Burning Devices	Explains the process of examining a gas burner device.
	Makes maintenance preparations.
	Makes maintance
Repair of Heating and Burning Devices	Makes Burner device fault detection
	Makes prepares for repairs.
	Makes repair work.
Informing the Customer	Provides information about the device.
	Makes reports about the device.
Environmental Safety Measures	Describes applying emergency procedures in case of danger.
	Describes the reduction of environmental risks. Applies environmental protection requirements in the work it carries out.
Kalite Yönetim Sistemi	Describes the efforts to eliminate errors and malfunctions detected in the processes.

In National Qualification; No content was found regarding basic definitions and units, problem-solving focused communication, gender roles, professional development and competencies. Studies in this context can be carried out in order to meet the expectations of the firm and society.

It has been determined that he has limited competence regarding work organization, professional development, environmental safety measures and quality management system. In this context, there are areas for improvement.

It is thought that competencies regarding job planning, burning device installation, burning device commissioning, heating and burning device maintenance, heating and burning device repair are suitable for the purpose of the profession.

Those who pass the exam, which takes place in two stages: theoretical and practical, are entheled to receive an internationally valid certificate.

4.2.1.2. Ministry of Education curriculum document review

Ministry of National Education Plumbing Technology and Air Conditioning Field (Sanitary Plumbing and Heating Branch) Qualifications are presented in table 16.

Table 16

Ministry of National Education Plumbing Technology and Air Conditioning Field (Sanitary Plumbing and Heating Branch) Qualifications

Basic Definitions and Units	Supplying the Air Required for Combustion, Calculating the Heat Loss, Selecting the Heater
	Gas Burning Devices Workshop Equipment
	Electrical Concepts and Conductors, Circuit Concept, Measurement, Power and Heat Effect, Electric Motors, Simple Automatic Control Circuits
	Heating and Natural Gas Workshop Equipment, Heating Installation Project, Heating Installation Pipe Diameter Calculation,
Occupational health and Safety	Takes occupational health and safety measures and uses personal protective equipment.
	Uses tools and equipment in line with occupational health and safety measures.
	Explains emergency procedures in situations of danger.
	Takes environmental safety measures according to the characteristics of the work area.
Business Organization	Organizes work according to the characteristics of the work area.
	Cleans the equipment and work area at the end of the job.
Burner Device Installation	Checks the suitability of the installation site.
	Mounts in accordance with the installation manual.
	Performs tests and controls of the burning device.
Commissioning the Burner Device	Checks the installation conformity certificate issued by the gas distribution firm.
	Checking the installation connections of the burning device
	Kuruluma uygun olarak hizmeti devreye alır.

	Performs gas conversions of combustion devices.
	Performs the natural gas tightness and strength test inside the flat.
Maintenance of Heating and Burning Devices	Inspect the heating and burning device
	Prepare for maintenance
	Performs maintenance in accordance with the manufacturer's instructions.
Repair of Heating and Burning Devices	Makes burner device fault detection
	Performs fault detection in accordance with the manufacturer's firm instructions.
Informing the Customer	Provides information about the use of devices.
	Makes reports about the device.
Environmental Safety Measures	Explains how to act economically in the consumption of natural resources.
Quality management system	Explains the quality requirements of the job.

In the content of the MEB framework curriculum; No content was found regarding problem-solving-oriented communication, gender roles and business planning competencies. Studies can be carried out in this context in order to meet the expectations of the sector and society.

Content; It was determined that he had limited competence regarding work organization, repair of heating and burning devices, professional development, customer information, environmental safety measures and quality management system.

In this context, there are areas for improvement. Content; It is thought that competencies regarding basic definitions and units, occupational health and safety, burning device installation, burning device commissioning, heating and burning device maintenance are suitable for the purpose of the profession.

People who complete four-year (eight semesters) vocational training are entheled to receive diplomas and certificates. Ministry of Education qualifications for the profession are given in table 17 below.

Table 17

Ministry of National Education Plumbing Technology and Air Conditioning Field Plumbing and Heating Branch courses and qualifications

Course Name / Weekly Course Hours (38 Weeks per Year)	Plumbing Technology and Air Conditioning Field (Plumbing and Heating Branch)
Technical Drawing Course (Grade 9) 4 Lesson Hours	Geometric Drawings
	Appearance Subtraction
	Dimensioning and Surface Treatments
	Sketch, Perspective and Production Drawing
Basic Operations and Welding Workshop Lesson (Grade9) 6 Lesson Hours	Equipment of the Basic Plumbing Workshop
	Metal Material Cutting Processes
	Leveling Operations
	Steel Pipe Work
	Plastic Pipe Work
	Copper Pipe Workmanship
	Soldering Copper Pipes
	Oxy-Acetylene Preparation Before Welding
	Oxy-acetylene Welding Processes
	Preparation Before Electric Arc Welding
	Electric Arc Welding Processes
	Mig-Mag Welding Processes
	Tig Welding Processes
Basic electricity course (grade 10) 2 lesson hours	Electricity and Conductors
	Joining Conductors
	Electrical Supplies
	Electricity and Circuit Concept
	Measuring Voltage, Current and Resistance
	Electrical Installation Power and Heat Effect
	Electric Motors
	Simple Automatic Control Circuits
Computer Aided Plumbing Vocational Official Course (Grade 10) 4 Lesson Hours	Two-Dimensional Drawing Settings and Commands
	Computer Drawing İmplementations
	Natural Gas Installation Installation and Detail Pictures
	Natural Gas Installation Project Drawing
Heating and Natural Gas Installation Workshop Lesson (Grade 10) 7 Lesson Hours	Equipment of Heating and Natural Gas Workshop
	Getting Gas into the Building
	Natural Gas Column Installation
	Intra-Flat Natural Gas Installation
	Natural Gas Burning Device Installation
	Boiler Room Installation
	Installation of Solid Fuel Devices
	Floor Heating Systems Circuit Elements
	Floor Heating Installation Installation
	Central Heating Installation Installation
	Commissioning the Central Heating Installation
Plumbing Projects Course (Grade 11) 3 Lesson Hours	Plumbing Project
	Plumbing Pipe Diameter Calculation
	Vitrified Materials Detail Pictures

	Heat Loss Calculation
	Heating Installation Project
	Heating Installation Pipe Diameter Calculation
Gas Burning Devices Workshop Lesson (Class 11) 6 Lesson Hours	Gas Burning Devices Workshop Equipment
	Supply of Air Required for Combustion
	Burner Device Installation
	Commissioning of Combustion Devices
	Burner Device Maintenance
	Burner Device Fault Detection
	Customer relationship
Plumbing and Solar Energy Workshop Lesson (Grade 11) 8 Lesson Hours	Equipment of Plumbing and Solar Energy Workshop
	Plumbing Survey Procedures
	Clean Water Installation
	Wastewater Piping
	Bathroom Sanitaryware-Armature Accessory Installation
	Kitchen - WC Sanitaryware-Armature Accessory Installation
	Installation of Hot Water Preparation Devices
	Fire Installation
	Plumbing Pump Installation
	Garden Irrigation System Installation
	Solar Water Heating System Installation
	Solar Water Heating System Piping Operations
	Solar Water Heating System Testing and Sealing Procedures
Vocational Training in Businesses (Class 11) 24 Hours	Practical Training in Business

The qualifications of the developed curriculum, the qualifications that the firm used in internal training before curriculum development, the applied curriculum qualifications, the developed curriculum qualifications, VQA UY and MEB qualifications are given comparatively in Table 18 below.

Table 18

Comparative qualifications for the profession of Natural gas heating and gas burner device service personnel (level 4)

Qualification / Curiculum	**Applied Curriculum Qualifications**	**Qualifications within the Scope of Vocational Qualifications Authority Examination**	**Ministry of National Education Plumbing Technology and Air Conditioning Field (Sanitary Plumbing and Heating Branch) Qualifications**	**Developed Curriculum Competencies**
Basic Definition and Units	Having an idea about heating devices		Providing Required Air for Combustion, Calculates Heat Loss, Selects Heater	Having an idea about heating devices

	Having an idea about natural gas		Gas Burning Devices Workshop Equipment	Having an idea about natural gas
	Having an idea about Basic Electricity and Measurement		Electrical Concepts and Conductors, Circuit Concept, Measurement, Power and Heat Effect, Electric Motors, Simple Automatic Control Circuits	Having an idea about Basic Electricity and Measurement
	Having an idea about Basic Plumbing		Heating and Natural Gas Workshop Equipment, Heating Installation Project, Heating Installation Pipe Diameter Calculation,	Having an idea about Basic Plumbing
Problem-Solving Oriented Communication				Having an idea about the concept of communication
				Having an idea about communication barriers
				Creating solutions in problem situations
Gender Roles				Evaluates gender and gender discrimination
				Evaluates the relationship between Gender and business life
Occupational safety and health	Analyzes legal and workplace rules regarding occupational health and safety.	It defines the legal and workplace rules regarding occupational health and safety.	Takes occupational health and safety measures and uses personal protective equipment.	Analyzes legal and workplace rules regarding occupational health and safety.
	Analyzes measures to reduce harmful factors that threaten occupational health and safety.	It describes reducing risk factors related to occupational health and safety.	Uses tools and equipment in line with occupational health and safety measures.	Analyzes measures to reduce harmful factors that threaten occupational health and safety.
	Analyzes emergency procedures in case of danger within the scope of occupational health and safety.	Complies with OHS rules in the work it carries out.	Explains emergency procedures in situations of danger.	Analyzes emergency procedures in case of danger within the scope of occupational health and safety.

	Analyzes emergency exit routes and methods within the scope of occupational health and safety.	Applies quality requirements in the work it carries out.	Takes environmental safety measures according to the characteristics of the work area.	Analyzes emergency exit routes and methods within the scope of occupational health and safety.
Business Organization	Analyzes the characteristics of the work area.	Identifies workspace features appropriate for the job.	Organizes work according to the characteristics of the work area.	Analyzes the characteristics of the work area.
	Prepares the necessary machinery, equipment and materials for work.			Prepares the necessary machinery, equipment and materials for work.
	Cleans the equipment and work area at the end of the job.		Cleans the equipment and work area at the end of the job.	Cleans the equipment and work area at the end of the job.
Business Planning	Reviewing the request from the authorized service unit	Explains how to review historical service information of the device.		Reviewing the request from the authorized service unit
		It describes creating the most appropriate route/sequence for transportation according to business demands.		planning transportation
	Preparing for service delivery	Lists the preparation processes for service delivery		Preparing for service delivery
Burner Device Installation	Checking the suitability of the installation site	It checks the suitability of the installation site.	It checks the suitability of the installation site.	Checking the suitability of the installation site
	Makes assembly.	Makes assembly.	It mounts in accordance with the installation manual.	Makes assembly.
	Conducting tests and checks	Performs tests and controls.	Performs tests and controls of the burning device.	Conducting tests and checks
Commissioning the Burner Device	Checking the "Installation Compliance Certificate" of the Natural Gas Distribution Firm	Checks the "Installation Compliance Certificate" of the Natural Gas Distribution Firm.	Checks the installation conformity certificate issued by the gas distribution firm.	Checking the "Installation Compliance Certificate" of the Natural Gas Distribution Firm

	Checking the installation connections of the burning device	Checks the installation connections of the burning device.	Checking the installation connections of the burning device	Checking the installation connections of the burning device
	Making heating and burning device connections when necessary	Makes gas burning device connections when necessary.	Commissions the service in accordance with the installation.	Making heating and burning device connections when necessary
	Converting natural gas	Converts natural gas.	Performs gas conversions of combustion devices.	Converting natural gas
	Making final checks and reports	Performs natural gas tightness test. Makes final checks and reports.	Performs the natural gas tightness and strength test inside the flat.	Performs natural gas tightness test. Makes final checks and reports.
Maintenance of Heating and Burning Devices	Inspect the heating and burning device	Explains the process of examining a gas burner device.	Inspect the heating and burning device	Inspect the heating and burning device
	Prepare for maintenance	Makes prepare for maintenance	Prepare for maintenance	Prepare for maintenance
	Make maintenance	Makes maintenance	Performs maintenance in accordance with the manufacturer's instructions.	Make maintenance
Repair of Heating and Burning Devices	Inspect the heating and burning device	Makes burner device fault detection	Makes burner device fault detection	Inspect the heating and burning device
	Preparing for repairs	Makes prepare for repairs		Preparing for repairs
	do repair work	Makes repair work	Performs fault detection in accordance with the manufacturer's firm instructions.	do repair work
Informing the Customer		Provides information about the device.	Provides information about the use of devices.	Provides information about the device.
		Makes reports about the device.	Makes reports about the device.	Reporting about the device
				Invoicing and collecting
Professional development			Working on individual professional development	Working on individual professional development
			Providing professional training to subordinates and other employees	Providing professional training to subordinates and other employees
Environmental Safety Measures		Describes applying emergency procedures in case of danger.	Explains how to act economically in the consumption of natural resources.	Analyzes environmental protection standards and methods

		It describes the reduction of environmental risks. Applies environmental protection requirements in the work it carries out.		Analyzes the contribution to reducing environmental damaging factors.
Quality management system		It describes the efforts to eliminate errors and malfunctions detected in the processes.	Explains the quality requirements of the job.	Analyzes the quality requirements of the job.
				Analyzes technical ways and methods in ensuring quality.
				Analyzes efforts to prevent errors and malfunctions detected in routes and methods.

4.2.1.3. Authorized Certification Agency (ACA) Official Interview Data

ACA officials are people with at least five years of working experience in the sector. Within the scope of the interviews, opinions were received about the exams of participants who wanted to become technicians. In addition, the relationship between the exam content and knowledge and skills was examined. The data obtained from the interview are given in table 19.

Table 19

ACA official interview data

Code	Document	Section
Number of Female Technician Employees	ACB2	There are very few families who want their children to be technicians.
	ACB3	Young people do not choose this profession
	ACB3	Perception that the economic expectations of the technician profession are low
	ACB2	As incentives increase, the number of female technicians also increases.
Working Female Technician Experiences	ACB3	Since it is a manual job, nails etc. Those who are careful may be reluctant to do this job.
	ACB1	Companies may not prefer female technicians.
	ACB1	In general, the number of women taking exams in all technician professions is very low.
	ACB3	Over time, female technicians begin to behave like men.

	ACB3	Being a technician is not like an office job. As you know, it involves some difficulties. It requires especially physical strength.
	ACB3	Prevalence of the perception that the technician profession has physical difficulties for women
The Effect of On-the-Job Training Program on Female Technician Employment	ACB3	I think there is an increase in women's participation in business life as technicians due to economic conditions.
	ACB2	Companies' profit-oriented approach, insufficient social benefit priority,
	ACB2	On-the-job training is a good opportunity for women to distinguish themselves
	ACB2	The attheudes of firm managers are decisive in on-the-job training
	ACB1	I think you can learn better on the job.
	ACB2	Good technicians earn well.
	ACB3	What should happen is that women should be easily employed, but this is not that easy.
	ACB1	Practical-oriented education may be beneficial to those with low academic success.
	ACB2	The sector primarily looks at profitability
	ACB1	I am completely positive
	ACB2	A technician is valuable if he brings profit to the firm.
Opinion and Evaluation about VQA Exam	ACB2	Vocational high school students graduating from different departments should also prepare well for the exam. Theoretically they are weak. It has some shortcomings in terms of implementation.
	ACB1	Generally, men apply for the exam.
	ACB3	All individuals who have completed their professional preparation can pass the knowledge and skill exams.
	ACB1	Not many female participants participate in the exam.
	ACB3	The lowest success rates among all exam groups are encountered in technician exams.
	ACB1	Success scores are decreasing in all technician exams, especially in theoretical exams. A better learning system is needed.
	ACB2	Employees working in a firm are successful in practice exams.
Opinions on Technician Training Programs	ACB1	Anyone who is prepared can do this job.
	ACB3	Opportunities should be given in education. It is important for the private sector and the state to cooperate on this issue.
	ACB2	Trainings should attract the attention of young people
	ACB1	Since the exam success rate is low compared to other professional groups, more effective and strong training needs to be provided. There is a need for public and sectoral collaborations.
	ACB1	Education should be organized using new technologies. Now everyone has a smart phone. These phones can be used for education.
	ACB2	New approaches can make learning easier
Gender Equality and Female Technicianship	ACB1	Families may not be guiding.
	ACB3	There is no man or woman involved in this job, everyone can learn it. There are even very good female technicians.
	ACB1	Taking care of children, housework and the sick is seen as a woman's priority job.
	ACB1	Women face difficulties in the education process.

	ACB3	Opportunities should be given in education. It is important for the private sector and the state to cooperate on this issue.
	ACB1	For married technicians, their spouses may prevent female employees.
	ACB1	In general, there are economic, cultural and social obstacles to women's participation in business life.
	ACB2	Women are seen as men's helpers.
	ACB3	The perception of "Senior" for women is not well established
	ACB2	Women are always seen as assistant personnel when doing technical work.
	ACB3	When we say technician, the first thing that comes to mind is a male technician.
	ACB1	Being a technician is an important vocational and technical training process, and women's inability to participate in this training process due to their family and social disadvantages.
	ACB1	Society does not fully approve of female employees. It is seen as men's work.

4.2.2. What are the opinions of consumers regarding the knowledge and skills required to become a natural gas heating and gas burner service personnel?

The firm has a systematic structure in which it evaluates the opinions of its customers regarding the services provided by its authorized services. Customer evaluations regarding the service they receive are received through different methods. Interviews are held via call-center. Participant technicians who participate in the implementation and successfully complete the training process are included in the system if they are employed. In this context, all technicians working in the authorized service are evaluated. Customer satisfaction has an important place in this process. The survey questions used to measure customer perception towards the technician are given in the Table 20 below. Net Promoter Score (NPS) survey questions. NPS is a measurement tool accepted by companies that aims to obtain feedback from customers to support companies' business strategies.

Table 20
NPS Survey Questions used to measure customer perception of the technician

• Do you have a different suggestion to increase the service evaluation you receive to 9 or 10 points?
• Can we know the reason why you gave this score?
• If you have a different suggestion, can you please let me know?
• Could you please specify the reason for your dissatisfaction?
• Can you evaluate the technician's behavior?
• Can you evaluate the technician's compliance with the appointment time?
• Can you evaluate your overall satisfaction with the service provided by the technician?
• Can you evaluate the adequacy of the technician's explanation?
• Would you recommend our authorized service to your family, friends and circle?

As a result of the surveys, the scores of all technicians are determined. This process affects employees' bonuses and employment contracts.

4.2.3. What kind of curriculum should be designed for training natural gas heating and gas burner service personnel?

Methods and techniques have an important place in teaching the profession. The evaluation system, teaching methods and techniques used in vocational education should be chosen carefully.

4.2.3.1. VQA IAS and UY Document Review Results for Curriculum Design

It is a process only for the exam. In this process, qualifications are defined. The exam has two parts, theoretical and practical. Your exam; purpose, competencies, learning outcomes, measurement and evaluation tool, knowledge expressions, skills and competencies, performance criteria, performance-based exam criteria, terms, symbols and abbreviations are defined. The exam has national and international validity. Those who are eligible to receive a certificate are given a certificate certifying that they are qualified to practice the profession all over the world. The examination system is a structure accredited by the European Union.

The distinctiveness of the exam is open to improvement. It is partially accepted that some of those who successfully complete the exam do not have all the qualifications required by the profession.

4.2.3.2. Ministry of Education Curriculum Document Review Results for Curriculum Design

In the Ministry of Education Plumbing Technology and Air Conditioning Field (Plumbing and Heating Branch) framework curriculum and course information forms, limited space is given for methods and techniques for teaching qualifications. Course information forms contain information about the environment, equipment and achievements. However, teachers working in technical branches need more practical training in teaching methods and techniques. For this reason, new methods and techniques for vocational and technical education, in line with scientific developments, can be planned and implemented within the scope of in-service training.

4.2.3.3. Educator Profession / Field Expert Interview Data

Field experts were selected from teachers with twenty years of experience in the Ministry of Education. It was taken into account that the instructors actively attended classes and participated in the MEB curriculum study processes. Ministry of Education field expert educators; they expressed their opinions about the training programs, training and education processes, and examination and evaluation system for the "Heating and Gas Burning Device Service Personnel" training. They also shared their ideas about the sectoral impact of gender roles. In interviews with field expert teachers; It is expressed that the methods and techniques used in vocational education have not changed for three generations. Field experts state that although they have worked in their profession for more than 20 years, teaching techniques that include expression and imitation elements based on the senior-apprentice relationship are still applied by their own teachers. They stated that there were no effective suggestions in the education system regarding how to use developing methods and techniques in vocational education. Field experts are of the opinion that online or lecture-based seminars and in-service trainings are not effective in teaching new methods and techniques. Educator profession experts stated that studies can be carried out on different methods and techniques that can be used in vocational education, both in universities and educational institutions. During the curriculum development studies, opinions were received from expert trainers in the field and their opinions were received for both the content and implementation of the curriculum. In the studies carried out in this context, the data in Table 21 was obtained;

Table 21

Professional field expert opinion data

Category- Code	Document	Section
On-the-Job Training	FE1	The general opinion in this field is that there is a high density of male technicians.
	FE1	Most technicians hired within the scope of İŞKUR on-the-job projects are dismissed after the contract.
	FE3	On-the-job programs will be very important and useful as they will create self-confidence in women that they can do the job. More training programs should be opened and training should not remain in theory, but should be learned by doing and experiencing.
	FE1	Workplaces, especially large companies, benefit heavily from incentives. However, when the legal obligation is eliminated, the contracts are terminated.
	FE1	Women should also be included in training programs, employed and encouraged in these fields.
	FE2	I find it important
	FE1	Essentially, it is necessary to support cultural development positively by enrolling more female students in technical programs in schools providing vocational education and providing more internship and on-the-job training opportunities in workplaces.
	FE1	Although the action to be taken does not seem easy, I believe that institutional structures should lead in this regard.
Female Technician Experiences	FE3	Frankly, as a female teacher working in the field, I hesitate at first when I see a female combi boiler technician coming to my house.
	FE3	They can be very successful at noticing details.
	FE2	It can be said that they are equally or more successful in other topics such as exam, learning, finding solutions, institutional memory, effective communication, and focusing on details.
	FE3	I think support should be given in situations that require physical strength.
	FE3	The female technician, who does the job without liking it out of necessity and is full of hesitations, will prefer to be in the background anyway.
	FE1	It is a fact that female employees who are competent in their jobs bring business seriousness to the environment they work in.
	FE2	Female technicians' ability to do work in terms of physical strength is lower than men.
	FE3	I don't think female technicians have a theoretical disadvantage as long as they love what they do.
	FE1	Women's learning and business skills in technical jobs provide significant added value to companies.
	FE1	It is also known that women working in technical jobs naturally experience physical difficulties.
	FE1	The cultural structure that has formed in Türkiye has always made women look timidly at their work in these fields.
Number of Female Technicians	FE2	It can be said that it is low in sectors that require physical strength and have high male employment.

	FE3	Young people are not directed to relevant professions due to the belief that the jobs in the field require 100% physical strength, prejudices, and the anxiety of not being able to find a job.
	FE1	Minimum wage practice is widespread
	FE2	Likewise, it is known that men do not want to work in sectors due to social issues and personal preferences.
	FE3	I think that their numbers can increase in the country only if their successes are appreciated, if positive discrimination is made, if they are encouraged to do these jobs, if their working opportunities are improved and encouraged.
	FE1	Inappropriate training programs
	FE1	Male technicians and employees are illiterate and their number is high
	FE1	All incentives and supports for women to work in industrial fields will provide a positive outlook.
	FE3	For women to work in the field themselves, they must first be willing.
	FE2	It is known that women do not want to work due to various social issues and personal preferences.
	FE1	Approaches in corporate workplaces
	FE1	The low number of female students participating in technical departments in vocational education programs
	FE1	The environment and conditions where technicians work are not suitable for women.
	FE1	Incentives
	FE1	Manager / superior harassment - treating female technicians based on their sexual identhey rather than as colleagues
Exam and Evaluation System in Technicianship	FE2	Programs, exams, training, etc. for "Heating and Gas Burning Device Service Personnel" training. Instead of distinguishing subjects between men and women, the qualifications of the job come to the fore.
	FE2	It can be said that there is no restriction on the area of freedom and that the processes develop due to the values of each society and personal preferences.
	FE2	It can be said that they are equally or more successful in subjects such as exam, learning, finding solutions, institutional memory, effective communication, and focusing on details.
Social Gender	FE1	Companies not implementing equal work and equal pay policies for female employees,
	FE3	Frankly, as a female teacher working in the field, I hesitate at first when I see a female combi boiler technician coming to my house. This situation is due to the 'what if' anxiety that has been going on for years. However, perhaps the female technician will detect the fault faster and perform more careful maintenance.
	FE1	Sanctions against this issue in Europe are deterrent, but this deterrence is not sufficient in our country.
	FE1	Gender difference always poses a problem for women.
	FE1	While working, the female technician is not allowed to bend, lie down, etc. Their movements can sometimes be perceived with a different sexual perspective. The problems of cultural immaturity can also be experienced in business life.
	FE1	Being desperate and having to earn money

	FE2	In general, I don't think it's any different than it is in many countries.
	FE1	Female employees are not aware of their rights.
	FE1	It will develop the perception in society that women can also work in technical fields.
	FE2	It is a known fact that societies are shaped in line with customs, traditions, cultural and national spiritual values. It is a fact that cannot be ignored that this shaping affects every issue in society.
	FE1	Over time, women will seriously support their families by working and sweating, and the importance of women in society will be felt.

The field professional development code system is presented in table 22.

Table 22

Field-professional expert opinions code system

Code System	Frequency
Code System	48
Female technician experiences	11
number of female technicians	15
gender	11
On-the-Job Training	8
Exam and Evaluation System in Technicianship	3

The field professional development high-level code system is presented in table 23.

Table 23

Field-professional expert opinions, high-level code statistics

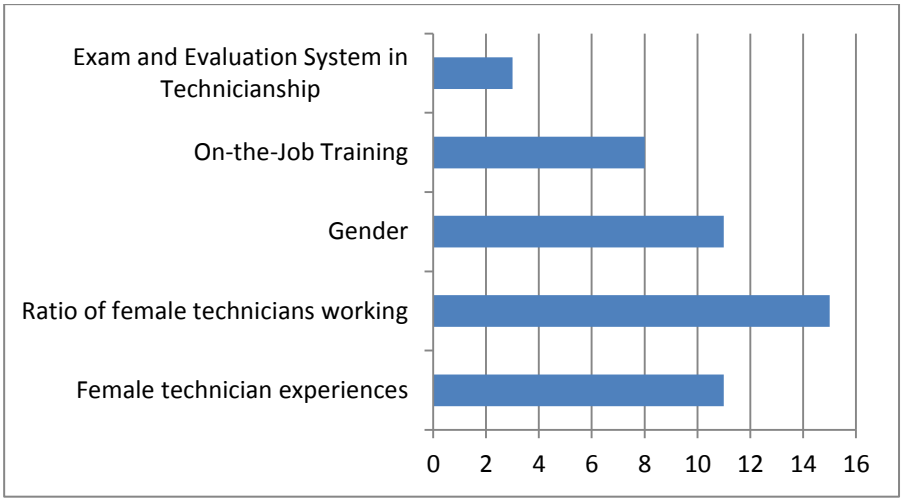


Figure 4 presents the word cloud of professional field experts.

Figure 4

Opinions of field-professional experts - cloud words

In table 24, field expert expert opinion codes and categories are presented.

Table 24

Field-professional expert opinions codes and categories

Code and Category	Explanation	Frequency 48
Female technician experiences • Positive experiences • Negative experiences	Opinions about the experiences of female technicians working in the industrial sector in the labor market (Gender difference, physical strength, ways of doing business, contributions to companies, learning abilities, exam successes and all other issues related to the profession	11
Proportional decrease in the number of female technicians • Reasons arising from Legal Legislation • Due to physical properties • Social reasons • Economic reasons • Reasons related to the working environment	Reasons why the rate of women working as technicians in Turkey is quite low	15
Social Gender • Legal status • Social-Cultural reasons • Economic reasons	The relationship between gender equality and female technicians in Turkey	11
On-the-Job Training • Positive opinions	Effects of on-the-job training programs on female technician employment	8

• Negative opinions		
Exam and Evaluation System in Technicianship • Positive outlook on the exam process	In general, evaluation of training programs, education and training processes, examination and evaluation system for "Heating and Gas Burning Device Service Personnel" training in the context of gender	3

The opinions of professional field experts regarding the needs analysis are presented in Table 25.

Table 25

Opinions of professional field experts on needs analysis

Explanation	Code
Opinions about the experiences of technicians working in the industrial sector in the labor market (gender difference, physical strength, ways of doing business, contributions to companies, learning abilities, exam successes and all other issues related to the profession	*Positive experiences* "Women's learning and business skills in technical jobs provide significant added value to companies." "It can be said that they are equally or more successful in other topics such as examination, learning, solution generation, institutional memory, effective communication, and focusing on details." "It is a fact that female employees who are competent in their jobs bring business seriousness to the environment they work in." "I don't think female technicians are at a theoretical disadvantage as long as they love what they do." "They can be very good at noticing details." negative experiences "Frankly, as a female teacher working in the field, when I see a female combi boiler technician coming to my house, I hesitate at first." "The female technician who does the job without liking it out of necessity and is full of hesitations will prefer to be in the background anyway." "It is also known that women working in technical jobs naturally have physical difficulties." "The cultural structure that has formed in Turkey has always made women look timidly at working in these fields." "Female technicians' ability to do work in terms of physical strength is lower than men." "I think support should be given in situations that require physical strength."
Reasons why the rate of women working as technicians in Turkey is quite low	*Reasons arising from Legal Legislation* All incentives and supports for women to work in industrial fields will provide a positive outlook.

	I think their numbers can increase in the country only if their successes are appreciated, if positive discrimination is made, if they are encouraged to do these jobs, if their working opportunities are improved and encouraged. On-the-job programs will be very important and useful as they will create self-confidence in women that they can do the job. More curriculums should be opened and training should not remain in theory, but should be learned by doing and experiencing. Inappropriate curriculums *Due to physical properties* It can be said that it is low in sectors that require physical strength and have high male employment. *Social reasons* Young people are not directed to relevant professions due to the assumption that the jobs in the field require 100% physical strength, prejudices, and the anxiety of not being able to find a job. Likewise, it is known that there are sectors in which men do not want to work due to social issues and personal preferences. For women to work in the field themselves, they must first be willing. The participation of female students in technical departments is low in vocational education programs. Male technicians and employees are illiterate and their number is high *Economic reasons* Companies not implementing equal work and equal pay policies for female employees, Minimum wage practice is widespread *Reasons related to the working environment* Manager harassment Treating female technicians based on their sexual identhey rather than as colleagues The environment and conditions where technicians work are not suitable for women. Negative attheudes in workplaces
The relationship between gender equality and female technicians in Turkey	*Legal status* Sanctions against this issue in Europe are deterrent, but this deterrence is not sufficient in our country. Female employees are not aware of their rights. *Social-Cultural reasons* Perceiving the movements of the female technician during work from a different sexual perspective The problem of society's cultural immaturity is also experienced in business life.

	Developing the perception in society that women can also work in technical fields Negative view on women's support by working and the importance of women in society Women do not want to work due to various social issues and personal preferences. The belief that there are general similarities in many countries regarding women's work The belief that societies are shaped in line with customs, traditions, cultural and national spiritual values. Gender difference always poses a problem for women. "Frankly, as a female teacher working in the field, when I see a female combi boiler technician coming to my house, I hesitate at first." *Economic reasons* Being desperate and having to earn money
Effects of on-the-job training programs on female technician employment	*Positive Opinions* I find it important It is necessary to support cultural development positively by enrolling more female students in technical programs in schools that provide vocational education and providing more internship and on-the-job training opportunities in workplaces. Institutional structures lead Long implementation time Being able to follow technology more easily Ease of finding a job, knowing the market *Negative opinions* Contracts are terminated when the legal obligation is no longer valid. Most technicians hired within the scope of İŞKUR on-the-job projects are dismissed after the contract. The general opinion in this field is that there is a high density of male technicians.
In general, evaluation of curriculums, education and training processes, examination and evaluation system for "Heating and Gas Burning Device Service Personnel" training in the context of gender	*Positive outlook on the exam process* "All participants in the exam; "It can be said that they are equally successful in areas such as learning, finding solutions, corporate memory, effective communication, and focusing on details." "In the VQA heating and gas burning device service personnel exam, the qualifications of the job come to the fore, regardless of gender." "It can be said that there is no restriction on the area of freedom and that the processes develop entirely due to the values of each society and personal preferences."

The senior technician code system is presented in table 26.

Table 26

Senior technician code system

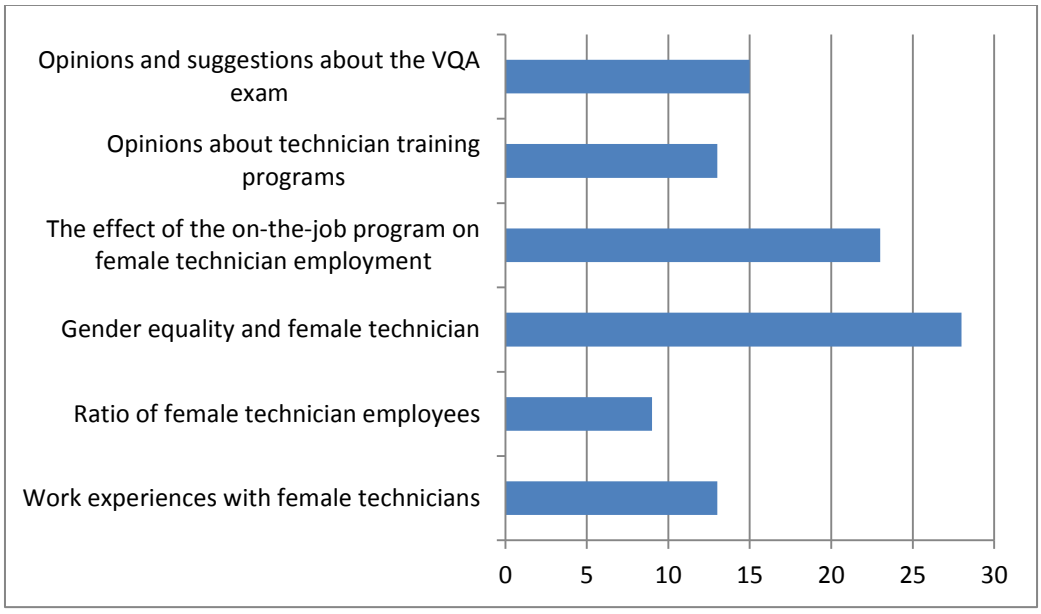
Code System	Frequency
Code System	47
Working Female Technician Experiences	6
Number of Female Technician Employees	4
Gender Equality and Female Technicianship	13
The Effect of On-the-Job Training Program on Female Technician Employment	11
Opinions on Technician Training Programs	6
Opinion and Evaluation about VQA Exam	7

4.2.3.4. Senior technician implementation phase opinions

The high-level code statistics of the interviews regarding the implementation process of senior technicians is presented in Table 27.

Table 27

Implementation phase, senior technician high-level code statistics



In Figure 5, the Implementation phase, senior technician word cloud is presented.

Figure 5

Implementation phase, senior technician word cloud

4.2.3.5. Comparative Competencies

During the needs analysis process; Interviews were held with a total of seven different stakeholder groups to determine the goals/achievement/competencies. As a result of the interviews, data was collected for needs analysis. These groups and comparative data are presented in table 28.

Table 28

Needs and expectations of stakeholder groups

Need / Group	1. Firm decision maker manager	2. Firm manager	3. Authorized Service Manager	4. Firm Department Managers	5. Senior Technician	6. Educator Profession / Field Expert	7. ACA Official
Collaboration culture	X	X	X	X	X	X	
Employment of female technicians	X	X	X	X	X	X	
Variation	X	X	X	X	X	X	
Cleanliness-oriented approach in service	X		X		X		
Strong communication with the customer	X	X	X	X	X		
Increase in customer satisfaction	X		X	X	X		
Contribution to brand strength	X	X	X	X			
Homogeneous distribution of service working hours throughout the day	X		X	X			
Trained senior technician who is interested in his profession, has skills and positive attheude	X	X	X	X	X	X	X
Increase in authorized service satisfaction	X		X	X	X		
Technician who is willing to continuously improve		X	X	X	X	X	X
Sectoral support for technician training			X		X	X	X
Official support for technician training (On-the-job training)			X	X	X	X	X
Belonging to the workplace			X	X	X		
Compliance with ethical rules			X	X	X		
Confidence			X	X	X	X	
Offering practical and fast solutions			X				
At least class B driver's license			X				
Meticulous and detailed			X		X		
Convincing			X				
It's suitable for team work			X	X	X	X	
Cultural barriers				X		X	X
Legal rights						X	
Deficiencies in the curriculum						X	X

As a result of all interviews and document review, the content and competencies of the curriculum developed in line with the data collected from the groups are given in Appendix K.

4.2.4. What should be the features of the model chosen for curriculum development?

The studies were carried out in line with the curriculum development model given in Chapter 3. While choosing the model used in curriculum development, since it is a study for vocational and technical education; It has been taken into consideration that it is scientific, adaptable to changing needs and suitable for team work. In this context, the suitability of the SUPSKY curriculum design model and suitability for the development of the "Heating and Gas Burning Device Service Personnel Level 4" curriculum was discussed with curriculums and experts in the field of education. Academicians who are experts in educational programs have expressed the opinion that it would be appropriate to use the SUPSKY curriculum design model in the thesis study.

As a result of the opinions of curriculum and instruction experts, the basic features of the model used in the study are expressed as follows;

- It is a scientific method,
- Focusing on users' needs,
- Promoting a continuous feedback and improvement cycle,
- Offering the ability to adapt to changing needs and conditions,
- Providing the opportunity to work together by encouraging cooperation among team members,
- Encourages the development of the thesis work in small and manageable iterations.

In the curriculum development study, it was tested that the model is applicable and suitable for the purpose in the field of vocational education. The SUPSKY model was developed by making additions to the feedback process. The developed model is presented in Appendix L.

4.2.5. Implications for implementation

The data from the needs analysis was arranged in order to determine the content and competencies of the curriculum. Nationally and internationally valid occupational standards were examined, and VQA and Ministry of Education occupation-related documents were examined. After interviews (Appendix O), qualifications for the curriculum to be developed for the profession were determined.

The relationship between the exam content and knowledge and skills was examined together with the Authorized Certification Agency (ACA) officials. The view that the gender equality on-the-job training program has a positive impact on technician exam success has come to the fore in the sector. Based on the data obtained from interviews with field expert instructors, it was concluded that there is no gender difference in VQA exam results. The opinion that the on-the-job training process will have a positive impact on the certification exams of technicians is dominant throughout the sector. Especially the real business environment and practical training support this perspective.

Authorized service managers; It has assigned participant technicians together with senior trainers to combi boiler services. Positive feedback was received during or after these tasks. Women, like men, provide significant added value to companies thanks to their learning and business skills in technical jobs. As a result of the opinions received from the authorized service and experienced craftsmen, customers receiving service; It has been stated that the satisfaction of participant technicians is at a high level. Especially participant technicians; Professional skills such as commissioning the boiler and informing the customer are appreciated. The general behavior of the participant technician reinforces customer satisfaction. If the participant technician is a woman, it surprises the customers and increases their expressions of satisfaction. Female technician satisfaction; since it takes place in an industry where male technicians work intensively, it can be said that it is surprising and remarkable for customers.

As a result of needs analysis, desk-based design studies and a competency-based curriculum were developed (Appendix L).

VQA-NQ exam is held for international recognition of qualifications. The distinctiveness of the exam is open to improvement. It is partially accepted that some of those who successfully complete the exam do not have all the qualifications required by the profession. Although the technician participants passed the exam, it was determined

that they did not have the ability to solve problems on their own. Although all experienced seniors working in the sector have passed the exam, they have deemed themselves competent after at least one year of experience. The exam only measures basic knowledge and skills. Only the competencies determined by the ACA are measured in the exam. It is recommended that technicians continue to improve themselves after the exam. Women technicians; It can be said that they have similar characteristics with male technicians in subjects such as exam, learning, finding solutions, institutional memory, effective communication, and focusing on details.

In the Ministry of Education Plumbing Technology and Air Conditioning Field (Plumbing and Heating Branch) framework curriculum and course information forms, limited space is given for methods and techniques for teaching qualifications. In course information forms; Information about the educational environment, equipment and achievements is available. However, teachers working in technical branches need more practical training in teaching methods and techniques. For this reason, new methods and techniques for vocational and technical education, in line with scientific developments, can be planned and implemented within the scope of in-service training.

As a result of the interviews with field expert teachers, it was concluded that the methods and techniques used in vocational education have not changed for years. Field experts state that although they have worked in their profession for more than 20 years, teaching techniques that include expression and imitation elements based on the senior-apprentice relationship are still applied by their own teachers. For this reason, it is recommended to effectively implement the methods and techniques developed in education in the education system on how to use them in vocational education. Field experts are of the opinion that online or lecture-based seminars and in-service trainings are not effective in teaching new methods and techniques. Practical-oriented training of trainers can help achieve more effective results. In line with the opinions of educators and professional field experts; it has been concluded that studies can be carried out on different methods and techniques that can be used in vocational education, both in universities and other education and training institutions. Continuous revision is important for both the content and implementation of the curriculum by obtaining opinions from expert trainers in the field during curriculum development studies.

The cultural development of female students in schools that provide vocational education can be supported positively by directing them to technical education institutions

and providing on-the-job training opportunities in workplaces. Leading corporate structures, sufficient implementation time, being able to follow technology more easily, ease of finding a job and knowing the market are the obvious benefits of on-the-job training. Job shadowing programs have been beneficial as they provide women with self-confidence that they can do the job. More employment-oriented training activities regarding technicians should be carried out and training should not remain only theoretical. The participant must learn by doing and experiencing.

The authorized service may dismiss some of the technicians recruited within the scope of the İŞKUR on-the-job project after the on-the-job training contract ends. In particular, some of the companies benefiting from incentives can easily dismiss participant technicians by taking advantage of deficiencies in legal regulations. The personal rights of participant technicians must be legally secured. Authorized services can easily terminate technician contracts when the legal obligation date expires. İnstitutional structures should take more leadership in the training and employment of female technicians. Women should also be included in curriculum, employed and encouraged in these fields.

Instructor observation reports, researcher lesson observations and interviews showed that female technicians were quite successful in noticing details.

However, the fact that even a female field expert hesitates about a female combi boiler technician coming to her home shows the depth of the social and cultural obstacles to the employment of female technicians. Women technicians; It can be said that they are similar to male technicians in subjects such as exam, learning, finding solutions, institutional memory, effective communication, and focusing on details. It is a general opinion that women working in technical jobs naturally have physical difficulties. The cultural structure in Turkey makes it difficult for women to work in technical fields. Although women's need for physical strength is constantly emphasized in shuttle services, no concrete example can be given other than the difficulty of carrying a tool bag. It has been accepted by all stakeholders that female employees bring business seriousness to the environment they work in. There is no evidence that female technicians will experience a significant disadvantage in theory and practice if they enjoy what they do. The main reason why it is thought that the work done in the field requires 100% physical strength is prejudice.

The widespread practice of minimum wage is a negative factor regarding female technician preferences. It has been observed that especially participant technicians from

low-income socio-economic backgrounds easily leave their profession when they get a higher-income job opportunity. It can be said that socio-economic structure is an important factor in determining job preferences.

Recognition of success, positive discrimination, encouragement, good working opportunities and legal incentives are important factors in increasing the number of female technicians.

Having appropriate training programs increases the interest of female technicians in the sector. The needs of today and the future must be met in line with sustainable development goals. In teaching programs; the importance of managing relations with society, sensitive to gender equality, prioritizing economic and social rights, should be emphasized.

As much as possible, male technicians and other employees should also benefit from the parts of the curriculum related to sustainable development. These trainings can contribute to the education of society and cultural transformation. During the curriculum development studies, training deficiencies of the senior and other personnel working in the authorized service were identified. Positive feedback was received from authorized service personnel who participated in the problem-solving focused communication skills development and gender roles training. These trainings can be carried out in association with the trainer training process.

Women; they may not want to work due to various negative social perspectives and personal preferences. In addition, attheudes in workplaces can also create negative examples. The low number of female students participating in technical professions in vocational education programs should be investigated.

All incentives and supports for women to work in industrial fields provide a positive perspective on the technician profession. The sector; legal measures should be taken to deter female technicians from being treated based on their sexual identhey rather than as technicians.

In interviews with firm decision makers, firm human resources managers, authorized service managers, firm department managers, senior technicians working in the authorized service, Ministry of Education vocational field experts and ACA officials, it was determined that the group with the most expectations from the participant technicians was the authorized service managers. It was observed that there were parallelism in the technician expectations of other groups, except YBK officials. It was observed that the

firm's upper and middle level managers had similar expectations in general criteria. In professional and technical matters, the expectations of authorized services and senior technicians have common characteristics. Apart from these, it was observed that Ministry of National Education and ACA officials concentrated on sectoral and legal supports.

The studies were carried out in accordance with the SUPSKY curriculum development model given in the chapter 3. A continuous feedback and improvement cycle of the SUPSKY curriculum development model has been developed. Model; It offers the ability to adapt to changing needs and conditions. By encouraging cooperation among team members, it provided the opportunity to work together and contributed to the development of the thesis study in small and manageable iterations.

In the curriculum development study, it was tested that the model is quite applicable in the field of vocational education. The model was developed by making additions to the feedback process. The process was divided into small steps, the steps were completed, tested and the results analyzed. The developed model is presented in Appendix P.

4.3. Is it appropriate to implement and develop the designed curriculum? (İmplementation)

The curriculum, whose qualifications, teaching methods and techniques, and measurement and evaluation criteria were determined, was applied to participant technicians. Data was obtained by conducting interviews with the components of the implementation.

4.3.1. How should the curriculum be implemented for natural gas heating and gas burner device service personnel training?

In this section, data obtained from the studies on the implementation of the developed curriculum are shared.

4.3.1.1. Implementation Phase Firm In-Service Trainer Interview Data

Face-to-face interviews were held with two vocational trainers who participated in the trainer training. The instructors have more than five years of experience working in the

firm training department. During the entire firm face-to-face training process, observation reports were created by the trainers for each participant. Data based on observation reports were collected and analyzed. Observation report criteria and data based on these criteria are classified below;

Willingness:

It was observed that all participants were willing to learn.

Being active in class:

It was observed that class participation increased, especially in the applied parts. However, there are also deficiencies arising from their previous education. It was observed that they participated slightly less in subjects related to cognitive skills (such as mathematical calculations and physics symbols).

Focusing on the lesson, being curious, being passionate, and asking questions:

It has been observed that with participation in the lesson, their sense of asking questions and curiosity increases and they concentrate more on the lesson.

Understanding the lesson:

It was observed that all participants were able to understand the course topics easily.

Ability to use equipment:

Trainers emphasized that the participants were able to use approximately 20 different tools and equipment of the profession, but they needed to perfect them by doing more repetheions.

Profession aptheude and openness to development

It was observed that there was no obstacle for all participants to do this profession when they were motivated. However, desire and curiosity must continue. They may need support in the field for this.

Ability to use past experiences

Some participants easily reflected their knowledge and skills from their previous experiences into the course. Those who were shy and lacked self-confidence joined the process, albeit slowly, after a while.

4.3.1.2. Preparatory data for the implementation of the curriculum prepared for Natural Gas Heating and Gas Burner Device Service Personnel Level 4 training

In the firm's in-service training, a technical teacher and an engineer who were accredited in their fields took part. In order for the implementation to be carried out in accordance with the objectives, a trainer training program, the content of which is stated in Appendix M, was carried out. During the trainer training process; the focus is on the educational environment, teaching methods and techniques, and measurement and evaluation tools. The current evaluation system for technician participants in the studies carried out with educators is shared in table 29.

Table 29

Training measurement and assessment system for technician participants

Training Phase	Educational Environment	Assessment Tool	Evaluation Criteria
Participant apprentice online training	Online Academy	Multiple Choice standardized test	Successful with a total of 50 points or more
Firm face-to-face participant technician training	Face to face	Educator observation report (10%) Final exam (90%)	Successful with a total of 70 points or more
On-the-job training at authorized service	Process monitoring reports Authorized service manager opinion senior opinion ACA exam	Report Observation ACA exam	Success or Fail Success or Fail Successful with a total of 70 points or more

4.3.2. Has the designed curriculum been implemented in accordance with the model used?

While implementing the curriculum, the SUPSKY curriculum development model was developed and used. During the implementation phase; Data was collected from educators, firm and authorized service managers and experienced craftsmen. The model was applied for the first time within the scope of vocational and technical education. In the implementation of the SUPSKY curriculum development model, all stages shown in Table 30 below have been carried out. Planning Curriculum Design, desk-based design, experiment and decision stages have been completed. The curriculum (Appendix L) and the trainer training program (Appendix M) developed during the implementation phase were used.

Table 30

İmplementation stages and process steps of the SUPSKY curriculum development model

Stage	Explanation
1. Planning Curriculum Design	
1.1. Formation of Teams	Created (Appendix N)
1.2. Setting Work Schedule	Created
1.3. Literature Review	Review carried out
2. Desk-Based Design, Evaluation, and Development of Curriculum	
2.1. Context of Curriculum	Created
2.2. Conducting Needs Analysis	Carried out
2.3. Desk-Based Design of Curriculum	Carried out
2.4. Formation of Tools and Materials	Created
2.5. Evaluation and Development of Curriculum	Opinion received and approved
2.6. Decision	
2.6.1 Approval- Switch to Experiment Step	Positive decision was taken
2.6.2 Partial Approval – Go Back to Incorrect Part	---
2.6.3 Rejection – Start over	---
3. Experiment	
Preparation Sub-stage - Expereiment Sub-stage-Evaluation and Development Sub-stage	
3.1 Training of Trainers	Created (Appendix M)
3.2 Preparation of Educational Environment	Created
3.3 Deciding on the Experiment Conditions	Implementation conditions have been determined
3.4 Planning Pilot Experiment Procedure	Implementation planned
3.5 Performing Experiment	The implementation has been carried out
3.6 Evaluation of Experiment and Developing Draft Curriculum	The curriculum has been developed
3.7 Decision	
3.7.1 Approval – Dissemination Decision	Positive opinion received
3.7.2 Partial Approval - Go Back to Incorrect Part	---
3.7.3 Rejection – Start over	---

4.3.2.1. Implementation Phase Firm In-Service Educator Interview Data

An expert and accredited engineer and a technical teacher carried out the training face-to-face. Instructors are authorized to decide whether the participants will continue the process. Trainers are an important factor in the evaluations carried out during and at the end of the process. Objectivity is the main focus in the firm's current evaluation system. The current evaluation system is given in table 31.

Table 31

Firm face-to-face training exam and evaluation system

Measurement and assessment Criteria	
Measuring tools	The impact of the measuring tool on the exam (%)
Written examination	90
Instructor observation	10
Total	100 Puan
Those with 70 points and above will be considered successful.	

In-depth data was collected by taking opinions about educators' expectations from the developed curriculum and participant expectations.

The opinions of the instructors who are responsible for and carry out the technician training process are presented below;

Instructors expressed their expectations from the curriculum as follows;

- Covering all qualifications for the VQA exam,
- Correctly highlighting the goals,
- It includes knowledge and skills that can be used in business life,
- Being a practice-based training,
- Meeting participant expectations,
- Not reducing participant motivation and ensuring focus,
- Having interaction in the classroom,
- Good fit between the subject and course duration.

Educators expressed their expectations, attheudes and behaviors towards the participants as follows:

- Participating in class,
- Be motivated to study,
- They strive to carry out the implementation processes and do not give up,
- They stated that they should comply with time and planning.

4.3.2.2. Interview data regarding the training received by the participants

Participants received training in three stages. These; online preliminary training, face-to-face training provided by the firm and training received in the field at the authorized service. Belonging to the participants; Age, education information and source of information for applying for education are given in Table 32.

Table 32

Participant demographic information

Participant	Age	City of residence	Educational Background	Information Source for Education İmplementation
K1	22	İstanbul	High school	İBB-İSPER-BİO, Headman's Office, Whatsapp
K2	33	İstanbul	High school	Whatsapp
K3	36	Ankara	High school	Ankara Metropolitan Municipality Whatsapp
K4	37	Ankara	High school	Ankara Metropolitan Municipality Whatsapp
K5	37	İstanbul	Undergraduate education	İBB-İSPER-BİO
K6	23	İzmir	Associate degree education	www.kariyer.net

Online Pre-Training

Participants stated that online pre-training was very useful. Apprentice technician opinions about online training are given below.

It is useful for obtaining preliminary information,

Helping motivation,

Excitement for education,

Focus on the target.

Firm Face-to-face Training

In Table 33, the answers of the technician participants regarding how they define themselves are presented.

Table 33

Participants describe themselves

Participant Code	Opinions
K1	Does not like lies, optimistic, controlled
K2	Energetic, positive, careful not to be offensive, responsive when necessary, excited
K3	Honest, self-motivated, compassionate, trusts people quickly, does not lie
K4	I am positive, calm, understanding, self-controlled, persuasive and determined.
K5	Optimistic, warm-blooded, high energy, loves to laugh, courageous, free, helpful
K6	Challenging, wanting to improve themselves, stable

Table 34 presents data on participant technicians' motivation in choosing a profession.

Table 34

Participants' motivation and expectations for career choice

Participant Code	Opinions
K1	Being exciting, having a profession
K2	To improve myself, to have a profession
K3	Everyone being understanding and giving me strength, having a profession
K4	to have a career, to have a profession
K5	Making a career, developing new technologies, having a profession
K6	Getting a profession, making money, personal development, having a profession

Table 35 presents the opinions of female technician participants regarding being the first female technician in the sector.

Table 35

Opinions of female technician participants about being the first female technician in the sector

Participant Code	Opinions
K1	It is an honor to show that women can also do the work that men can do, to be stronger in life.
K2	Firsts are beautiful, breaking prejudices, showing that women can do the same job as men, feeling stronger in life, contributing to society.
K3	Going to a house and doing technical service with equipment is very exciting, and the power that solving people's problems will give me.
K4	Showing that women can also do the work that men can do, being stronger in life, feeling of solidarity
K5	To show that women can do the same things that men can do, to be stronger in life.
K6	Giving hope to women who want to be stronger in life and receive technician training

In Table 36, the opinions of technician participants regarding firm training are presented.

Table 36

Participants' opinions about the training they received from the firm

Theme	Category	Document name	Code
Satisfaction with Firm Training	Satisfaction with the educational environment	Participant-B	We took our lessons in a very good classroom.
	Satisfaction with the educational environment	Participant-C	The educational environment was perfect. I was very pleased.
	Satisfaction with the educational environment	Participant-E	The educational environment was excellent.
	Satisfaction with the educational environment	Participant-A	The training environment was very suitable.
	Satisfaction with the educational environment	Participant-B	The educational environment made it easier for me to learn.
	Satisfaction with the educational environment	Participant-D	The educational environment was complete. It was way above my expectation.
	Satisfaction with the educational environment	Participant-F	The educational environment was excellent. . It's way above my expectation.
	Satisfaction with the educational environment	Participant-E	We took our lessons in a good classroom.
	Satisfaction with the training method	Participant-D	Knowing the objectives before starting the lesson made me feel very comfortable.
	Satisfaction with the training method	Participant-A	Knowing the objectives before starting the lesson made it easier for me to understand.
	Satisfaction with the training method	Participant-E	Knowing the goals in advance enabled me to listen carefully and without interruption.
	Satisfaction with the training method	Participant-B	Goals were stated before each lesson. We never left the lesson. My motivation never dropped and I was always able to focus.
	Satisfaction with the training method	Participant-A	While listening to the lecture, I did not expect that I would listen carefully for so long.
	Satisfaction with the training method	Participant-C	I was never bored in class. However, the topics were technical. In other words, these were issues I had never encountered before.
	Satisfaction with the training method	Participant-D	I tried to attend the class constantly. Despite eight hours of daily training, I was almost never distracted
	Satisfaction with the training method	Participant-A	Normally, I didn't think I could learn technical subjects so easily.
	Satisfaction with the training method	Participant-D	Even though there were technical subjects, I didn't think I could learn them so easily.
	Satisfaction with the training method	Participant-F	Normally, I thought technical subjects were harder to learn. But it was easy. It was easy once you saw it and applied it.
	Satisfaction with the training method	Participant-A	Its practical nature made it easier for me to learn and understand.
	Satisfaction with the training method	Participant-B	Practical training was very useful.
	Satisfaction with the training method	Participant-D	Working on a real boiler made it easier for me to learn.
	Satisfaction with the training method	Participant-E	I felt like I was on the field. It was like I was going to houses and repairing combi boilers.

	Satisfaction with the training method	Participant-F	Continuous practice in learning made our job easier.
	Satisfaction with educator	Participant-F	He constantly wanted us to be better. It gave us confidence.
	Satisfaction with educator	Participant-B	Our teachers were very helpful. I could easily ask questions when I did not understand.
	Satisfaction with educator	Participant-D	We had fun instructors who knew their job very well.
	Satisfaction with educator	Participant-A	We took lessons from competent instructors.
	Satisfaction with educator	Participant-F	We took lessons from instructors who were fun and knew their job very well.
	Satisfaction with educator	Participant-B	Indeed, we took our lessons from expert instructors and in very good classrooms.
	Satisfaction with educator	Participant-C	They have an approach that constantly supports us.
	Satisfaction with educator	Participant-E	Everyone was helpful.
	Education meeting expectations	Participant-C	It was a training far beyond my expectations.
	Education meeting expectations	Participant-C	I can apply what I learned.
	Education meeting expectations	Participant-A	I believed that I could do this job. I think I will get better when I practice it on the field.
	Education meeting expectations	Participant-B	If I practice a little more, I can fix the boiler at home.
	Education meeting expectations	Participant-D	It was a very productive training.
	Education meeting expectations	Participant-C	It was very useful training.
	Education meeting expectations	Participant-A	I have never received training like this before.
	Education meeting expectations	Participant-D	I have never received training like this before. I believe that I will use what I have learned in the field.
	Education meeting expectations	Participant-A	It was a course in which I received very good training.
	Education meeting expectations	Participant-D	What I learned made me very strong professionally.
	Education meeting expectations	Participant-E	The training was very effective.
	Education meeting expectations	Participant-B	The training was very effective. I have never received training like this before. I believe that I will use what I have learned in the field.
	Education meeting expectations	Participant-A	I believe that I will use what I learned from the training in the field.
	Education meeting expectations	Participant-F	This is the first time I received such training. Thank you very much everyone.
	Education meeting expectations	Participant-C	I can use what I learned in the field.
	Education meeting expectations	Participant-F	I can improve myself even more when I go to an authorized service.
	Education meeting expectations	Participant-C	I think I will get better when I practice it on the field.
	Satisfaction with the organization	Participant-A	There were very positive relationships.
	Satisfaction with the organization	Participant-A	Everyone was very helpful and caring
	Satisfaction with the organization	Participant-B	The organization was very good.
	Satisfaction with the organization	Participant-D	Everyone was very helpful and caring. The organization was very good.

	Satisfaction with the organization	Participant-C	Everyone was very helpful and caring. I had my hesitations before, before coming here, but over time I felt more confident.
	Satisfaction with the organization	Participant-A	Everyone was helpful.
	Satisfaction with the organization	Participant-A	The organization was very good.
	Satisfaction with the organization	Participant-E	The organization was very good.

In Table 37, the category-code system regarding the participants' opinions about their satisfaction with the training they received from the firm is presented.

Table 37

Categories and codes regarding the participants' opinions about their satisfaction with the training they received from the firm

Category-Code System	**Frequency**
Satisfaction with firm training	
Satisfaction with the training method	15
Satisfaction with educator	8
Satisfaction with the educational environment	8
Education meeting expectations	17
Satisfaction with the organization	8

In table 38 Codes regarding participants' opinions regarding their satisfaction with the training they received from the firm.

Table 38

Codes regarding participants' opinions regarding their satisfaction with the training they received from the firm

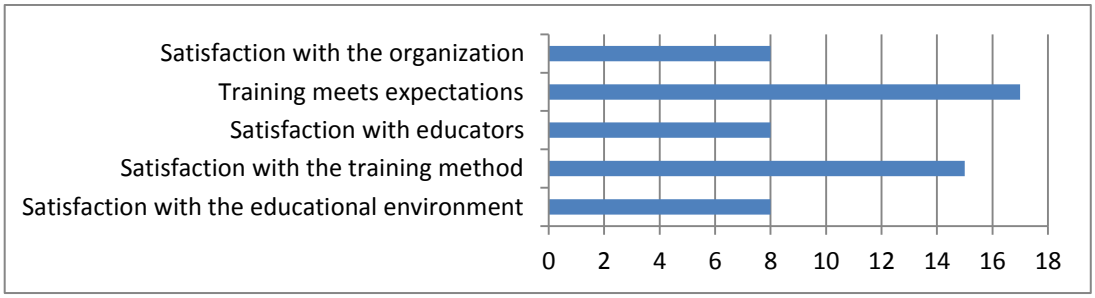


Figure 6 presents the word cloud regarding the training the participants received at the firm.

Figure 6

Natural gas heating and gas burner device service personnel (level 4) natural gas participant-firm Training word cloud

4.3.2.3. Authorized Service On-the-Job Training Process Participant Interview Data

All participants' opinions about the training they received, their opinions about the suitability of the training content to expectations, the usability of the learned subjects in your business life, their opinions about the instructor, their opinions about the training environment, and their opinions about the training method were taken.

Opinions vary according to participants and authorized service managers. Positive and negative opinions are presented in Table 39 below;

Table 39

Participant opinions about the on-the-job process

Positive Opinions of Participants	Negative Opinions of Participants
✓ The on-the-job training process was very instructive and enjoyable, I am very pleased. ✓ The service people were very helpful. ✓ There is an educational and fluid environment ✓ I have no difficulty in establishing a dialogue ✓ I can communicate with my boss when necessary. ✓ I think I can and I succeed. ✓ My curiosity and interest continues. ✓ Maybe after a month I can even go to the service alone. ✓ My learning environment is very good. ✓ I learn very easily through practical explanation. ✓ The teaching skills of the seniors are sufficient. ✓ Seniors immediately check and correct themselves if there is abusive language. ✓ My communication with the seniors is very good, they support me in everything. ✓ When I ask questions to the seniors, I can get answers immediately. ✓ My seniors help me when I need a break. ✓ Everyone has good intentions	✓ Difficulty communicating with seniors ✓ Difficulty establishing dialogue ✓ Seniors smoking in vehicles ✓ Professionals listening to excessive music in the vehicle ✓ Inability to take breaks (especially due to need on the way to the shuttle) ✓ Abusive speeches of seniors ✓ Although the seniors have good communication skills with other women (customers), they behave rudely when communicating with them. ✓ Being treated like an apprentice or child ✓ Not being able to ask questions to the seniors ✓ No practical explanation ✓ Inability to fully see the implementations due to insufficient space (low field of view) at the time of service ✓ Lack of learning environment ✓ Lack of teaching skills of seniors ✓ carrying heavy bags ✓ Harsh, demotivating speeches ✓ Inability to communicate with the manager ✓ Not being requested by the services ✓ Lack of communication within the organization
Participant suggestions	
✓ Both my seniors and I are having a hard time carrying the tool bag. Could there be a tool bag that can be carried on the back? ✓ We have a dressing room. A small personal closet would be nice. ✓ I need more information about VQA exam content. ✓ Sometimes I want to check with the training academy so I can ask about technical issues I don't know about. ✓ I need to study and practice more in using hand tools. ✓ Private life should not be shared unnecessarily ✓ Private life should not be shared unnecessarily (Youtuber, driving videos, etc.) ✓ Should not be addicted to the phone	

Technician participants expressed themselves professionally with the values given in Table 40;

Codes used in the table and their explanations:

• Participant technician codes: A-B-C-D-E-F

• Months: J – July 2023, A – August 2023, S – September 2023

• Professional self-assessment data: Worst (1) - Best (10)

Table 40

Process self-evaluation of participants in their vocational training

	Participant Code	K1			K2			K3			K4			K5			K6		
	Three months process	J	A	S	J	A	S	J	A	S	J	A	S	J	A	S	J	A	S
1	Compatibility of the technician participant within the firm	10	10	10	5	5	4	5	-	-	7	-	-	8	-	-	1	-	-
2	Behavioral characteristics of the technician participant	10	10	10	10	10	10	10	-	-	8	-	-	10	-	-	1	-	-
3	Technician participant's views on social relationships	10	10	10	10	10	10	10	-	-	8	-	-	6	-	-	1	-	-
4	Technician participant's opinions about communication skills	10	10	10	10	10	10	10	-	-	8	-	-	6	-	-	1	-	-
5	Opinions about the professional and technical theoretical knowledge of the technician participant	2	4	6	3	4	5	1	-	-	5	-	-	6	-	-	1	-	-
6	Opinions about the professional and technical implementation skills of the technician participant	2	5	7	4	5	6	1	-	-	5	-	-	6	-	-	1	-	-
7	Opinions about your motivation	10	10	10	5	2	1	10	2	-	10	-	-	10	-	-	1	-	-

4.3.2.4. Firm Training Phase in the Firm Participant and Trainer Interview Data Comparison

Comparative opinions of participants and firm trainers about the training process in the firm are presented in Table 41. The table includes the opinions of the participant and instructor groups regarding the effects of the curriculum.

Table 41

Opinions of participants and firm trainers on the effects of the training program

Participant Opinions	Firm Educator Opinions
Suitable educational classroom environment	The curriculum covers all competencies of the VQA exam
Being satisfied with education	Content and subject headings are determined correctly
Effectiveness of education	Having a good structure between the subject and course duration
Making education fun	Active participation of participants in the lesson
Be aware of goals	They strive to carry out the implementation processes and do not give up,
Overcoming fears about studying technical subjects	Participants comply with time and planning
Safe training environment	
Common Views	
Being motivated and focused	
Education meeting expectations	
Establishing positive communication and relationships	
İmplementation-oriented planning of training	
Having what is learned usable in business life	
Forming the belief in being able to do the job	

The firm measured and evaluated the trainings implemented through online and face-to-face training.

Firm Online Pre-Training Standard Exam Results

Participants have successfully completed their online pre-training. During the process, they learned that they would constantly encounter this type of training. A total of six participant technicians participated in the online training. Training topics and measurement and evaluation results are given in table 42.

Table 42

Online pre-training and exam results

Online Training-Qualification Name / Participant Code		**Exam result**					
		A	**B**	**C**	**D**	**E**	**F**
Basic Definitions and Units	Heating devices	Successful	Successful	Successful	Successful	Successful	Successful
	Natural gas	Successful	Successful	Successful	Successful	Successful	Successful
	Basic Electricity and Measurement	Successful	Successful	Successful	Successful	Successful	Successful
	Basic Plumbing	Successful	Successful	Successful	Successful	Successful	Successful

Firm Face-to-Face Training Standard Exam Results

As a result of face-to-face training, all participants were taken to the exam under the supervision of the firm training department supervisor and researcher. The standard exam with ASA-WB training code and R00 document version was conducted by Bosch Home Comfort Academy. The exam consists of a total of 20 questions, three open-ended, one true-false and 16 multiple choice questions. After the face-to-face firm training process of the developed curriculum, the standard participant evaluation system prepared by the firm was applied. The written exam affected the overall evaluation by 90%, compliance with OHS rules, the ability to analyze malfunctions and current situations, problem solving with the help of technical documents, and communication skills by a total of 10%. To increase exam security, take the exam together with the educators; Researchers, firm representatives and training observers participated. The success criterion for the exam is at least 70/100 points. The scores obtained by the participants who took the exam are given in table 43 below.

Table 43

Firm face-to-face training participant exam results

Participant	Written Exam Score	90%	Instructor Note	10%	Training Note	Evaluation
K1	70 / 100	63 / 100	80 / 100	8 / 10	71 / 100	Successful
K2	71 / 100	64 / 100	100 / 100	10 / 10	74 / 100	Successful
K3	80 / 100	72 / 100	100 / 100	10 / 10	82 / 100	Successful
K4	70 / 100	63 / 100	100 / 100	10 / 10	73 / 100	Successful
K5	81 / 100	73 / 100	50 / 100	5 / 100	78 / 100	Successful
K6	80 / 100	72 / 100	50 / 100	5 / 100	77 / 100	Successful

4.3.2.5. Firm Authorized Service Manager Semi-Structured Interview

Participants' opinions about the on-the-job process were received from authorized service managers. Authorized service managers; The participant's adaptation to the authorized service, his/her behavior towards problem solving, the difficulties experienced by the participant, the positive aspects of the participant, the orientation plan of the authorized service, feedback from customers and their opinions about the employment of female technicians were taken.

The data obtained as a result of the interviews with authorized service managers are presented in table 44.

Table 44

Opinions of authorized service managers about the on-the-job process for the participants

Theme-Category	Document Name	Code
Participant Technician Positive Characteristics > Behavior and Attheude	YS-C	It knows how to consult and ask for Itlp.
	YS-B	It has a reliable feature.
	YS-A	It accepts his mistakes.
	YS-A	One of his positive characteristics is that It accepts his mistakes and strives to correct them.
	YS-E	It has mature behavior due to his previous experiences.
	YS-A	It corrects its errors when alerted.
	YS-A	Over time, it develops positive attheudes towards both work and his colleagues.
Participant Technician Positive	YS-C	It asks about things it doesn't understand or can't do. We constantly remind you of the importance of complying with occupational safety and work discipline.

Characteristics > Professional Development	YS-C	It leaves its work environment better than It found it. It immediately understands what is said.
	YS-D	It worked for a very short time. I can say that It was talented during the time It worked. It could do this job if it wanted.
	YS-E	It could have become a good technician if it had worked longer.
	YS-E	It has a careful nature. It can analyze the problem well. It can be analyzed easily. It tries harder because It is aware of his lack of experience.
	YS-E	Open to development. Trustworthy. His interest in his profession is at a high level.
	YS-B	It's learning fast.
	YS-E	Work discipline is very good.
	YS-B	She makes an effort to improve herself.
	YS-A	It must make himself accepted by the senior technician. In this regard, it is important that it is related to the profession. There is the opportunity to learn everything about this profession from the seniors.
	YS-D	It had financial problems. Therefore, It abandoned the learning process. In this regard, if It had continued to work, It could have solved this problem.
	YS-E	It has a positive attheude and work discipline.
	YS-D	Being smart. Quick grasp. It is important to have dexterity.
Participant Technician Positive Features > Adaptability	YS-C	It adapted very easily. Since it already had work experience in the past, It had no difficulty.
	YS-A	Mutual respect and love are important in workplaces.
	YS-C	The rules are for all of us. There was no problem because it followed the rules.
	YS-C	She tried to constantly motivate her by providing salary and additional bonuses.
	YS-E	It had no problem adapting. Its adaptability increased over time.
	YS-A	Even though problems occur from time to time, they are solved with good will.
	YS-A	It adapted over time.
Participant Technician Negative Characteristics > Behavior and Attheude	YS-B	The participant's family issues may have made the relevant service uneasy.
	YS-A	More attention should be paid to etiquette.
	YS-B	Since it is the first work experience, problems may occur. She should not mix her private life with his business life.
Participant Technician Negative Characteristics > Professional Development	YS-B	The employment was terminated by the service, citing the participant's low interest in this profession.
	YS-B	It needs time to gain experience. Must be more patient and calm with faced with problems
Participant Technician Negative Characteristics > Compatibility	YS-E	She experienced difficulties due to her family's Italth problems.
	YS-B	It is difficult to comply with workplace rules. Can communicate better with employees. It must admit that It works with very different people.
	YS-B	The technician participant must have the necessary attire, behavior and communication etc. required by business life. Once you have the skills, adaptation is easy.
Area of the Firm Open to Development > Participant Selection	YS-A	We can choose the participant ourselves or be involved in the participant selection process. After this study, the participant technician can receive face-to-face training and come back to the service.

Process	YS-A	The name of the firm increases the expectations of technician participants. Participant technicians working in authorized services may sometimes not meet these expectations.
	YS-A	First of all, they can receive orientation training at the authorized service for a week.
Area for Development of the Firm > Bag Weight	YS-C	There was a problem with carrying bags. It may be difficult due to its Itavy weight. Especially in this area, there are many new buildings without elevators or whose elevators have not been put into operation. Of course, there are difficulties. There are studies on a new backpack design. No other problems occurred.
Area of the Firm Open to Development > Orientation Plan	YS-A	We do not have such a written plan. We provide all information verbally. This is how we express it.
	YS-D	We verbally give preliminary information to each of our employees about the working rules and conditions. It can access all the information by asking in time. There is no written document. However, it can be used.
	YS-C	There are rules for everyone. We explain these to newcomers orally. Of course, it may also be useful to prepare it in writing.
	YS-E	Unfortunately, we do not have an orientation plan in writing. However, we provide constant information both before and during work.
	YS-B	We don't have a written plan. General rules are explained to everyone who comes to the authorized service. When they ask questions, they are answered.
İEmployment-Expectation of the Authorized Service from the Participant	YS-D	I think anyone can do this job. A female technician can add a different color and culture to our service. I support. We can build more positive relationships with our customers, especially our female customers.
	YS-C	When you experience a problem; you have the opportunity to consult me or an experienced technician in the firm.
	YS-B	In this job, you need to constantly learn new things. If It can constantly improve himself, It will be successful.
	YS-A	Itre It learns from his mistakes. It/sIt learns workplace rules, business style and business relations. When it goes to another business, It can be more successful and happier because it will not repeat these mistakes.
	YS-B	Women with experience and work discipline can work in all authorized services.
	YS-A	We all need a different color and perspective.
	YS-C	It is important in terms of bringing a different color, excitement and perspective to the firm. It also positively affects our customer relations.
	YS-B	Our firm has suggestions for employing female technicians. We are also evaluating this suggestion. We will see over time wItther it will be useful or not.
	YS-E	We support the firm's approach as technical service. I think this system will get better over time.
	YS-E	If It can learn from his mistakes, It can be even more successful in other authorized services. The important thing is to manage relationships and constantly improve yourself.
	YS-D	It can work anywItre. As long as it complies with ethical rules.
	YS-C	When everyone has good intentions, problems are easily solved.
	YS-E	Female employees can bring a different perspective and dynamism to the firm.
	YS-A	I would like to work with anyone who cares about internal relations and brand affiliation.
	YS-D	I think that differences within the institution are richness.
	YS-C	I look at it positively and I am one of those who very much support this idea. Personally, I intend to run and hire. It will be better trained after working for another month or two. If It passes the VQA exam, I can hire him immediately.
Client Impact	YS-C	“Customers absolutely loved it.”

	YS-C	They say that sIt was the first female technician to enter the house and they were very surprised.
	YS-A	We usually get positive feedback. However, real evaluations can be obtained when the firm is subject to the evaluation system. I did not receive any negative feedback from my technician friends in this direction.
	YS-E	The service is still working on preliminary preparations. We will learn customer opinions after the service.
	YS-D	Since It was doing in-service work, It did not have much contact with customers. However, if it had been put into service, I think our customers would have been positive and supportive.
	YS-B	It works in service preparation and organization support operations. We will receive customer opinions after the service.

Table 45 presents the category-code system for the data obtained from authorized services.

Table 45

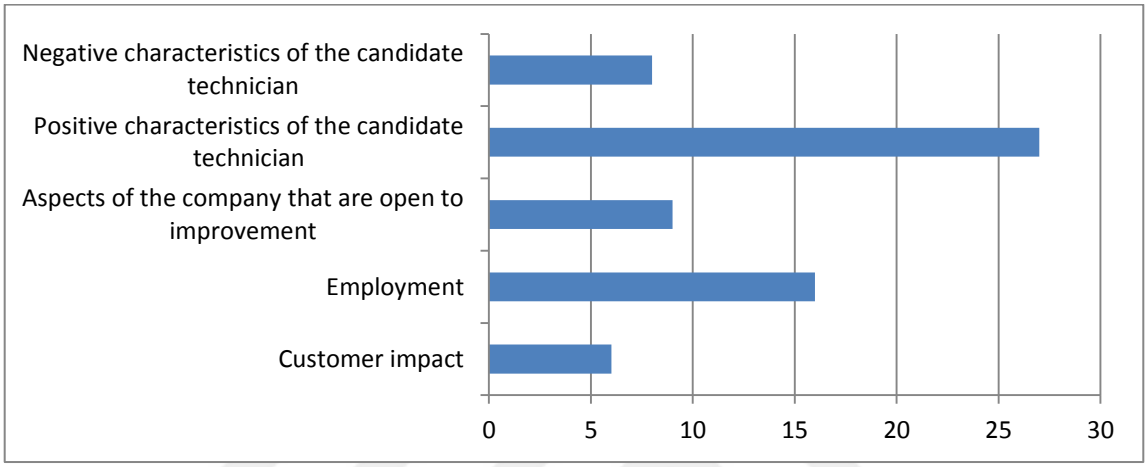
Authorized service manager opinions - categories and codes

Category and Code System	Frequency
Category and Code System	66
Customer Impact	6
Employment-Expectations of the Authorized Service from the Participant	16
Area of the Firm Open to Development	
Orientation Plan	5
Participant Selection Process	3
Bag Weight	1
Participant Technician PositiveFeatures	
Harmony	7
Behavior and Attheude	7
Mesleki Gelişim	13
Participant Technician Negative Characteristics	
Harmony	3
Behavior and Attheude	3
Mesleki Gelişim	2

In Table 46, the opinions of authorized service managers regarding the participants are presented.

Table 46

Authorized service managers' opinions about the participants



The word cloud regarding the data obtained from authorized services is presented in figure 7.

Figure 7

Authorized service manager interview word cloud

Table 47 presents the positive and negative opinions obtained from the interviews with authorized service managers.

Table 47

Positive and negative opinions obtained from interviews with authorized service managers

Positive opinions	**Nnegative opinions**
• Among the participants, those who continued on-the-job training adapted to the workplace, but it took time to adapt to workplace rules, • Ensuring motivation through salary and bonuses, • Compliance with etiquette and communication rules, • The knowledge and implementation levels of participant technicians improve throughout the process, • Solving all problems in good faith, • Admitting his mistakes and trying to fix them, • The participant knows how to ask for help, • Having a positive attheude towards work and colleagues, • They have access to basic service skills, • Leaving the working environment clean and tidy, • Positive feedback from customers, but actual evaluations are subject to the firm evaluation system, • "Customers absolutely loved it." • Customers expressed surprise that the participant was the first female technician to enter their home, • Senior technicians do not give negative feedback • The employment of female technicians is viewed positively by both the firm and the customers, • If he passes the VQA exam, he can be hired immediately. • Recommending employment of female technicians to other companies, • Employing female technicians will bring diversity, excitement and a different perspective to the authorized service,	• Participants have the problem of carrying heavy loads such as bags that require physical strength, • The participant is not sufficiently aware that he/she is in the learning process, • The participant is not sufficiently aware that there are subjects he needs to learn from the seniors, • There is a need for a written orientation plan, • Participant orientation should only be provided verbally in authorized services.

4.3.2.6. İmplementation Phase Senior Technician Interview Data

Face to face interviews were held with experienced senior technicians who have certified their expertise in their field with an international certificate. In the interviews with senior technicians, the participant; opinions about their professional competencies (Knowledge, skills, attheude, adaptation, communication, problem solving, etc.), difficulties experienced during the training process, positive aspects, areas of improvement, aspects that are open to improvement and areas that need to be improved, feedback from customers, problems experienced and problems experienced. Opinions were received on how the problems were solved. In addition, opinions were received from senior technicians about working with female technicians; employing female technicians in other authorized services, and the support given to participants for the VQM exam. Interview categories and codes are presented in Table 48.

Table 48

Senior technician opinions on on-the-job training process

Theme	Category	Document name	Code
Participant technician characteristics	Problem encountered with the participant technician and problem solving method	U3	If there was a problem that I believed I could not solve, I would refer it to the boss.
		U2	We are having problems while carrying equipment.
		U1	She should also pay attention to the place and time of the question she asks. For example, she should ask when he returns to the service rather than when she is with the customer. Or the customer should ask questions while they are away.
		U2	She should not talk too much in cases where she has no knowledge.
		U1	Anyone can experience problems in a workplace. Similar problems may occur with new technician friends. However, over time, we get to know each other better and misunderstandings decrease. When everyone has good intentions, problems are solved automatically. If there is stubbornness, the problem may grow. In these cases, we notify the authorized service manager and he solves the problem. Sometimes she makes an agreement, sometimes he changes teams.
		U4	I didn't have a problem.
		U4	This problem exists for both male and female technicians.
		U3	I did not see any problems other than carrying a bag.
		U4	There may be a problem with carrying a bag.
		U2	Bags, business suits, etc. must share the load while carrying it.
		U3	I had no problems in terms of behavior and attitude.

		U1	Married friends do not want to be seen with a female technician in the same car. For this reason, there are even those who prefer the long route when going to the service. They are afraid of gossip.
		U3	To truly become a senior, it is necessary to have at least one year of experience.
		U2	She should not talk more than necessary.
		U2	Shee should pay attention to her actions and attitudes.
		U5	It takes some time to get to know the whole business.
		U5	It takes at least one year to become a good senior.
		U2	She should not impose her own knowledge.
		U2	Ite should not remain in his own knowledge.
		U2	No one wants to carry equipment, but we have to carry it due to our profession. Each person can carry five kilos of load.
		U5	Since there are many types of combi boiler models, it is difficult to have information about all of them.
		U2	One should not establish too much intimacy with customers.
		U2	Maybe she could adapt faster if she had an orientation plan.
		U2	He/she clings too much to what he/she has previously learned and is resistant to learning new information.
		U2	For example, if I tell the customer that this card has reached the end of its life, he should not say that it will be repaired by the customer, but it will be very costly.
		U2	Borders must be drawn correctly.
		U1	They should sincerely understand that they should not use jewelry.
		U5	Difficulties may occur because the tool and material bags are heavy.
		U4	It takes at least one year to become a fully experienced senior technician.
		U5	In terms of technological knowledge, one should know the features of combi boiler types.
		U1	He shouldn't be too busy on the phone.
		U2	TIKTOK should not be filmed.
		U1	I did not want to go to the service with the new technician participant. We especially do not want to go to the service with a female technician participant.
	Developmental characteristics of the participant technician	U3	However, it would be better if he does only 5 days of practice after 5 days of theory and explanation in his preliminary training.
		U4	However, he/she can improve in the process and receive a seniory certificate within three months.
		U5	Her explanation is good.
		U1	Sufficient knowledge and skills
		U5	She grasps it quickly.
		U5	So willing.
		U2	Should be more willing
		U1	While it was at level one when it was commissioned, it is now at level three. After two months it should be at level 10.

		U3	She can perform the commissioning process and explain the system.
		U1	His ego has diminished a little more.
		U4	Can choose tools and materials according to the job.
		U5	Her adaptation to the job and his relationships with customers are very positive.
		U3	She understands and can explain well.
		U3	The combi boiler can be disassembled and assembled.
		U4	It can inform the customer very well about the first operation of the boiler.
		U2	She should improve his mechanical skills.
		U3	She knows how to take notes.
		U2	It improves when you pay attention to what is said.
		U5	Of course,s he is just starting out and trying to learn.
		U3	She has the basic knowledge.
		U5	Compatible.
		U3	She also learns how to install valves in a short time.
		U3	She may commission the combi boiler soon.
		U1	Even though it is not enough, it adapts over time.
		U2	When he has to go to the service alone, he must do all the work himself.
	Aspects that the participant technician needs to improve	U3	We provide service for more than 10 types of combi boilers. Must have knowledge about these types of combi boilers.
		U4	It should focus on fault detection and troubleshooting.
		U5	It is also necessary to be practical in this profession.
		U3	Sometimes it gets the cables mixed up. We explain and fix it. Must have better cable cutting, tying and similar skills
		U1	When faced with a malfunction, one should think about the reasons. He should know how to get support and ask for help from his senior.
		U2	In her spare time, she should learn the fault cards of the firm's combi boilers.
		U3	She was at level 1 when he came here. It is currently at level 4. It should be at least 8-9 out of 10.
		U1	Should focus more on work when repairing devices.
		U3	Must have a better understanding of the operating cycle of the device.
		U3	Electrical knowledge should be even better.
		U5	Electrical knowledge is important.
		U3	It should take away the fear of electricity.
		U5	Must learn more about electricity and system.
		U4	Due to the large number of combi boiler types, sometimes there may be a lack of information.
		U4	There are deficiencies in mechanical skills.
		U5	She should improve his mechanical skills.
		U5	Mechanical dexterity should be better.
		U1	Must be more professionally relevant
		U4	Must be able to perform operations such as disassembly and assembly more practically.

		U1	I think it's not adaptable enough.
		U1	Being smart is not enough; one must also ask questions about the profession.
Accreditation exam	Accreditation exam	U4	I also direct him to review documents related to the boiler in his spare time in the office outside the service.
		U2	So I took the VQA exam. I share my experiences whenever questions are asked. If he doesn't ask, I can't share.
		U3	Before each service, we give brief information about the boiler type. I am providing information about the VQA exam format and my own exam experience.
		U5	We are trying to help him learn the job well.
		U4	I am sharing my own exam experiences.
		U5	We share our VQA exam experiences.
		U4	I answer the questions he asks.
		U5	When he asks a question, I try to explain as much as I know.
		U1	I try to answer all the questions asked. So I took the VQA exam. I share my experiences from time to time.
Effect of working female technician	Working in the same team with a female participant technician	U2	Everyone who wants to work should work in the job they want.
		U1	We started to use less swearing.
		U2	We expect it to make a difference.
		U5	She is a very compatible and willing participant.
		U5	I'm really pleased.
		U1	We pay more attention to our movements.
		U5	No, I didn't have any problems.
		U5	They are careful and attentive both during the preparation and during the service.
		U5	It seemed a little strange at first, but now we got used to it.
		U1	I would like to work with willing female technicians.
		U5	It added a different color to our business life.
		U3	A better relationship can be established with customers.
		U2	I would like to work if there is a willingness to learn and do something.
		U3	First of all, I never thought something like this would happen.
		U3	They especially affect our behavior positively.
		U2	Of course I want.
	Employing female technicians in authorized services	U1	Yes I recommend.
		U1	It both changes the appearance of the firm in the eyes of the customer and has a positive impact on our behavior.
		U4	I definitely recommend it.
		U2	They can be useful in relations with customers.
		U5	Relationships with customers can be more positive.
		U3	They work as bus drivers and people can trust them with their lives. They can entrust their lives to this job, too.
		U3	I recommend.

		U5	I recommend.
		U2	Her marketing skills and ability to persuade customers are quite good.
Customer Expectation	Reaction from customers	U1	"It makes us proud that you are in this profession."
		U4	There are more comfortable service hours.
		U4	We can more easily contact our customers who ask them to come to the service when their spouse arrives.
		U4	Our service hours are not concentrated on certain hours during the day.
		U1	This satisfaction is evident from both verbal and facial expressions.
		U3	They say, "I hope you will be successful."
		U1	As he explains the combi boiler problem, the women come closer and listen carefully.
		U5	They are pleased and often surprised.
		U4	Their relations with the customers are very good.
		U4	Customers always give good feedback in terms of body language.
		U5	Customers generally give positive information.
		U3	Customers congratulate.
		U2	First of all, they are surprised and usually congratulate.
		U1	I can say that veiled women are more satisfied.
		U4	Especially customers are very satisfied.
		U3	They are surprised.

Category-code-frequency data of experienced senior opinions are given in Table 49.

Table 49

Senior technician opinions category-code and frequency data

Category and Code System	Frequency
Category and Code System	129
Participant technician characteristics	
Problem encountered with the participant technician and problem solving method	33
Developmental characteristics of the participant technician	25
Aspects of the participant technician that are open to improvement	21
Effect of working female technician	
Working in the same team with a female participant technician	16
Employing female technicians in authorized services	9
Reaction from customers	16
Accreditation exam	9

Figure 8 gives the experienced senior interview word cloud.

Figure 8

Senior technician opinions about the vocational training process - word cloud

In Table 50, the data obtained from the interviews with senior technicians' opinions are presented, classified as positive and negative.

Table 50

Positive and Negative Opinions of the Seniors about the Participants about the On-the-Job Process

Positive Comments	**Negative Comments**
✓ Their ego decreases over time, ✓ Veiled female customers are more satisfied, ✓ Satisfaction of customers both verbally and in facial expressions, ✓ Female customers get closer and listen carefully while explaining the combi boiler problem, ✓ Conflicts and problems decrease over time, ✓ Increasing positive behavior by paying more attention to speech and movements, ✓ They are prepared and willing to take the VQA exam, ✓ Marketing ability, ✓ persuasion ability,	✓ Focusing more on work while repairing the device, Not reviewing documents related to the boiler in his spare time in the office, except for service time, ✓ Not paying much attention to the phone, spending too much time on social media (TikTok, etc.) ✓ Sufficient in knowledge and skills but not sufficiently adapted, ✓ Not wanting to go to the service with a new technician participant, Not wanting to go to the service with a female technician participant. ✓ Not using jewelry due to work safety rules, ✓ Being smart is not enough, ✓ Not focusing only on what you know, ✓ They need to ask more questions, ✓ Resistance to learning, ✓ Not open to development, ✓ Asking for more help

✓ Having good note-taking skills, ✓ The participant technician can receive a seniory certificate at the end of the three-month period, ✓ Not concentrating at certain hours during service hours,	✓ Organizing their behavior according to place and time, ✓ Being too friendly with customers ✓ Talking too much, ✓ Difficulty in situations that require physical strength, such as a work bag, ✓ Lack of electrical knowledge, ✓ Lack of mechanical skills, ✓ Device operating cycle lack of grip, ✓ Lack of information about the type of combi boiler,

4.3.2.7. On-the-Job Training Process - Firm District Manager Interview Data

Evaluations, observations and opinions of the Firm Coordinator and the regional managers responsible for authorized services (Istanbul - Ankara - Izmir) were taken. On-the-job training processes of the participants were observed in July 2023, August 2023, and September 2023. Data were collected about the participants' professional development and workplace adaptation. These data are divided into four main groups:

1. Opinions about the developed curriculum

    • Generally accepted positively,

    • Companies carrying out social responsibility activities

    • Providing employment-oriented qualified education

2. Positive aspects of the curriculum

    • Emphasizes inclusion and diversity

    • Provides basic skills

    • Being motivating

3. Differences of the developed curriculum

    • Being holistic

    • In addition to technical knowledge, gender equality and communication training should be provided

• Full presentation of VQA exam content that even current senior technicians are not aware of (work organization, work planning, professional development, environmental safety measures, quality management system).

• Giving employment-oriented targets to participants

4. Aspects that need to be improved in the developed curriculum

• Increasing the practice times in basic training, and providing an additional 40 hours of training focused solely on practice after 40 hours of training.

• More contribution of authorized services to the process

The observation results of on-the-job training processes are shown in Table 51;

Participants who completed face-to-face workshop and laboratory training were placed in six different businesses to receive on-the-job training. Monthly process monitoring was carried out for the participants who continued to work for a total of three months. Researchers, firm representatives and regional service managers contributed to the process monitoring. These periods; It took place in July 2023, August 2023 and September 2023. The codes used and their explanations are coded in the table (Months: T – July 2023, A – August 2023, E – September 2023; Participant Technician Observation Level: 1-Basic Level, 2-Intermediate Level, 3-Good Level, 4-Advanced Level).

Table 51

On-the-Job training process - firm regional manager process monitoring data

	Participant Code	K1			K2			K3			K4			K5			K6		
	Question / Three-month period	J	A	S	J	A	S	J	A	S	J	A	S	J	A	S	J	A	S
1	What are your opinions about the technician participant's compatibility within the firm?	1	1	1	2	3	4	2	-	-	2	-	-	2	-	-	1	-	-
2	What are the behavioral characteristics of the technician participant?	1	1	1	3	4	4	2	-	-	2	-	-	2	-	-	1	-	-
3	What are your opinions about the social relations of the technician participant?	1	1	1	2	3	4	2	-	-	2	-	-	2	-	-	1	-	-
4	What are your opinions about the communication skills of the technician participant?	1	1	1	2	3	3	2	-	-	2	-	-	2	-	-	1	-	-
5	What are your opinions about the professional and technical theoretical knowledge of the technician participant?	1	1	1	1	2	3	1	-	-	2	-	-	2	-	-	1	-	-
6	What are your opinions about the professional and technical implementation skills of the technician participant?	2	2	2	1	2	3	1	-	-	2	-	-	2	-	-	1	-	-
7	What are your opinions about the job motivation of the technician participant?	4	4	4	4	4	4	4	2	-	3	-	-	3	-	-	1	-	-

Table 52 presents the participants' attendance and departure from on-the-job training.

Table 52

Continuing and leaving on-the-job training status of the participants who were evaluated during the process

Participant Technicians' Participation and Leaving Situations in On-the-Job Training			Process Evaluation Periods		
Participant Technician Receiving On-the-Job Training		Reasons for Technician Participants to attend and leave on-the-job training	July 2023	August 2023	Septembe 2023
1	K1	She could not adapt to the firm he worked for and exhibited inappropriate attitudes in front of customers in the workplace environment, which could potentially damage the brand image. Her employment was terminated by the authorized service.	✓	✓	✓
2	K2	She has adapted to the relevant profession and firm and the process of becoming a technician continues.	✓	✓	✓
3	K3	The working days in the on-the-job training program are not counted in the number of premium days entitled to retirement. Incompatibility with service manager. She left the process voluntarily, explaining that he had a different business plan.	✓	✓	✓
4	K4	She left the process voluntarily due to his family's health problems.	✓	-	-
5	K5	The participant's family relationships made the service uneasy and his work uniform became a problem. The employment of the participant was terminated by the service, citing the participant's low interest in this profession.	✓	-	-
6	K6	She left the process voluntarily, citing the location of the firm he would work for as being far from his home. She expressed her husband's reservations.	-	-	-

4.3.2.8. On-the-job process; participant, firm manager, authorized service manager and senior technician opinions

During the on-the-job training process, individual interviews were held with people from four different groups (senior technicians, firm managers, authorized service

managers, participants). As a result of these interviews, positive and negative opinions were reached. Positive and negative opinions are presented in Table 53.

Table 53

Opinions of on-the-job process participants, firm managers, authorized service managers, senior technicians

Positive Comments	Negative Comments
Senior Technician ✓ Senior technician ST: "First of all, I never thought something like this would happen." ✓ Senior technician HR: "First of all, they are surprised and usually congratulate.", ✓ Senior technician LK quotes the customer as saying: "It makes us proud that you are in this profession." ✓ Professional and technical skills increase over time, ✓ Having basic knowledge (being able to commission the boiler, removing the boiler safety valve), ✓ They adapt over time, ✓ Their ego decreases over time, ✓ Veiled female customers are more satisfied, ✓ Satisfaction of customers both verbally and in facial expressions, ✓ Female customers get closer and listen carefully while explaining the combi boiler problem, ✓ Conflicts and problems decrease over time, ✓ Increasing positive behavior by paying more attention to speech and movements, ✓ They are prepared and willing to take the VQA exam,	*Senior Technician* ✓ Focusing more on work while repairing the device, Not reviewing documents related to the boiler in his spare time in the office, except for service time, ✓ Not paying much attention to the phone, spending too much time on social media (TikTok, etc.) ✓ Sufficient in knowledge and skills but not sufficiently adapted, ✓ Not wanting to go to the service with a new technician participant, Not wanting to go to the service with a female technician participant. ✓ Not using jewelry due to work safety rules, ✓ Being smart is not enough, ✓ Not focusing only on what you know, ✓ They need to ask more questions, ✓ Resistance to learning, ✓ Not open to development, ✓ Asking for more help ✓ Organizing their behavior according to place and time, ✓ Being too friendly with customers ✓ Talking too much, ✓ Difficulty in situations that require physical strength, such as a work bag, ✓ Lack of electrical knowledge, ✓ Lack of mechanical skills,

✓ Marketing ability, ✓ persuasion ability, ✓ Having good note-taking skills, ✓ The participant technician can receive a seniory certificate at the end of the three-month period, ✓ Not concentrating on service hours at certain times, *Authorized Service Managers* ✓ Among the participants, those who continued on-the-job training adapted to the workplace, but it took time to adapt to workplace rules. ✓ Ensuring motivation through salary and bonuses, ✓ Compliance with etiquette and communication rules, ✓ The knowledge and implementation levels of participant technicians improve throughout the process, ✓ Solving all problems in good faith, ✓ Admitting his mistakes and trying to fix them, ✓ The participant knows how to ask for help, ✓ Having a positive attitude towards work and colleagues, ✓ They have access to basic service skills, ✓ Leaving the working environment clean and tidy, ✓ Positive feedback from customers, but actual evaluations are subject to the Bosch evaluation system. ✓ "Customers absolutely loved it." ✓ Customers expressed surprise that the participant was the first female technician to enter their home. ✓ Senior technicians do not give negative	✓ Device operating cycle lack of grip, ✓ Lack of information about the type of combi boiler, *Authorized Service Managers* ✓ Participants have the problem of carrying heavy loads such as bags that require physical strength, ✓ The participant is aware that he/she is in the learning process and that there are issues that he/she needs to learn from the senior, ✓ There is a need for a written orientation plan, ✓ Participant orientation should be done verbally only,

feedback ✓ The employment of female technicians is viewed positively by both the firm and the customers, ✓ If he passes the VQA exam, he can be hired immediately. ✓ Recommending employment of female technicians to other companies, ✓ Employing a female technician will bring a different color, excitement and perspective to the authorized service.	
Firm Manager ✓ Companies carrying out social responsibility activities ✓ Providing employment-oriented qualified education ✓ Emphasizes inclusion and diversity ✓ Teaching basic skills ✓ Being motivating ✓ Being holistic ✓ Having gender equality and communication training in addition to technical knowledge ✓ Full presentation of VQA exam content that even current senior technicians are not aware of (work organization, work planning, professional development, environmental safety measures, quality management system). ✓ Giving employment-oriented targets to participants	*Firm Manager* ✓ Increasing the practice times in basic training, and providing an additional 40 hours of practice-oriented training after 40 hours of training ✓ More contribution of authorized services to the process
Participant ✓ The on-the-job training process was very instructive and enjoyable, I am very pleased. ✓ The service people were very helpful.	*Participant* Difficulty communicating with senior technicians Difficulty establishing dialogue Senior technicians smoking in the vehicle Professionals listening to excessive music in the

✓ There is an educational and fluid environment ✓ I have no difficulty in establishing a dialogue ✓ I can communicate with my boss when necessary. ✓ I think I can and I succeed. ✓ My curiosity and interest continues. ✓ Maybe after a month I can even go to the service alone. ✓ My learning environment is very good. ✓ I learn very easily through practical explanation. ✓ The teaching skills of the seniors are sufficient. ✓ Seniors immediately check and correct themselves if there is abusive language. ✓ My communication with the seniors is very good, they support me in everything. ✓ When I ask questions to the seniors, I can get answers immediately. ✓ My seniors help me when I need a break. ✓ Everyone has good intentions	vehicle Inability to take breaks (especially due to need on the way to the shuttle) Abusive speeches of seniors Although the seniors have good communication skills with other women (customers), they behave rudely when communicating with them. Being treated like an apprentice or child Not being able to ask questions to the seniors No practical explanation Inability to fully see the implementations due to insufficient space (low field of view) at the time of service Lack of learning environment Lack of teaching skills of seniors carrying heavy bags Harsh, demotivating speeches Inability to communicate with the manager Not being requested by the services Lack of communication within the organization

4.3.3. Results for the Implementation of the Developed Curriculum

The curriculum created within the framework of the protocol (Appendix 13) was applied to participant technicians. The following results were achieved during and after the implementation phase:

The trainers who participated in the trainer training supported the creation of the content by supporting the process as people who are knowledgeable about the content approach and determination of competencies. Thanks to their experience in teaching methods and techniques, they learned the components of the UbD framework plan and partially implemented them in the lessons. They used components such as the big idea,

informing about the goals, and connecting with life as elements in all units. Thanks to this implementation, the motivation and participation of the participants in the lesson increased. Time pressure has emerged as a negative factor in the implementation of the UbD framework program in vocational education. In order to solve this problem, the idea of increasing the training period was adopted. The firm responded positively to this suggestion. It was predicted by all firm officials that increasing the curriculum to be applied in subsequent vocational training from 40 hours to 80 hours would solve the problems.

In the educator observation report, it was stated that there were similarities in the learning and exam results of male and female participants. It was observed that all participants were willing to learn, and participation in the course increased, especially in the applied parts. However, there are also differences among the participants due to their previous education and experiences. Although participation in the course was less in subjects related to cognitive skills (mathematical calculations and physics symbols, etc.), all participants were able to understand the course topics thanks to their asking questions, being curious and being motivated to the course.

In order to improve the ability to use equipment, problem-based teaching method can be used by increasing the practice time. Participants became more focused on the process during the problem-solving stages. A systematic structure should be established so that participant technicians receive continuous support from firm trainers during on-the-job training at the authorized service, after the firm training. The support system provided by the firm in the existing system has been found to be useful despite its limited use. Participants easily reflected their knowledge and skills from their previous experiences into the course. Those who were initially shy and lacked self-confidence soon joined the process.

Trainers have been an important factor in all training processes and participant evaluations. Objectivity is the main focus in the firm's current evaluation system. A new evaluation plan proposal was created without changing the main focus. It has created an evaluation proposal in which instructors are based on objective criteria and take more responsibility. In this suggestion; the impact of the work done by the participants during the process on the final evaluation has increased. The current and proposed evaluation system is given in Table 54 below. Revision of measurement and evaluation tools is an

important part of curriculum development. The new system proposed by the firm's Testing Training & Research department can be evaluated and revised. All the work done by the participants during the process can be evaluated.

Table 54

New evaluation system proposal for firm face-to-face training

SUGGESTED EVALUATION SYSTEM	
	%
Written examination	**70**
Instructor observation	**30**
Ability to analyze malfunction or current situation	5
Ability to comply with occupational health and safety (OHS) rules	10
Problem solving skills with the help of technical documents	5
Communication skills	10
Total	**100 Puan**
Evaluation: Those whose written exam and instructor observation average is over 70 points will be considered successful.	

The developed curriculum met the expectations of the firm's trainers regarding competence, subject and content.

Participants received training in three stages. These; online preliminary training, face-to-face training provided by the firm and practical training they received in the field at the authorized service. All training took place within the scope of on-the-job training principles.

It has been observed that municipal units and neighborhood headmen's offices are very effective in reaching participants for employment-oriented trainings. Whatsapp implementation has been used very effectively by local governments for public information purposes. Announcements on employment websites had limited impact. The announcements of İŞKUR and governorships were not sufficient and effective in the process of receiving participant implementations.

The developed curriculum was applied to the adult group. The group did not experience significant difficulties in the process of perceiving the competencies and in the learning and implementation phases.

Participants did not experience any problems in the first two stages. However, there were difficulties in the on-the-job training process at the authorized service. These difficulties; It resulted from the characteristics of the profession, the approach of the authorized service and the attheudes and behaviors of the participant. There were no problems in the process of participants gaining professional knowledge and skills.

Participants; they stated that online pre-training is very useful in preparing for the training process. In online training, apprentice technicians are provided with access to preliminary information before face-to-face training. Asynchronous online training content provided by the firm academy was developed. The firm attaches importance to the continuous updating of all trainings. The measurement and evaluation parts of online training are open to improvement. These trainings; Acquisition of preliminary information, increased interest in the profession, education helped create excitement and focus on the goal. When starting face-to-face education, it also contributed to having a homogeneous participant group in terms of professional readiness.

It was observed that the participants had the necessary motivation to learn the profession. They were active in the processes of listening to the lesson, participating in the lesson, asking questions and solving problems. It can be said that the main motivations of the participants are to make a career, to have a profession, to have social status, to be noticed and economic reasons.

Participants; the firm was satisfied with the face-to-face training and this vocational training met all the expectations of the participants. The fact that the firm's training and social environments are similar to the real business environment and that food and beverages are offered during break times have increased participant satisfaction.

Participants were satisfied with the vocational training services of experienced trainers. It was ensured that the participants were constantly active in the lesson. The fact that the training was practice-oriented, role-taking, teamwork and the use of many creative drama techniques in teaching had a positive impact on the process. Participants discovered that they could learn.

The participants' prejudices towards learning technical subjects were eliminated. Effective use of training methods and techniques has resulted in an increase in course efficiency and participant satisfaction. The fact that the participants started the course by being aware of the objectives, the lecture related to real life and the teaching with up-to-date technological tools and equipment contributed to the motivation of the participants and the success of the face-to-face education exam.

Participants and instructors were highly satisfied with the educational organization. Accommodation, transportation and catering services are fully provided by the firm. This situation positively affected the participants' trust and communication style.

All participants' opinions about the training they received during the on-the-job training process in the field, their opinions about the conformity of the training content to expectations, the usability of the learned subjects in your business life, their opinions about the instructor, their opinions about the training environment, and their opinions about the training method were taken. These opinions are grouped into three groups: positive, negative and suggestions. It was observed that there were more positive opinions.

Participants; was positively affected by the on-the-job training process.

Service employees shared their experiences with the participants. However, in some services, cultural problems occurred between participants and authorized service employees. The prominent reasons for these problems are; the workplace orientation plan is not written and systematic and there are deficiencies in communication channels.

Field experts have expressed the opinion that both women and men can learn this profession better, especially thanks to on-the-job training. It has been emphasized by experts in the field that corporate companies should take a greater role in technician training. However, it has been observed that there is a prejudice against female technicians, both in society and from themselves. It is important to note that female technician participants have many positive characteristics, except for very limited areas that may require physical strength. Having a system like VQA that provides equal examination opportunities for everyone is important on the path to becoming a female technician. Legal, cultural, social and economic difficulties reduce participation in technician training programs. Tax incentives provided in labor laws, especially for female employees, provide significant contributions to companies. The society's negative view of the technician

profession also exists among some experts in the field. Companies should take a more active role in realizing cultural change. It is important to improve the duration and content of training programs. The prevailing opinion among field experts is that some companies that benefit from government incentives do not use these incentives for their intended purpose. Stricter measures should be taken by the state to eliminate this problem.

There are differences between what is said in the interviews held at authorized services and the attheudes during the implementation phase in the service. There is a strong tendency for some female technicians not to continue working. Coordination should be ensured between the firm training environment and the authorized service training environment. Cooperation between the firm and the authorized service regarding training can be increased.

Since VQA documents were last updated in 2016 and 2017, they do not fully coincide with the sustainable development-oriented approach. Therefore, occupational standards and qualifications can be updated accordingly.

In the employment of heating and gas burning device service technicians; Problems arising from economic inadequacy and long working hours are seen as the most important problems in the employment of employees. Collaboration between authorized services and technicians to develop corporate affiliation can positively affect the process.

When technicians know that their work and service are being evaluated, it positively affects the quality of work and service. At the same time, this process has an instructive feature in that it informs the technicians about the critical processes of the job. The firm can use this evaluation process to make its teaching processes more effective.

By providing trainer training to authorized service personnel, the training skills of senior trainers can be contributed.

Authorized service managers, in order to better teach the profession to participants; Environments that are energetic and support learning have been created. Participants did not have difficulty accessing information. However, there were problems between the senior technician and the participant technician. The main source of these problems can be shown that the seniors do not have sufficient teaching skills. The seniors treated the technician participants as if they were children, not adults. In order to correct these

approaches, constructive criticism was made by the firm's regional managers to the senior technicians. In addition, senior technicians are recommended to benefit from the senior instructor courses of Vocational Training Centers.

Participants; He had no difficulty in establishing dialogue with customers and senior technicians. Senior technicians and other employees exhibited more positive behaviors in work environments where technician participants were present. The employment of female technicians in workplaces has made positive contributions to the authorized service culture. The lack of female technicians in the sector has reduced the self-control of male technicians. Male technicians did not initially use the same positive communication style with female technicians that they used with female customers. However, over time, there have been positive changes in their behavior under the influence of authorized service managers.

Participant technicians; They easily reported the problems they experienced to the firm coordinator via the WhatsApp group. These problems were reported to the regional authorized service managers and an attempt was made to solve them.

Participants experienced problems due to the weight of the kit bags used in the service. The firm has carried out ergonomic bag design studies on this subject. Improvements have been made to the lockers. The authorized service manager is the most important actor in solving problems.

Participant technicians consulted firm trainers to learn technical topics they did not know and to get more information about the VQA exam content. Thanks to this system, a continuous and accurate information flow has been created.

Authorized service managers' opinions regarding the participants' on-the-job process were taken. Authorized service managers were satisfied with the on-the-job training process. They intend to continue their active participation in participant technician training as an authorized service. Both the economic incentives of the state and the need for experienced senior technicians positively affect the participation of authorized services in the on-the-job process. However, the principle of respect for diversity, which is one of the most important values of the firm, is an area open to improvement in authorized services. Each authorized service has a different workplace culture. This workplace culture; The region where the authorized service is located, the authorized service manager and the

seniors. Although the firm wants to constantly contribute to the development of the authorized service culture, this contribution may be limited depending on the characteristics of the authorized service.

The most important expectation of senior technicians from technician participants is; The service is of high quality and they support the job to be done at once and correctly. The most important element of the technician evaluation system is the customer opinions the firm receives from customers regarding the service. Customer opinions affect technicians' employment contracts. For this reason, technicians expect participant technicians to have a positive impact on service quality while they are in service.

The experience of the senior technician and his attheude towards teaching are the most important factors that directly affect the on-the-job training of the participant technician. The personal characteristics of the participant technician, his openness to development, exam motivation and suitability for team work affect the teaching process. The fact that participant technicians do not examine the archives and current documents related to the boiler during the time remaining from the in-office preparation work of on-the-job training has a negative impact on the process of becoming a technician. Senior technicians expect participant technicians to be interested and enthusiastic about the profession.

Participant technicians spend too much time on smartphones and social media, which negatively affects their business relationships. Authorized service managers and senior technicians expect adult trainee technicians to correct their behavior without warning. However, these negative behaviors partially continue even if a warning is given.

As technician participants spend time in the work environment; It was observed that there was an improvement in listening skills, adaptation, solving problems, complying with work safety rules and technical skills. The general structure of on-the-job training programs paves the way for these developments.

Customers' opinions about female technicians are positive. Similar customer expressions such as “First of all, I never thought something like this would happen” and “It makes us proud that you are in this profession” support this conclusion.

Senior technicians expect participant technicians to attain the awareness of striving for continuous improvement. To become a senior technician, only on-the-job training is not

enough. At least one year of service work is required to gain more experience. For this reason, technician participants; they must constantly improve themselves in terms of complying with occupational safety rules, working harmoniously, improving customer relations, knowing how to ask for help, electrical knowledge, mechanical skills, understanding the device operating cycle, and learning combi boiler types.

Participants, who completed face-to-face workshop and laboratory training, started on-the-job training in six different authorized services. Monthly process monitoring was carried out for the participants who continued to work for a total of three months. Process monitoring; the researcher, firm representative and regional service manager contributed. As a result of the data collected during the on-the-job training process and monitoring activities;

- The developed curriculum meets the objectives,
- It is compatible with sustainable development goals,
- The developed curriculum is fully integrated with the employment-oriented approach,
- The curriculum is inclusive and supports diversity,
- Its content for the international accreditation of the profession is complete,
- It was concluded that the curriculum provides basic skills and motivates participation in learning processes.

Moreover;

- Companies' greater contribution to social responsibility activities will ensure the continuity of the curriculum development process,
- Increasing the implementation times in firm face-to-face training,
- After 40 hours of training, there will be an additional 40 hours of training focused solely on practice,
- In order for technician participants to comply with the work rules and ensure their compliance, it is recommended that orientation plans be made in cooperation with the firm and the authorized service.

The employment-focused training program development model is presented in the following prerequisites and stages:

VOLDEM Employment-Focused Training Program Development Model

Prerequisites of the Model

- ✓ The company is willing and its needs are defined.
- ✓ The university's desire to develop and implement an educational program
- ✓ Having an incentive system for the public and/or sector
- ✓ The society needs a training program to be developed.
- ✓ The training program can be applied to young people and adults over the age of 16
- ✓ Focused on sustainable development goals
- ✓ Focus on 21st century skills

Needs Analysis

- ✓ State
- ✓ Sector
- ✓ Society
- ✓ Individual
- ✓ *Academy*

Determining Goals and Content

- ✓ Determining goals
- ✓ Determination of qualifications
- ✓ Determining and creating teaching environment needs
- ✓ Determination and creation of teaching materials

Implementation

It may consist of six digits;

1. Trainer training
2. Identification of participants
3. Candidate apprenticeship training
4. Candidate technician training
5. On-the-job training
6. Accreditation process

Evaluation

Evaluation; It should be done in order to evaluate the efficiency and effectiveness of the training provided. A four-stage evaluation process can be followed at each stage of training:

1. Candidate apprenticeship training evaluation
2. Candidate technician training evaluation
3. On-the-job training evaluation
4. National and/or international certification exam

4.4. Does the developed curriculum meet the level 4 training needs of natural gas heating and gas burner device service personnel?

After the implementation of the curriculum development model, the opinions of the Curriculum and Instruction Specialist and firm decision-making managers were taken. In this context, the opinions of academicians in the field and the firm's manager with decision-making authority were received regarding whether the developed curriculum met the expectations and whether the curriculum should be disseminated.

4.4.1. Has the implemented natural gas heating and gas burner device service personnel curriculum met the firm's expectations?

The decision-making managers of the firm stated that the desired targets were achieved in order for the developed curriculum to meet the firm's expectations. In particular, the program's positive contributions to customer satisfaction and business life were emphasized by the senior management.

Firm managers answer the other question; they expressed their opinion that the developed curriculum should be disseminated and implemented throughout Türkiye. The curriculum developed for the profession is currently implemented in firm face-to-face training for all participant technicians.

4.4.2. Has the developed curriculum been developed in accordance with program development principles?

Regarding the developed curriculum, expert opinions on the curriculum and instruction were received. Experts were asked for their opinions on the suitability of the developed curriculum with the curriculum development principles, methods and selected model. In this context, experts expressed their positive opinions about the developed program on the following topics.

- Implementation of curriculum development stages using the SUPSKY model,
- Suitability of units, content and durations of qualifications
- The relationship of the research question and sub-questions with the curriculum
- Editing and creating professional content
- Recommended new DEBİ curriculum development model
- Developed curriculum design principles guide

Experts; they made opinions, criticisms and suggestions. In this direction; the qualifications have been reviewed, spelling errors have been corrected and corrections have been made. All experts expressed positive opinions about the curriculum structure, qualifications, curriculum integrity and curriculum applicability.

4.4.3. Results for the Evaluation of the Developed Curriculum

An evaluation scale has been developed to evaluate the curriculum (Appendix Q). Curriculum design principles guide questions were created by developing the "Curriculum Evaluation Guide According to Design Principles" prepared by Dilek Canlıer. As a result of the data received from education program and training experts and firm officials regarding the curriculum;

- The curriculum met the expectations of the firm's senior management.
- The firm has decided to disseminate the developed curriculum.
- The developed curriculum enables technician participants to; Possessing knowledge, skills and positive behaviors, being able to establish strong communication with the customer, being able to provide quality service, increasing

corporate belonging, respecting and contributing to the value of in-house diversity, contributing to brand power and increasing authorized service satisfaction have contributed.

- In authorized services, male and female technicians can provide service to customers together.
- There has been an improvement in the distribution of service working hours throughout the day.
- The curriculum developed for the profession is applicable to all participant technicians within the scope of the on-the-job program.

5. CONCLUSION AND IMPLICATIONS

In this thesis; a study was carried out with the aim of developing the natural gas heating and gas burner device service level (4) personnel curriculum. “How can a curriculum be developed for training natural gas heating and burner device service personnel?” An answer was sought to the research question. To answer the research question in this study; Answers to four sub-research questions were sought. In this context;

- ✓ Need for training of natural gas heating and gas burner device service personnel,
- ✓ Developing a curriculum for natural gas heating and gas burner device service personnel training,
- ✓ The suitability of the developed curriculum and
- ✓ Results were obtained for the curriculum to meet the educational needs.

As a result of the protocol (Appendix R) made; Based on the research results, it can be said that a new approach has been gained to curriculum development studies in the field of vocational and technical education. A curriculum was developed taking into account the academic approach, in-company training dynamics and the state's incentive system.

From this point on, some observable inferences for stakeholders can be listed:

Competency-based, Natural Gas Heating and Gas Burner Device Service Level (4) Personnel curriculum may be responsive to sustainable development goals. A curriculum specifically focused on employment and supporting the vocational training of female technicians has been developed.

While applying the on-the-job training model, national and international accreditation exams were taken into account. In this way, technician participants were both informed about the goals and learned about the career opportunities of the profession.

The developed curriculum encouraged female technician participants to obtain many technical competencies and increased their self-confidence.

The firm has reviewed and improved its in-service training process, teaching methods and techniques, content and measurement-evaluation activities.

Authorized services had the opportunity to try different implementations recommended by the firm in order to improve the quality of the service they provide. It contributed to the development of corporate communication and relationship between the firm and authorized services in terms of employment-oriented training.

There have been improvements in education and training environments. An inventory of teaching materials has been developed.

Thanks to the curriculum development model, the firm's administrative components and authorized services have developed and experienced the collaborative working approach.

The model applied during the program development process has been developed and an effective program in vocational and technical education has been achieved. A system has been created for the continuous improvement of in-firm training. Especially corporate companies have been observed to want to benefit from this system. This firm, which has units in many countries, tends to apply its education system to other professions as well.

Recommendations for researchers who want to do more work in the field are presented below:

- Training of trainers can also be applied to personnel participating in on-the-job training in the field.
- Participant technician selection processes can be restructured.
- Tools can be created to measure the degree to which sustainable development goals overlap with firm activities.
- Joint studies can be carried out with national and international certification bodies in curriculum development studies in vocational and technical education (needs analysis, determination of qualifications, revision of the examination system, etc.).
- Exam implementation and measurement-evaluation tools of ACAs can be improved.
- Different approaches can be developed regarding on-the-job training.
- In vocational and technical education, the effects of learning environments on gender equality can be investigated.

- Studies can be carried out on the use of the UbD framework plan in vocational and technical education.
- Research can be conducted on the technician evaluation system.
- The approaches, methods and techniques used by local governments in curriculum development studies can be researched.
- Incentives and programs of the central government for training technicians can be examined.
- Communication research focused on problem solving in workplaces can be developed.
- Research can be conducted on the development of personnel responsible for teaching in enterprises. Just having a document does not determine competence. Collaborations can be made with firm human resources units on this issue.
- The effect of social media use on the teaching process can be investigated.

REFERENCES

3308 Sayılı Mesleki Eğitim Kanunu. https://www.mevzuat.gov.tr/MevzuatMetin/1.5.3308.pdf

Abramo, G., D'Angelo, C.A., & Di Costa, F. (2011). Research productivity: are higher academic ranksmore productive than lower ones? *Scientometrics*, 88(3), 915-928. DOI: 10.1007/s11192-011-0426-6

Acar, O. K., & Yabanova, E. K. (2017). Aktif İşgücü Piyasası Politikaları Çerçevesinde Kütahya İŞKUR'un Mesleki Eğitim Faaliyetlerinin İncelenmesi. *Mehmet Akif Ersoy Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 4 (2): 85-111.

Adams RB. *Governance and the financial crisis*. International Review of Finance. 2012;12(1):7-38. DOI: 10.1111/j.1468-2443.2011.01147.x

Adıgüzel, O. A., & Berk, Ş. (2009). Mesleki ve teknik ortaöğretimde yeni arayışlar: Yeterliğe dayalı modüler sistemin değerlendirilmesi. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 6(1), 220-236.

Ahi, P., & Searcy, C. (2013). A Comparative Literature Analysis Of Definitions For Green And Sustainable Supply Chain Management, *Journal of Cleaner Production*, 52, 329-341.

Ak, R., & Bingül, B.A. (2011). *Eğitim-Büyüme İlişkisi Yazımı Üzerine Bir Değerlendirme.* Bilgi Ekonomisi, (Eds. S. Murat, İ. Güran Yumuşak). İstanbul, İ.Ü. İktisat Fakültesi Yayınları, s. 163-164.

Aktif İşgücü Hizmetleri Yönetmeliği. (2020). https://www.mevzuat.gov.tr/File/GeneratePdf?mevzuatNo=17197&mevzuatTur=KurumVeKurulusYonetmeligi&mevzuatTertip=5

Alipour, M.M.S., & Shahnavaz, A. (2009). A Study of On the Job Training Effectiveness: Empirical Evidence of Iran. *International Journal of Business and Management*, 4 (11).

Almedia, Rita K. & Marta Lice De Feria (2014). The Wage Returns to On-the-Job Training: Evidence from Matched Employer-Employee Data, Discussion Paper Number 8314, IZA, Germany.

Almeida, R. K., & Faria, M. L. (2014). The wage returns to on-the-job training: evidence from matched employer-employee data. IZA Journal of Labor and Development, Discussion Paper No. 8314. IZA

Angus, J. (1995). The United Nations World Summit For Social Development: Copenhagen 6-12 March 1995, *Social Policy Journal of New Zealand*, 3(4), 1-5.

Asderaki, F. (2009). The Impact of the Bologna Process on the Development of the Greek Quality Assurance System. *Quality in Higher Education*, 15(2), 105–122. https://doi.org/10.1080/13538320902995758

Ashton, D., & Green, F. (1996). *Education, Training and the Global Economy*. Cheltenham, Edward Elgar.

Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly journal of economics*, *118*(4), 1279-1333.

Balcı, A. (2001). *Sosyal Bilimlerde Araştırma Yöntem, Teknik ve İlkeler*. 3. Baskı. Ankara: Pegem A Yayıncılık.

Bansal, P. (2005). Evolving Sustainably: A longitudinal Study Of Corporate Sustainable Development, *Strategic Management Journal*, 26(3), 197-218.

Barkemeyer, R., & Holt, D. (2014). What Happened to the Development in Sustainable Development? Business Guidelines Two Decades After Brundtland, *Sustainable Development*, 22(1), 15-32.

Barnow, B. (2002). Occupations and Skills in the United States: Projection Methods and Results Through 2008. In M. Neugart & K. Schömann (Eds.). *Forecasting Labour Markets in OECD Countries, Measuring and Tackling Mismatches*, Edward Elgar, Cheltenham

Basiago, A. (1999). Economic, Social And Environmental Sustainability In Development Theory And Urban Planning Practice, *The Environmentalist* , 19, 145-161.

Benavot, A., Hoppers, C.O., Lockhart, A.S. et al. (2022). Reimagining adult education and lifelong learning for all: Historical and critical perspectives. *Int Rev Educ* 68, 165–194. https://doi.org/10.1007/s11159-022-09955-9 Access Link: https://rdcu.be/dhLnq

Bercovitz, J., & Feldman, M. (2006). Entpreprenerial Universities and Technology Transfer: A Conceptual Framework for Understanding Knowledge-Based Economic Development. *J Technol Transfer* 31, 175–188. https://doi.org/10.1007/s10961-005-5029-z

Bernstein, B. (2000). Pedagogy, Symbolic Control, and Identhey: *Theory, Research, Critique*. Lanham, MD: Rowman & Littlefield.

Bhanot, N., Rao, P., & Deshmukh, S. (2019). Sustainable Scenario: A Systematic Review of Definitions of Sustainability and Agenda for Future Research, *South Asian Journal of Management*, Vol: 11(1), 32-70.

Billett, S. (2011). *Vocational education. Purposes, traditions and prospects*. Dordrecht: Springer.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative Research for Education: An Introduction to Theory and Methods*. Needham Heights, MA: Allyn and Bacon, Inc.

Booth, A. L., & Snower, D. J. (1996). *Acquiring Skills Market Failures, Their Symptoms and Policy Responses*. Cambridge, Cambridge University Press, pg. 8.

Bouchrika, I. (2023). *On the Job Training: OJT Meaning, Advantages & Types*. https://research.com/careers/on-the-job-training

Bowden, J. A., & Seniors, G. N. (1993). *Implications for higher education of a competency-based approach to education and training*. Canberra: Australian Government Publishing Service.

Bowl, M. (2017). *Adult Education in Neoliberal Times: Policies, Philosophies and Professionalism*. Cham, Switzerland: Palgrave Macmillan

Bramley, G., & Power, S. (2009). Urban Form And Social Sustainability: The Role Of Density And Housing Type. Environment and Planning B, *Planning and Design*, 36(1), 30-48.

Brundtland, G.H. (1987) *Our Common Future: Report of the World Commission on Environment and Development*. Geneva, UN-Dokument A/42/427.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş. & Demirel, F. (2020). *Eğitimde Bilimsel Araştirma Yöntemleri*. 29. Baskı. Pegem Akademi.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. A., Karadeniz, Ş. & Demirel, F. (2013). *Bilimsel Araştırma Yöntemleri*. Pegem Akademi Yayıncılık.

Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2011). *Bilimsel Araştırma Yöntemleri (8. Baskı*). Ankara: Pegem Akademi.

Caniato, F., Caridi, M., Crippa, L., & Moretto, A. (2012). Environmental Sustainability In Fashion Supply Chains: An Exploratory Case Based Research, *International journal Of Production Economics*, 135(2) , 659-670.

Career (n.d). *Ensuring Effective on the Job Training. Manila*, Philippines: Department of Labor and Employment.

Castellanza, L., & Woywode, M. (2024). Types, determinants, and outcomes of entrepreneurial behaviours during crises. *Entrepreneurship & Regional Development.* 1–30. https://doi.org/10.1080/08985626.2024.2324320

Clark, R. E., Feldon, D. F., van Merriënboer, J. J. G., Yates, K., & Early, S. (2008). *Cognitive task analysis.* In J. M. Spector, M. D. Merrill, J. J. G. van Merriënboer, & M. P. Driscoll (Eds.). Handbook of research on educational communications and technology (3rd ed., pp. 577–593). New York: Routledge.

Corbin, J., & Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Thousand Oaks, CA: Sage

Cox, R. W. (1987). *Production, Power and World Order: Social Forces in the Making of History*. Vol. 1, Columbia University Press.

Crell, P. (2012). *Benchmarking employability of young graduates*. EU Science Hub.

Crespo, M., & Dridi, H. (2007). Intensification of university–industry relationships and its impact on academic research. *Higher Education*, 54(1), 61–84. https://doi.org/10.1007/s10734-006-9046-0

Çetin Aydın, G. & Aytaç, S. (2020). "The Status Of Women In Working Life In Turkey", *International Social Sciences Studies Journal*, (e-ISSN:2587-1587) Vol:6, Issue: 55; pp:292-300.

Damtoft, J., Lukasik, J., Herfort, D., Sorrentino, D. & Gartner, E. (2008). Sustainable Development And Climate Change Initiatives, *Cement and Concrete Research*, 38, 115–127.

Davey, J. W., Hohenlohe, P. A., Etter, P. D., Boone, J. Q., Catchen, J. M., & Blaxter, M. L. (2011). Genome-wide genetic marker discovery and genotyping using next-generation sequencing. *Nat. Rev. Genet*. 12, 499–510. doi: 10.1038/nrg3012

Dekeyser, H. M., Van Rijn, F. H. M., & Jansen, D. (2005). Teacher training on the job. *Information and Communication Technologies and Real-Life Learning*, 182, 179-188.

Özcan Demirel.(2020).*Eğitimde Program Geliştirme Kuramdan Uygulamaya*. 27. Baskı. Pegem İndeks.

Despotovic, M., & Pejatovic, A. (2005). *Policy and Strategy of Adult Education Development in the Republic of Serbia*. Retrieved August 27, 2019 from http://www.vetserbia.edu.rs/Zbirka%20doc/Finaldoc/Adult%20Policy.pdf

Dew, N., & Sarasvathy, S. D. (2013). Innovations, Entrepreneurship Stakeholders. *Journal of Business Ethics* 74 (3):267–283. https://doi.org/10.1007/s10551-006-9234-y.

Dewey, J. (1916). *Democracy and education*. Lexington: Feather Trail Press.

Kılıç, D. & Öztürk, S. (2014).*Türkiye`de Kadınların İşgücüne Katılımı Önündeki Engeller ve Çözüm Yolları: Bir Ampirik Uygulama*. Amme İdaresi Dergisi.

Dulupçu, M. A. (2001). *Küresel Rekabet Gücü, Türkiye Üzerine Bir Değerlendirme*, Yayın No: 251, s. 108. Ankara, Nobel Yayınları.

Ekiz, D. (2003). *Eğitimde Araştırma Yöntem ve Metodlarına Giriş.* Ankara: Anı Yayıncılık.

Encylopedia of Education (2002). In Deighton, L.C., & MacMillan (Eds) Reference Books.

English, L. M., & Mayo, P. (2012). Adult education and social movements. In L. M. English, & P. Mayo (Eds.). Learning with adults: A critical pedagogical introduction (pp. 109–130). Rotterdam: Sense Publishers.

Erden, M. (1998). *Öğretmenlik Mesleğine Giriş*. İstanbul: Alkım Yayınları

European Commission. (2004). *National Sustainable Development Strategies in the European Union. A first analysis by the European Commission*. Commission Staff Working Document.

Eysenbach, G., & Köhler, C. (2002). *How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews.* Bmj, 324(7337), 573-577.

Finch, C. R., & Crunkilton, J. R. (1999). *Curriculum development in vocational and technical education. planning, content, and implementation*. Allyn and Bacon, 160 Gould Street, Needham Heights, MA 02494.

Forsyth, K., Parkinson, S., Kielhofner, G., Kramer, L., Summerfield, M., & Duncan, E. (2011). The measurement properties of the Model of Human Occupation Screening Tool and implications for practice. *New Zealand Journal of Occupational Therapy*, 58(2), 5–13

Galindo, S. M. (1999). A Revised On-The-Job Training System at Johnson Matthey Electronics: Benefits of Training Materials for On-The-Job Training, Doctoral Dissertation, Plan B (MS), University of Wisconsin, Stout.

Garrouste, C., & Rodrigues, M. (2012). *The Employability of Young Graduates in Europe*. Brussels, Belgium: European Commission.

SDG Collaborators. (2016). Measuring The Health-Related Sustainable Development Goals in 188 countries: A Baseline Analysis From The Global Burden of Disease Study 2015, *The Lancet*, Vol: 388 (10053) , 1813-1850.

Gedik, Y. (2020). Sosyal, Ekonomik Ve Çevresel Boyutlarla Sürdürülebilirlik Ve Sürdürülebilir Kalkınma. *Uluslararası Ekonomi Siyaset İnsan ve Toplum Bilimleri Dergisi*, *3*(3), 196-215).

Ghost, S. (2002). VET in Schools: The Needs of Industry. *Unicorn: Journal of the Australian College of Educators*, Vol. 28, No. 3, pp. 61-64.

Glesne, C. (2015). *Nitel Araştırmaya Giriş*. In Ersoy, A., & Yalçınoğlu, P. (Eds.). Ankara: Arı Yayıncılık.

Goel, P. V. (2011). Technical and Vocatıonal Education and Training (Tvet) System \ In India for Sustainable Development, UNEVOC. http://www.unevoc.unesco.org/up/India_Country_Paper.pdf.

Güler, A., Halıcıoğlu, N. B., & Taşğın, S. (2013). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Ankara: Seçkin.

Gültekin, M. (2018). *Eğitim Bilimine Giriş*, T.C. Anadolu Üniversitesi Yayını No: 1825 Açıköğretim Fakültesi Yayını No: 948. Eskişehir.

Tokgöz Güneş, S., & Binboğa, G. (2021). Toplumsal Cinsiyet Eşitsizliği Bağlamında Kadın Yoksulluğu Ve Sürdürülebilir Kalkınma: Türkiye Ölçeğinde Bir İnceleme. *Dokuz Eylul University Journal of Graduate School of Social Sciences*, 23(4).

Gür, A. (2011). *Rekabet Gücünün Artırılmasında Nitelikli İşgücü İhtiyacı ve Mesleki Eğitim.* Unpublished doctoral dissertation. İstanbul Üniversitesi Sosyal Bilimler Enstheüsü.

Gürkan, T. (2006). (Ed). *Öğretmenlik Mesleği ile İlgili Temel Kavramlar, Öğretmenlik Mesleğine Giriş.* Eskişehir: Anadolu Üniversitesi Yayını, s. 5.

Hajer, M., Nilsson, M., Raworth, K., Bakker, P., Berkhout, F., De Boer., Y., Rockström J., Ludwig, K., & Kok, M. (2015). Beyond Cockpit-ism: Four Insights to Enhance the Transformative Potential of the Sustainable Development Goals, *Sustainability*, 7, doi:10.3390/su7021651, 1651-1660.

Hake, B. J. (1999). Lifelong Learning Policies in the European Union: developments and issues, *Compare*. *A Journal of Comparative and International Education*, 29:1, 53- 69.

Harris, R., Guthrie, H., Hobart, B., & Lundberg, D. (1995). *Competency based education and training: Between a rock and a whirlpool.* South Melbourne: Macmillan Publishers Australia Pty. Ltd.

Healey, M., Flint, A., & Harrington, K. (2014). Engagement through partnership: Students as partners in learning and teaching in higher education. The Higher Education Academy Report, (July), 1-76. http://dx.doi.org/10.1080/1360144X.2016.1124966

Hodge, S., Holford, J., Milana, M., Waller, R., and Webb, S. (2020a). *Adult education, vocational education and economic policy: theory illuminates understanding.* International Journal of Lifelong Education, 39:2, 133-138, DOI: 10.1080/02601370.2020.1747791

Hodge, S., Mavin, T., & Kearns, S. (2020b). Hermeneutic dimensions of competency-based education and training. *Vocations and Learning*, 13, 27-46.

Hodge, S. (2014). *Interpreting competencies in Australian vocational education and training: Practices and issues*. Adelaide, SA: National Centre for Vocational Education Research.

Holden, E., Linnerud, K. & Banister, D. (2017). The Imperatives of Sustainable Development, *Sustainable Development*, 25(3), 213-226.

https://europa.eu/europass/en/europass-tools/european-qualifications-framework

http://www.kureselhedefler.org/hedefler/toplumsal-cinsiyet-esitligi/ (E.T: 19.07.2023)

https://library.educause.edu/topics/teaching-and-learning/competency-based-education-cbe

https://media.iskur.gov.tr/42507/isparta_eplan_30-11-2020.pdf

https://meslegimhayatim.meb.gov.tr/egitim/isbasi-egitimi

https://meslegimhayatim.meb.gov.tr/hakkimizda/mesleki-ve-teknik-egitimin-amaci

https://www.mevzuat.gov.tr/MevzuatMetin/1.5.3308.pdf

https://opentextbc.ca/teachinginadigitalage/chapter/6-6-competency-based-learning/

https://www.resmigazete.gov.tr/eskiler/2013/03/20130312-7.htm

https://www.right-to-education.org/issue-page/th-mes/adult-education-and-learning

https://www.teachthought.com/learning/what-is-competency-based-learning/

https://turkiye.un.org/tr/sdgs (E.T: 19.07.2023)

http://www.un-documents.net/ocf-ov.htm

https://www.unepfi.org/about/about-us/

https://www.un.org/sustainabledevelopment/

https://www.wgu.edu/about/competency-based-education/what-is-cbe.html

https://www.vic.gov.au/gender-equality-what-it-and-why-do-we-need-it

IMD, *World Competheiveness Yearbook 2005*, Geneva, 2005, s. 609-615.

International Standard Classification of Occupations (ISCO). (2016). *The International Standard Classification of Occupations (ISCO-08) Companion Guide.* https://webapps.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_896661.pdf

Nelson, J., Komba, H. K., & Mlingi, M. N. (2012). Relationship between on the Job Training and Employee's Performance in Courier Companies in Dar es Salaam, Tanzania. *International Journal of Humanities and Social Science*, 2 (22): 114-120.

Johnson, A. P. (2002). *A Short Guide to Action Research*. Boston: Allyn& Bacon.

Joyner, C. W. (1995). *The DACUM technique and competency-based education.* In J. Dennison (Ed.). Challenge and opportunity: Canada's community colleges at the crossroads (pp. 243–255). Vancouver: UBC Press.

Karasar, N. (2016). *Bilimsel Araştırma Yöntemi: Kavramlar Ilkeler Teknikler.* Nobel Yayıncılık.

Kayabaşı, A. (2010). *Rekabet Gücü Perspektifinde Lojistik Faaliyetlerde Performans Geliştirme*. İstanbul, İTO Yayınları, Yayın No: 2010-40, s. 38.

Kaymaz, K. & Eryiğit, K. Y. (2011). Determining factors hindering university-industry collaboration: An analysis from the perspective of academicians in the context of entrepreneurial science paradigm. *International Journal of Social Inquiry*, 4(1), 185-213.

Kearns, S. K., Mavin, T., & Hodge, S. (2016). *Competency-Based Education in Aviation. Exploring Alternate Training Pathways*. Farnham, Surrey: Ashgate Publishing Limited.

Kincheloe, Joe L.(1999). *Critical Democracy and Education*. pp. 70-83 in James G. Henderson and Kathleen R. Kesson, eds., Understanding Democratic Curriculum Leadership. New York: Teachers College Press.

Kirk, J. & Miller, M. L. (1986). *Reliability and Validity in Qualitative Research*. Beverly Hills: Sage Publications.

Kobes, Deborah (2013). *Making On-the-Job Training Work Lessons from the Boeing Manufacturing On-the-Job Training Project*. National Fund for Workforce Solutions 2.0, November 2013.

Korkmaz, N. (2022). *Yetişkin Eğitimi Programi Yaşam Boyu Öğrenme Politikalari Bağlaminda Türkiye'de Yetişkinlerin Mesleki Eğitimi*. Unpublished doctoral dissertation. Ankara Üniversitesi Eğitim Bilimleri Enstheüsü, Yaşam Boyu Öğrenme ve Yetişkin Eğitimi Anabilim Dalı.

Kümbetoğlu, B. (2017). *Sosyolojide ve Antropolojide Niteliksel Yöntem ve Araştırma.* Ankara: Bağlam Yayıncılık

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

Leff, S. S., Costigan, T., & Power, T. J. (2004). Using participatory research to develop a playground-based prevention program. *Journal of School Psychology*, 42, 3- 21.

Liefner, I., & Schiller, D. (2008). Academic Capabilities in Developing Countries—A Conceptual Framework with Empirical Illustration from Thailand. *Research Policy*, 37, 276-293. http://dx.doi.org/10.1016/j.respol.2007.08.007

Lumina Foundation for Education (2010, March). *Fueling the Race to Postsecondary Success.* Indianapolis, IN: The Council for Adult and Experiential Learning.

Mager, R. F. (1962). *Preparing instructional objectives.* Palo Alto: Fearon Publishers.

Magoon, A. J. (1976). *Teaching and performance-based teacher education.* In D. E. Lomax (Ed.). European perspectives in teacher education (pp. 235–267). London: John Wiley & Sons.

Marshall, G. (2005). Sosyoloji Sözlüğü. In Osman Akınhay & Derya Kömürcü. Ankara: Bilim ve Sanat Yayınları.

Matsuo, M., & Nakahara, J. (2013). The effects of the PDCA cycle and OJT on workplace learning. *The International Journal of Human Resource Management*, 24(1), 195–207. https://doi.org/10.1080/09585192.2012.674961

Mazzoleni, G. (2008). *Mediatization of Society.* In The International Encyclopedia of Communication, W. Donsbach (Ed.). https://doi.org/10.1002/9781405186407.wbiecm063

McClelland, D. C. (1973). Testing for competence rather than for 'intelligence. *American Psychologist*, 28(1), 423–447.

McCracken, G. (1988). The Long Interview Newbury Park. CA: Sage Publications. Melia, SP (1999). Continuity in the lives of elder Catholic women religious. *International Journal of Aging & Human* Development, 48(3), 175-189.

McMillan, J. H. (2004). *Educational research: Fundamentals for the consumer (4th ed.).* Boston: Allyn & Bacon.

Mebratu, D. (1998). Sustainability and Sustainable Development: Historical And Conceptual Review, *Environmental Impact Assessment Review*, 18(6), , 493-520.

Merriam, S. B. (2013). *Nitel Araştırma: Desen ve Uygulama İçin Bir Rehber.* In S. Turan (Ed). Ankara: Nobel Yayıncılık.

Mertler, C. A. (2017). *Action research communities: professional learning, empowerment, and improvement through collaborative action research*. London: Routledge.

Meslekî Yeterlilik Kurumu (VQA). (2016a). *Doğal Gaz Isıtma Ve Gaz Yakıcı Cihaz Servis Personeli Seviye 4 Ulusal Meslek Standardı (UMS).* https://portal.VQA.gov.tr/index.php?option=com_meslek_std_taslak&view=taslak_listesi_yeni&msd=2&Itemid=432

Mesleki Yeterlilik Kurumu (VQA). (2016b). *Doğal Gaz Isıtma Ve Gaz Yakıcı Cihaz Servis Personeli Seviye 4 Ulusal yeterlilik (UY).* https://portal.VQA.gov.tr/index.php?option=com_yeterlilik&view=arama

Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. New York: Sage Publications, Inc.

Miller, P. (2001). Competency Based Education and Training: A World Perspective. *Journal of Workplace Learning*, Vol. 13 No. 6, pp. 260-261. https://doi.org/10.1108/jwl.2001.13.6.260.2

Milli Eğitim Bakanlığı (MEB). (2023). *Mesleki ve Teknik Anadolu Lisesi, Anadolu Meslek ve Anadolu Teknik Programi, Tesisat Teknolojisi ve Iklimlendirme Alani, Tesisat ve Enerji Sistemleri Dalı, Çerçeve Öğretim Programı.* https://megep.meb.gov.tr/cop/cop9/tesisat_9.pdf

Milli Eğitim Bakanlığı (MEB). (2012). *Mesleki ve Teknik Eğitim Çalıştayı, Antalya.* https://mtegm.meb.gov.tr/TR/dokumanlar/calistay2012.pdf

Mills, G. E. (2011). *Action research: A guide for the teacher researcher* (4th ed.). Boston: Pearson.

Moldan, B., Janousková, S. & Hak, T. (2012). How To Understand And Measure Environmental Sustainability: Indicators And Targets, *Ecological Indicators,* Vol:17, 4-13.

Montiel, I. & Delgado-Ceballos, J. (2014). Defining and Measuring Corporate Sustainability: Are We There Yet?, *Organization & Environment*, 27(2), 113-139.

Mulder, M., & Winterton, J. (2017). In M. Mulder (Ed.). *Competence-based vocational and professional education.* Bridging the worlds of work and education (pp. 1–43). Dordrecht: Springer

Mulder, M., Weigel, T., & Collins, K. (2007). The concept of competence in the development of vocational education and training in selected EU member states: A critical analysis. *Journal of Vocational Education and Training*, 59(1), 67–88.

Mulder, R. H., Messmann, G., & Konig, C. (2015). Vocational education and training: researching the relationship between school and work. *European Journal of Education*, 50 (4), 497-512. https://doi.org/10.1111/ejed.12147

Murat, G. (2017). Sürdürülebilir Kalkınma 2030 Gündemi Bağlamında Çalışma Hayatında Cinsiyete Dayalı Ayrımcılık. *Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstheüsü Sosyal Bilimler Dergisi*, *7*(13), 7-36.

NACE (2019). *NACE 2019 Internship & Co-op Survey Report.* Bethlehem, PA: National Association of Colleges and Employers.

NACE (2020). *Job Outlook for the Class of 2020. Bethlehem*. PA: National Association of Colleges and Employers.

Nashashibi, P., & Watters K. (2003). *Curriculum leadership in adult learning.* Learning and Skills Development Agenc.

Neugart, M. and K. Schömann, eds. (2002). *Forecasting Labour Markets in OECD Countries, Measuring and Tackling Mismatches*. Cheltenham, UK: Edward Elgar, forthcoming.

OECD (2008). *Economic Surveys: Türkiye.* http://www.mod.gov.tr/Lists/OECDEconomicSurveyofTürkiye/Attachments/4/OECD%20Economic%20Survey%20of%20Türkiye%202008.pdf, 1 Ekim 2015

OECD (2004). *Economic Surveys: Türkiye*. http://www.mod.gov.tr/Lists/OECDEconomicSurveyofTürkiye/Attachments/6/OECD%20Economic%20Survey%20of%20Türkiye%202004.pdf OECD Economic Surveys: Türkiye, 2006. (Çevrimiçi) http://www.mod.gov.tr/Lists/OECDEconomicSurveyofTürkiye/Attachments/5/OECD%20Economic%20Survey%20of%20Türkiye%202006.pdf, 1 Ekim 2015

Oliva P. F. & Gordon W. (2013). *Developing the Curriculum* (8th ed.). Pearson.

Olkun, S. & Şimşek, H. (1999). An Assesment of School–To–Work Transition in a Vocational and Technical High School in Ankara, Türkiye. Montreal CA: Paper presented at the annual meeting of the American Educational Research Association.

Ornstein, A. C. & Hunkins, F.P. (2004). *Curriculum Foundations: Principles and Theory*. Boston. Allyn and Bacon.

Parris, T. and Kates, R. (2003). Characterizing And Measuring Sustainable Development, *Annual Review Of Environment And Resources*, 28(1), 559-586.

Patton, M. Q. (1997). *Utilization-Focused Evaluation*: The New Century Text.Thousand Oaks, CA: Sage.

Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'Este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., Krabel, S., Kitson, M., Llerena, P., Lissoni, F., Salter, A., & Sobrero, M. (2013). *Academic engagement and commercialization: a review of the literature on university–industry relations.* Research Policy, Vol. 42 No. 2, pp. 423-442.

Petrone, P. (2018). *The skills companies need most in 2018 – and the courses to get them*. LinkedIn.

Pınar, E. (2016). *Türkiyede İşgücünün Yönetimi Devlet Sermaye İlişkileri*. Unpublished doctoral dissertation.. Istanbul Üniversitesi, Sosyal Bilimler Enstheüsü, Siyaset Bilimi ve Kamu Yönetimi Anabilim Dalı.

Pitelis, C. (2013). Towards a More Ethically Correct Governance for Economic Sustainability, *Journal Of Business Ethics*, 118(3), 655-665.

Redclif, M. (2005). Sustainable Development (1987–2005): An Oxymoron Comes of Age, *Sustainable Development*, 13, 212–227.

Reynolds, P., Bosma, N., Autio, E., Hunt, S., De Bono, N., Servais, I., & Chin, N. (2005). Global entrepreneurshipmonitor: Data collection design and implementation 1998–2003. *Small business economics*, 24, 205-231.

Richardson, S., & Tan, Y. (2007). Forecasting Future Demands: What We Can and Cannot Know. *National Centre for Vocational Education Research*.

Şahin, Ç. (2010). *Bilimsel Araştırma Yöntemleri.* In Kıncal, R. Y. (Ed.). Ankara: Nobel Yayın Dağıtım.

Salmeron, L. (2013). Activities that promote transfer of learning: a review of the literature. *Revista de Educación*, 34-53. DOI: 10.4438/1988-592X-RE-2013-EXT-253

Saraf, P. (2017). *On-the-Job Training Returns, Barriers to Provision, and Policy Implications*. Policy Research Working Paper 8090, World Bank Group, June 2017.

Schiller, D., & Brimble, P. (2009). Capacity Building for University–Industry Linkages in Developing Countries: The Case of the Thai Higher Education Development Project. *Science, Technology and Society*, 14(1), 59-92. https://doi.org/10.1177/097172180801400103

Schoen, S. F., & Nolen, J. (2004). Action research: Decreasing acting-out behavior and increasing learning. *Teaching Exceptional Children*, 37(1), 26-29.

Sexton, J. (2002). A Review of Occupational Employment Forecasting for Ireland. in M. Neugart & K. Schömann (Eds.). *Forecasting Labour Markets in OECD Countries, Measuring and Tackling Mismatches*. Edward Elgar, Cheltenham.

Siegel, D. J. (2007). Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of well-being. *Social Cognitive and Affective Neuroscience*, 2(4), 259–263. https://doi.org/10.1093/scan/nsm034

Smits, W. (2007). Industry-specific or Generic Skills? Conflicting Interests of Firms and Workers. *Labour Economics*, No. 14, pp. 653-663.

Sönmez, V. & Alacapınar, F. G. (2016). *Örneklendirilmiş Bilimsel Araştirma Yöntemleri.* 4. Baskı. Anı Yayıncılık.

Spady, W. G., & Mitchell, D. E. (1977). Competency based education: Organizational issues and implications. *Educational Researcher*, 6(2), 9–15.

Stewart, C. J. & Cash, W. B. (1985). *Interviewing: Principles and Practices*. 4th Edition.W.C. Brown Publishers (Dubuque, Iowa).

T.C. Çalışma ve Sosyal Güvenlik Bakanlığı. *Türkiye Yeterlilikler Veri Tabanı*. https://portal.tyc.gov.tr/, https://www.tyc.gov.tr/yeterlilik/dogal-gaz-isitma-ve-gaz-yakici-cihaz-servis-personeli-seviye-4-VQA-mesleki-yeterlilik-belgesi-TR00100070.html

Taylor, F. W. (1906). *The Principles of Scientific Management.* New York: Harper.

Taymaz, H. (1992). *Hizmetiçi Eğitim (Kavramlar, İlkeler, Yöntemler).* Ankara: Pegem Yayını.

Tekin, H. H. & Tekin, H. (2006). Nitel Araştırma Yönteminin Bir Veri Toplama Tekniği Olarak Derinlemesine Görüşme. *İstanbul Üniversitesi Sosyoloji Dergisi*, Cilt 3, Sayı 13, 101-116. https://dergipark.org.tr/tr/pub/iusosyoloji/issue/521/4777

Tresserras, J., MacGregor, S., Espinach, X. (2005) *SME collaboration as a driver of design research and education development, ed. conference*. Edinburgh: Napier University

Tucker, C. M., Zayco, R. A., Herman, K. C., Reinke, W. M., Trujillo, M., Carraway, K., Wallack, C., & Ivery, P. D. (2002). Teacher and child variables as predictors of academic engagement among low-income African American children. *Psychology in the Schools*, 39(4), 477–488. https://doi.org/10.1002/pits.10038

Türkiye İş Kurumu (İŞKUR). 2019 Yılı Faaliyet Raporu. https://media.iskur.gov.tr/37553/2019-yilifaaliyet-raporu.pdf

Türkiye İş Kurumu (İŞKUR). (2015). Aylık ve Yıllık İstatistik Bültenleri. https://www.iskur.gov.tr/is-arayan/aktif-isgucu-programlari/isbasi-egitim-programlari

Türkiye İş Kurumu (TÜİK). (2014). Hanehalkı İşgücü İstatistikleri. http://www.iskur.gov.tr/LoadExternalPage.aspx?uicode=statikistatistikindex, 25.01.2011.

Türk, E. (1999). *Milli Eğitim Sistemi, MEB Yapısal Değişmeler*. Ankara; Nobel Yayın Dağıtım, , pp. 110.

Türkiye Metal Sanayicileri Sendikası (MESS). (1997); *Dünyada ve Türkiye'de Rekabet.* Ankara: MESS Yayın No: 250, pp. 30-35.

Tuxworth, E. (1989). *Competence based education and training: Background and origins*. In J. W. Burke (Ed.). Competency based education and training (pp. 10–25). Oxon: Falmer Press.

UN (2015). *Transforming our world: The 2030 Agenda for Sustainable Development. Resolution adopted by the General Assambly on 25 September*. New York: United Nations. Retrieved 11 May 2022 from https://sdgs.un.org/2030agenda

UNESCO & UIL (2016). *Recommendation on adult learning and education, 2015.* Paris: UNESCO. Retrieved 04 September 2023 from https://unesdoc.unesco.org/ark:/48223/pf0000245179/PDF/245179eng. pdf.multi

United Nations Sustainable Development (UNDP) (2015). *Sustainable development goals.* https://www.undp.org/sustainable-development-goals

Uzuner, Y. (2005). Özel Eğitimden Örneklerle Eylem Araştırmaları . *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi* , 6 (02) , 1-13 . DOI: 10.1501/Ozlegt_0000000092

Vallance, S., Perkins, H. & Dixon, J. (2011). What Is Social Sustainability? A Clarification Of Concepts, *Geoforum*, 42, 342-348.

Volles, N. (2016) Lifelong learning in the EU: changing conceptualisations, actors, and policies. *Studies in Higher Education*, 41:2, DOI: 10.1080/03075079.2014.927852

Vyas-doorgapersad, S. (2019). Gender equality for achieving sustainable development goal one (no poverty) in South African municipalities. *International Journal of Social Sciences and Humanity Studies*, 11(1), 84-98.

Wiese, A., Kellner, J., Lietke, B., Toporowski, W. & Zielke, S. (2012). Sustainability In Retailing –A Summative Content Analysis, *International Journal of Retail & Distribution Management*, Vol: 40 (4), 318-335.

Wiggins, G., & McTighe, J. (1998). *Understanding by Design.* Alexandria, VA: Association for Supervision and Curriculum Development.

Wiggins, G. P., & McTighe, J. (2005). *Understanding by design* (2nd ed.). Pearson.

Wikström, P. A. (2010). Sustainability and Organizational Activities – Three Approaches, *Sustainable Development*, 18(2), 99-107.

Winterton, J. (2009). Competence across Europe: Highest common factor or lowest common denominator? *Journal of European Industrial Training*, 33(8–9), 681–700.

World Bank. 2009. *World Development Report 2009: Reshaping Economic Geography*. © World Bank. http://hdl.handle.net/10986/5991

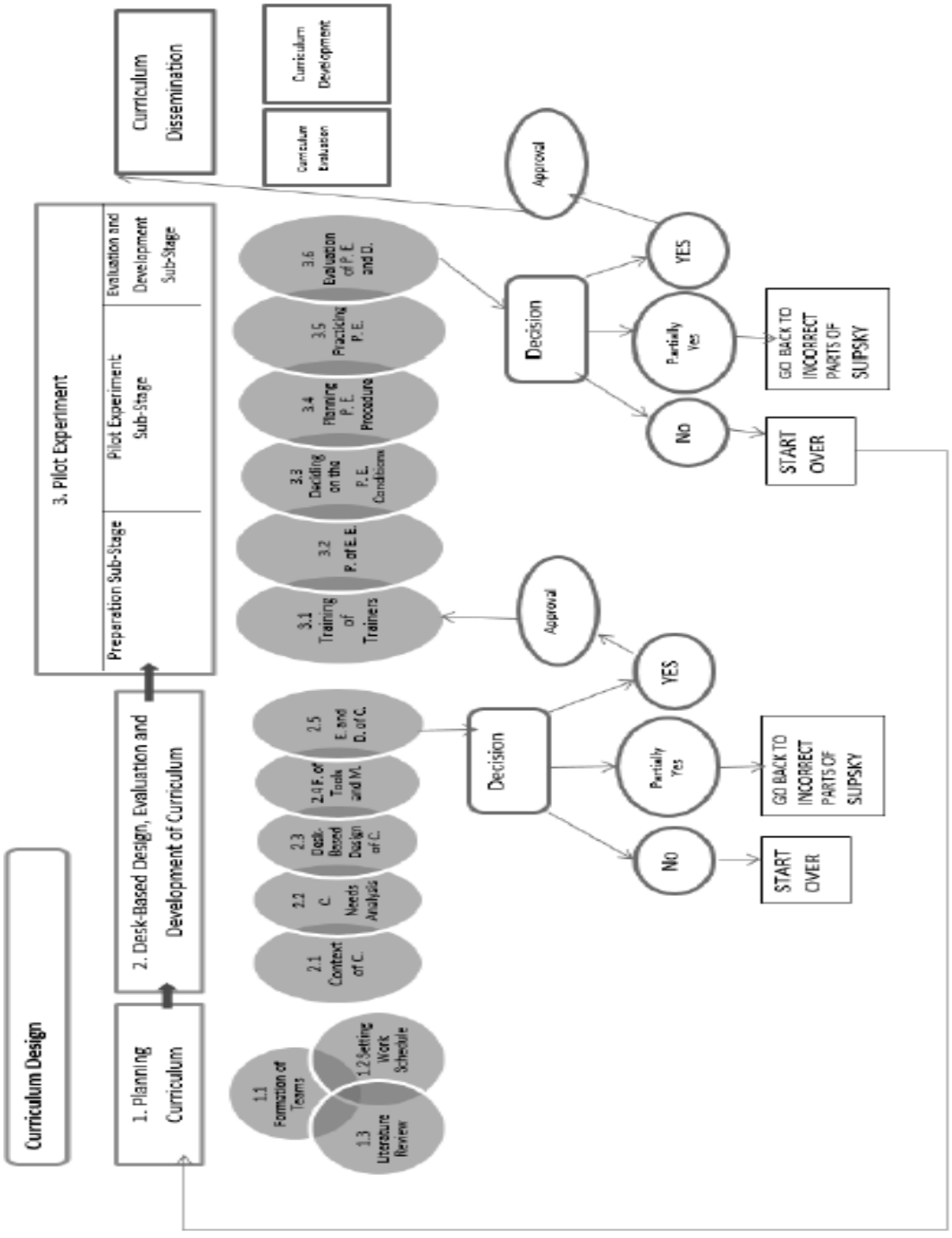
Yazıcı, N. (2015). İşbaşı Eğitim Programları ve Teşvikler. *İş ve Hayat*, 1 (2), 197-203. Retrieved from https://dergipark.org.tr/tr/pub/isvehayat/issue/29032/310465

Yıdırım, A. & Şimşek, H. (2008). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. (7. Baskı). Ankara: Seçkin Yayıncılık.

Yıldırım, K., Levent Ş. (2015). Osmanlı'dan Günümüze Mesleki Eğitimin Gelişimi. *Çalışma ve Toplum*, 44 (1): 77-112.

Yıldız, K. (2016). 2008 Krizinden Günümüze İŞKUR'un Mesleki Eğitim Faaliyetlerinin Gelişimi. *International Journal of Management Economics and Business*, 12 (27): 249-266.

APPENDIX A: SUPSKY CURRICULUM DESIGN MODEL



1. Planning Curriculum Design
1.1. Formation of Teams
1.2. Setting Work Schedule
1.3. Literature Review
2. Desk-Based Design, Evaluation, and Development of Curriculum
2.1. Context of Curriculum
2.2. Conducting Needs Analysis
2.3. Desk-Based Design of Curriculum
2.4. Formation of Tools and Materials
2.5. Evaluation and Development of Curriculum
2.6. Decision
2.6.1 Approval- Switch to Pilot Experiment Step
2.6.2 Partial Approval – Go Back to Incorrect Part
2.6.3 Rejection – Start over
3. Pilot Experiment
3.1 Training of Trainers
3.2 Preparation of Educational Environment
3.3 Deciding on the Pilot Experiment Conditions
3.4 Planning Pilot Experiment Procedure
3.5 Performing Pilot Experiment
3.6 Evaluation of Pilot Experiment and Developing Draft Curriculum
3.7 Decision
3.7.1 Approval – Dissemination Decision
3.7.2 Partial Approval - Go Back to Incorrect Part
3.7.3 Rejection – Start over
— -Curriculum Dissemination
— -Curriculum Evaluation during the process
— -Curriculum Development during the process

APPENDIX B: UbD UNIT DESIGN MODEL SAMPLE PLAN

Unit1:MONTAGE

<table>
<tr><th colspan="3">DESIRED RESULTS</th></tr>
<tr><td rowspan="6">GOALS

H1. Checking the suitability of the installation location of burning devices

H2. Installing combustion devices

H3. Performing tests and controls of burning devices</td><td colspan="2">TRANSFER</td></tr>
<tr><td colspan="2">T1. It takes precautions against the negative effects of waste gases created by machines using fossil fuels.
T2. It assembles cooker open burning systems, burners and industrial burner systems smaller than 70 KW.</td></tr>
<tr><td>UNDERSTANDING</td><td>BASIC QUESTIONS</td></tr>
<tr><td>A1. Checking its suitability and control before starting the installation at the installation site protects both the installer and the people around him from possible accidents.
A2. Balanced and solid mounting of the burner device ensures healthy operation of the system.
A3. Gas leaks etc. that go unnoticed as a result of regular tests and controls. Problems are detected, problems are solved and possible dangers are prevented.</td><td>TS1. What does proper montage mean?
TS2. Why is control necessary?
TS3. What was the last thing you checked?
TS4. Have you encountered any incorrect montage situations?
TS5. What are the tests and evaluations you encounter in daily life?</td></tr>
<tr><td>INFORMATION</td><td>SKILL</td></tr>
<tr><td>IN1. Selection criteria for the installation location
IN2. Correct sequence of montage steps
IN3. Features of the tester
IN4. Harms of gases formed from fossil fuels</td><td>SK1. It mounts the sample device given in accordance with the criteria.
SK2. Lists montage criteria.
SK3. Explains the testing and controls stages.
SK4. Determines the precautions that can be taken against the harmful effects of gases.</td></tr>
<tr><td colspan="3">EVIDENCE</td></tr>
<tr><td>CODE</td><td>EVALUATION CRITERIA</td><td></td></tr>
<tr><td>T2, U1, U2

T2, T1, U3, SK1</td><td>IN1. Selection criteria for the installation location
IN2. Correct sequence of montage steps
IN3. Features of the tester
IN4. Harms of gases formed from fossil fuels</td><td>Performance Tasks
PT1: You are a boiler technician working at Bosch home devices firm. You were called to solve the boiler malfunction upon a phone call from the firm.
When you got home, you smelled a gas leak and also saw that the boiler was installed in the wrong place.
You intervened in the leak, dismantled the combi boiler, moved it to the appropriate location and installed it.
When you came to the firm, your chief asked you for a presentation including why you moved the boiler, what you took</td></tr>
</table>

	SK1. It mounts the sample device given in accordance with the criteria. SK2. Lists montage criteria. SK3. Explains the testing and controls stages. SK4. Determines the precautions that can be taken against the harmful effects of gases.	into consideration when installing the new boiler, and how you responded to the leak. PT2: Installing the boiler in accordance with the steps in the manual and checking for gas leakage. **Other Evidence** OE1. Open-Ended Question: Montage criteria (Be3, Bi1) OE2. Quiz: Harmful effects of gases (SK4, IN4)

LEARNING PLAN		
CODE	**PRELIMINARY ASSESSMENT**	
	Awareness and knowledge about the importance of gas burning devices used in the participant's life.	
	LEARNING ACTIVITIES	**PROCESS MONITORING**
Event - 1	To make determinations on implementation examples for montage.	Complete the task as intended.
Event - 2	Examining the montage manual and making an explanatory presentation.	Complete the task as intended.
Event - 3	Filling out the commissioning control form in accordance with the findings.	Complete the task as intended.

Note: Within the scope of differentiating the teaching, the process will be completed by giving additional time and additional tasks to the participants who have incomplete learning.

APPENDIX C: CREATIVE DRAMA LESSON PLANS

Subject	Communication Based Problem Solving
Group	Bosch Authorized Service Personnel and Managers
The number of participants	8-16
Place	Contemporary Drama Association Istanbul Branch-Üsküdar
Tools	Tape, A4 paper, letter envelope, text, gum glue, colored cardboard, glue
Duration	three lessons/135 minutes (Each lesson duration is 45 minutes)
Method/Techniques	Creative Drama/ Improvisation, Role Playing, Leader in role
Attainment/s	• Communicates. • Defines the communication-based problem. • Tries different ways to solve problems. • Works together to achieve a goal.
PROCESS	
1. Activity **10 dk.**	Admission ticket - What Do We Hope For? The leader distributes 5x10 cm colored cardboard and pencils to the participants. This colored cardboard symbolizes the entrance ticket to the workshop. Everyone briefly writes their expectations from this workshop on one side of the colored cardboard (max. 3-4 sentences are sufficient). 2 minutes for participants. Time is given. At the end of the period, what is written is read aloud in the group. Once everyone has completed their entrance tickets are put aside.
2. Activity **5 dk.**	Circle Hello! The entire group stands in the circle. One person stands in front of another person. He says hello to the person he meets by opening his arms and jumping. The place is changed, and the person who moved out of the place stands in front of someone else and does the same. After a while, the number of those setting out increases. Whoever confronts whomever.
3. Activity **15 dk.**	Name in the Circle! The whole group stands in a circle. The leader takes one step forward from where he is and stands in front of the person on his left. He shakes hands with the person in front of him. He makes eye contact and says "Hello." Greetings are exchanged. Then, everyone takes turns saying their own name. (My name is…) The leader moves one left in the circle and repeats the same process. Meanwhile, the participants follow the leader in turn, everyone greets whomever they encounter in the circle and tells each other their names. While proceeding in this form, everyone continues to shake hands and say hello until they reach their own place. Everyone meets the same person twice during the event. In the second match, the names are tried to be guessed.
4. Activity **15 dk.**	Carrying papers between arms/shoulders/walking around with music. (First in pairs, then in fours) Pairs are matched. Matching pairs stand side by side. Shoulders are adjacent. The arms are hanging down. You cannot hold hands. The leader puts an A4 sheet of paper between the shoulders. Each pair is in the same position. The leader turns on wordless music with a slow rhythm. The duo starts walking without dropping the paper between their shoulders to the ground. In case the paper falls, the leader picks up the paper and places it between his shoulders again. The aim is to move around the place without dropping the paper on the ground. After about 3-4 minutes, the leader brings the duos together. He puts A4 paper between them. From this moment on, the four people continue walking, accompanied by music, without dropping the papers between their shoulders. If the cards fall, the leader stops the activity and asks, "Why do you think the cards fall to the ground?" Participants' answers are taken. Then he asks again; "What do you think we can do to prevent the papers from falling on the floor?

	Participants' answers are taken. And the event continues where it left off. 3-4 min. It takes longer. The event ends when/after a short period of time when the cards stop falling.
5. Activity **20 dk.**	We pass to the other side. Each participant is given one of the A4 sheets used in the previous activity. The start and finish line are determined. The group has to reach the finish line. He tries to cross the street by stepping on the papers in his hand so that he puts them on the ground. Rules; There must be at least two feet on each sheet of paper. Everyone can use the paper only once. Before crossing the street, the group talks among itself and determines which route to follow.
6. Activity **Animation/improvisation** **20 dk.**	The whole group is given a sealed envelope. The following text is written inside the envelope. *DEAR PARTİCİPANTS,* *WELCOME…* *Thank you for your implementation.* *You have gone through difficult stages, we are aware.* *You have all completed all stages successfully.* *and now you are part of our team.* *We wish you success in your next process...* *Please, let's create groups according to the color of our entry cards at the beginning of our process!* *You know, we are looking for the "OBJECT" that benefits humanity.* *What do you think this OBJECT could be?* *How do you think this OBJECT benefits humanity?* The object is designed from waste paper and what it is is discussed.
10 dk.	BREAK TIME
7. Activity **25 dk.**	The group is given the dramatic situation written below. Dramatic Situation; *We have heard that this "OBJECT" may be in a cave. As a team, we enter the cave and try to find the OBJECT.* *However…* *If there is any noise from the moment we enter the cave, the cave will collapse.* *Let's see if we can get this OBJECT that is for the benefit of humanity out of the cave.* Necessary preparations are made for resuscitation. Preparation time is 7 minutes. Reenactments are watched.
8. Activity **(Evaluation)** **15 dk.**	Exit Ticket (What Did We Expect? What Did We Find?) Everyone takes the entrance ticket at the beginning of the workshop and sits on the ground in a circle. The back of the ticket is our "Exit Ticket". The entrance ticket is read again, the entire workshop process is considered and thoughts about the workshop are written down. It is written taking into consideration the concept of "Intra-Group Communication". What is written is shared out loud with the group. An oral evaluation is taken.

Subject	Gender Roles in Working Life
Group	Bosch Authorized Service Personnel, Technicians and Managers
The number of participants	8-16
Place	Contemporary Drama Association Istanbul Branch-Üsküdar
Tools	Chairs as many as the number of people, colored cardboard, pens (Ballpoint, fizzy), pins, post-i, glue
Duration	3 lessons/135 min. (Each lesson duration is 45 minutes)
Method/Techniques	Creative Drama/ Improvisation, Role Playing
Attainment/s	• Gives examples of gender roles from daily life. • Expresses his opinion about the gender roles imposed on women and men. • Discusses gender roles in working life. • Discusses the relationship between problems in working life and gender roles.
PROCESS	
1. Activity 15 min.	Empty chair! Chairs are taken as many as the number of participants and placed in a scattered manner throughout the venue. One person does not sit, the others sit on the chair. The standing person stands at the farthest point from the empty chair. A heavy walking style is determined for the standing person. The one standing slowly moves towards the empty chair. Its purpose is to sit on the chair. The purpose of those sitting on the chair is to prevent the person standing from sitting down. For this, one constantly gets up from the chair and sits on the empty chair.
2. Activity 20 min.	Pen Speaks! Two/Three groups are determined. Each group is given a cardboard with "Working Life" written on it. Groups gather around their own cardboards and write whatever comes to mind about the concept written in the middle. Two min. time is given. At the end of the period, the group/s share what they wrote. This time, the same groups continue to think/write together by discussing the concepts they wrote. New directive; "Problems Encountered in Working Life". New sentences are added. Two minutes. time is given. At the end of the period, it is shared with the whole group. New instructions are given. Groups continue to think/write among themselves, associating what they have written so far with the new instruction. "The Relationship between Problems Encountered in Working Life and Gender". Two minutes time is given. At the end of the period, it is shared with the whole group. These cartons are displayed on the wall.
3. Activity 25 min.	Everyone in the group is given sentences containing the following sentences. You can walk freely in the space. While walking, what is written on the paper is read silently and after being read, it is given to the person you encounter while walking. A new piece of paper is taken from the other person and read. It is repeated 4-5 times. - But we are looking for male technicians. - This is women's work. - Is there work at this hour? - Will you be returning from work at this time? - Can a man become a kindergarten teacher? - Don't get involved in these matters with your own hands. - What would a girl do in civil engineering? - A husband should not earn less money than his wife. - What are you doing in the same job as your man? - Ballet is not a profession for men. - Treat me like you treat a customer?

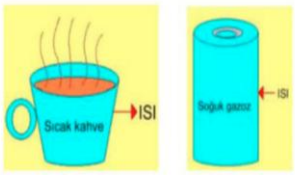
	- Can you come to work in this outfit? - Today it's your turn to carry the teams. - I couldn't remove this pipe. - Did you fall into the paint cube? Roles are determined and a pair improvisation practice is performed. The papers on which the sentences are written are added to the cardboards on the wall where they are deemed relevant.
5 min.	BREAK TIME
4. Activity 35 min.	Role Play Groups are created. Each group is given a dramatic situation written on paper. Groups read the dramatic situation given to them and begin to prepare for role-playing. Preparation time is 5 minutes. The roles are followed sequentially. Dramatic Situation 1 You are someone who works in the plaza. You have a friend of a different gender than you at work, with whom you do the same job and are close. You learned that he was paid more than you, even though you started working at the same time and did similar work. You decide to talk about this situation with your colleagues. There are people with different opinions among your colleagues. Your role begins with you going to your colleagues during your lunch break and broaching the subject. Dramatic Situation 2 Your family's financial situation is not good. You want to earn money, meet your own needs and contribute to the family budget. You are in a family that does not approve of women going out at night. You had a hard time convincing your family to work. After a long search, you found a job with night shift. You entered the living room to explain the situation to your family. Drama techniques start when you enter the room. Before each role play, a post-it note is given to the audience. After the role play is completed, he/she writes a sentence from the role play process that he/she finds meaningful about his/her working life. He sticks a post-it note with this sentence on the cardboard on the wall, wherever he finds a relationship.
5. Activity (Evaluation) 15 min.	All participants are given cards with the sentences below. Everyone fills it out individually. Regarding working life, What I want most in life is ……. …… prevents this desire of mine. He may have ….. for the obstacle to be removed. What is written is pasted to the relevant place on the cardboard on the wall.
6. Activity (Evaluation) 20 min.	Groups of 3-4 people are formed. Each group examines the cardboards on the wall. Groups are given colored cardboard. A slogan with the theme "Different Gender Sharing the Same Work Environment" is thought up and written on the cardboard. Groups read the slogans they prepared out loud.

APPENDIX D: PARTİCİPANT APPRENTICESHIP PRE-TRAINING AND ONLINE STANDARDIZED EXAM QUESTION SAMPLE

TEMEL TANIMLAR VE BİRİMLER

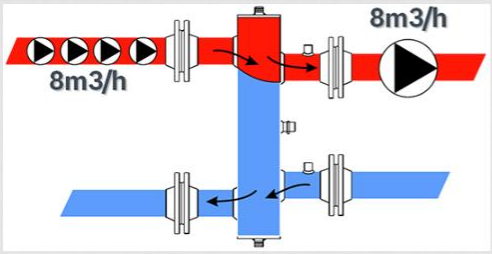
Isı

- **Isı**, belirli sıcaklıktaki bir cismin sınırlarından, daha düşük sıcaklıktaki bir cisme, sıcaklık farkı nedeniyle transfer edilen enerjidir. Isı da iş gibi bir enerji transfer biçimidir.
- Örneğin, sıcak kahve bulunduğu ortama ısı verir. Bu örnekten de anlaşılacağı üzere, ısı enerjisi sıcaktan – soğuğa doğru hareket eder.
- Soğuk gazoz örneğinde ise sıcaklığı fazla olan ortam odadır, odaya bırakılan soğuk gazoz odanın ısısından çekerek kendisi sıcaklığını da artırır.



BOSCH

Aşağıdaki sisteme göre hangisi doğrudur?



A) Cihaz ve tesisat devrelerinin debileri birbirine eşittir.
B) Hidrolik olarak düzgün bir akış yoktur.
C) Tesisat debisi, cihaz debisinden büyüktür.
D) Cihaz debisi, tesisat debisinden büyüktür.

Yanıtla

Question 10 of 10

APPENDIX E: FINAL STANDARD EXAM SAMPLE QUESTIONS AFTER FACE-TO-FACE TRAINING ADMINISTERED BY THE FIRM

Bosch Home Comfort Akademi
Bireysel Duvar Tipi Isıtma Cihazları Yeni Teknisyen Yetiştirme Eğitimi Değerlendirme Sınavı

Eğitim Kodu: ASA-WB-KADINTEK	Adı-Soyadı:	Tarih:
Doküman Versiyonu: R00	Firma:	İmza:

Her soru 5 puan değerindedir. Geçme Notu 70 puandır. Başarılar dileriz. Süre 90 dk.

1) Aşağıdaki ifadelerden hangisi yanlıştır?
   a) Bar, basınç birimidir.
   b) 1 kW = 860 Kcal/h dir.
   c) C, F ve K sıcaklık birimi sembolleridir.
   d) Kombiler A tipi gaz yakan cihazlardır. (5P)
   e) 1 mSS dendiğinde 1 m yüksekliğinde bir su sütununun altındaki yüzeye yaptığı basınç anlaşılır.

7) Aşağıda verilen sembollerin ne anlama geldiğini yazınız.

a)		**Bakım Göstergesi (1P)**
b)		**Yapılan İşlemin kaydedilmesi sonrası görüntü (1P)**
c)		**Şap kurutma fonksiyonu (1P)**
d)		**Sifon doldurma modu aktif (1P)**
e)		**Hava atma modu aktif. (1P)**

17) Kombide bir arıza olduğu için müşterinin evine gittiniz ve sorunun gaz ile ilgili olduğunu düşünüyorsunuz ancak yaptığınız testlerde tüm komponentler sağlam olduğu için gaz analizi yapmaya karar verdiniz. Gaz analizi yaparak hangi komponent üzerinde ayar yapmanız gerekir. Süreç boyunca yapılması gerekenleri aşamalandırarak aşağıdaki boşluğa yazınız.

Cevap: Gaz analiz cihazı ile baca adaptörüne bağlantı yapılır. Kombi maksimum seviyede çalıştırılarak (bacacı mod ile) gaz valfinin maksimum ayarları kontrol edilir. Daha sonra kombi en düşük seviyede çalıştırılır ve gaz valfi üzerinden minimum ayarlar yapılarak servis kılavuzuna uygun değerler analiz ekranında görülene kadar ayar noktası çevirilir.

APPENDIX F: FIRM IN-SERVICE TECHNICIAN EVALUATION SYSTEM

Measurement and assessment Criteria	
Measuring tools	The impact of the measuring tool on the exam (%)
Written examination	90
Instructor observation	10
Total	100 Puan
Those with 70 points and above will be considered successful.	

APPENDIX G: NATURAL GAS HEATING AND GAS BURNING DEVICE SERVICE PERSONNEL - VOCATIONAL QUALIFICATIONS AUTHORITY (VQA) NATIONAL QUALIFICATION EXAM CONTENT

11UY0032-4/A1 İş Sağlığı ve Güvenliği, Kalite, Çevre ve İş Organizasyonu - Yayın Tarihi:02/11/2011 Rev. No:02
11UY0032-4/A1 İş Sağlığı Ve Güvenliği, Kalite, Çevre Ve İş Organizasyonu Yeterlilik Birimi

1	**Yeterlilik Birimi Adı**	İş Sağlığı ve Güvenliği, Kalite, Çevre ve İş Organizasyonu
2	**Referans Kodu**	11UY0032-4/A1
3	**Seviye**	4
4	**Kredi Değeri**	-
5	**A)Yayın Tarihi**	02/11/2011
	B) Revizyon/Tadil No	Rev. No: 02 Tadil No: 02
	C) Revizyon/Tadil Tarihi	02 No'lu Revizyon 22/03/2017 -2017/31 02 No'lu Tadil 27.05.2021 -2164
6	**Yeterlilik Birimine Kaynak Teşkil Eden Meslek Standardı**	
09UMS0007-4 Doğal Gaz Isıtma Ve Gaz Yakıcı Cihaz Servis Personeli (Seviye 4)		
7	**Öğrenme Çıktıları**	
Öğrenme Çıktısı 1: İş sağlığı ve güvenliği ve çevre güvenlik önlemlerini açıklar. Başarım Ölçütleri: 1.1: İş sağlığı ve güvenliği konusundaki yasal ve işyerine ait kuralları tanımlar. 1.2: İş sağlığı ve güvenliği ile ilgili risk etmenlerini azaltmayı tarif eder. 1.3: Tehlike durumunda acil durum prosedürlerini uygulamayı tarif eder. 1.4: Çevresel risklerin azaltılmasını tarif eder. Öğrenme Çıktısı 2: İş süreçleri ve çalışma ortamı için kalite gerekliliklerini açıklar. Başarım Ölçütleri: 2.1: Proseslerde saptanan hata ve arızaları gidermeye yönelik çalışmaları tarif eder. 2.2: İş için uygun çalışma alanı özelliklerini tanımlar. Öğrenme Çıktısı 3: İş taleplerini alarak planlama sürecini tarif eder. Başarım Ölçütleri: 3.1: Cihaza ait geçmişteki servis bilgilerini nasıl inceleyeceğini açıklar. 3.2: İş taleplerine göre ulaşım için en uygun güzergâhı/sıralamayı oluşturmayı tarif eder. 3.3: Hizmet sunumuna hazırlık işlemlerini sıralar.		
8	**Ölçme Ve Değerlendirme**	
8 a) Teorik Sınav		
T1: A1 birimine yönelik teorik sınav Ek A1-2'de yer alan "Bilgiler" kontrol listesine göre gerçekleştirilir. Teorik sınavda adaylara 4 seçenekli çoktan seçmeli ve her biri eşit puan değerinde en az 15 soruluk yazılı sınav uygulanmalıdır. Sınavda yanlış cevaplandırılan sorulardan herhangi bir puan indirimi yapılmaz, adaylara her soru için1-2 dakika zaman verilir. Teorik sınavda sorulardan en az % 60 puan alan aday başarılı sayılır. Sınav soruları, bu birimde teorik sınav ile ölçülmesi öngörülen tüm bilgi ifadelerini (Ek A1-2) ölçmelidir.		
8 b) Performansa Dayalı Sınav		
-		
8 c) Ölçme ve Değerlendirmeye İlişkin Diğer Koşullar		
Yeterlilik biriminin geçerlilik süresi birimin başarıldığı tarihten itibaren 2 yıldır.		
9	**Yeterlilik Birimini Geliştiren**	Türkiye Doğal Gaz Dağıtıcıları Birliği Derneği (GAZBİR)

	Kurum/Kuruluş(lar)	
10	**Yeterlilik Birimini Doğrulayan Sektör Komitesi**	Enerji Sektör Komitesi
11	**VQA Yönetim Kurulu Onay Tarihi Ve Sayısı**	02.11.2011 – 2011/73 22.03.2017-2017/31

Kaynak: Mesleki Yeterlilik Kurumu (VQA). Erişim: file:///C:/Users/lenovo/Downloads/11UY0032-4%20Rev%2002%20Do%C4%9Fal%20Gaz%20Is%C4%B1tma%20ve%20Gaz%20Yak%C4%B1c%C4%B1%20Cihaz%20Servis%20Personeli.pdf

APPENDIX H: NATURAL GAS HEATING AND GAS BURNING DEVICE SERVICE PERSONNEL - VQA NATIONAL OCCUPATIONAL STANDARD

Doğal Gaz Isıtma ve Gaz Yakıcı Cihaz Servis Personeli (Seviye 4) Ulusal Meslek Standardı
Ref. Kodu / 09UMS0007-4 - Onay Tarihi 19.12.2015 - Rev.No / 01

3. MESLEK PROFİLİ
3.1. Görevler, İşlemler ve Başarım Ölçütleri
A İş sağlığı ve güvenliği önlemlerini almak
A.1 İş sağlığı ve güvenliği konusundaki yasal ve işyerine ait kuralları uygulamak
A.1.1 İş sağlığı ve güvenliği konusundaki normların anlaşılması için, işyerinin düzenlediği eğitimlere veya işyeri dışındaki kurumların eğitimlerine katılır.
A.1.2 Yapılan işe uygun iş elbiseleri ve kişisel koruyucu donanımları kullanır.
A.1.3 İş sağlığı ve güvenliği koruma ve müdahale araçlarını uygun ve çalışır şekilde bulundurur.
A.1.4 Yapılan çalışmaya ait uyarı işaret ve levhalarını talimatlar doğrultusunda yerleştirerek ve çalışma sırasında koruyarak iş alanının ve personelinin güvenliğini sağlar.
A.1.5 Servis hizmeti için gerekli olan ekipmanları kullanır.
A.2 Risk etmenlerini azaltmak
A.2.1 Yaptığı işle ilgili tehlike ve riskleri ilgili yönetmelik ve standartlar kapsamında kendi seviyesinde değerlendirerek, risklerin belirlenmesi çalışmalarına katkıda bulunur.
A.2.2 Risk faktörlerinin azaltılmasına yönelik yapılan çalışmalara katılır.
A.3 Tehlike durumunda acil durum prosedürlerini uygulamak
A.3.1
Tehlike durumlarını saptayıp hızlı bir şekilde yok etmek üzere önlem alma çalışmalarına katkıda bulunur.
A.3.2
Anında giderilemeyecek türden tehlike durumlarını amirlerine ve yetkililere veya gereken durumlarda işletme dışında ilgili kurumlara bildirir.
A.3.3 Özel acil durum prosedürlerini uygular.
A.4 Acil çıkış prosedürlerini uygulamak
A.4.1 Acil durumlarda çıkış veya kaçış prosedürlerini uygular.
A.4.2 Acil çıkış veya kaçış ile ilgili deneyimleri ilgililerle ve iş arkadaşlarıyla paylaşmak üzere yapılan periyodik çalışmalara ve tatbikatlara katılır.
B Çevre güvenlik önlemlerini almak
B.1 Çevre koruma standart ve yöntemlerini uygulamak
B.1.1 Çevre koruma gereklerine ve uygulamalarına yönelik periyodik eğitimlere katılır.
B.1.2 İş süreçlerinin uygulanması sırasında çevre etkilerini gözler ve zararlı sonuç ların önlenmesi çalışmalarına katılır.
B.2 Çevresel risklerin azaltılmasına katkıda bulunmak
B.2.1 Dönüştürülebilen malzemelerin geri kazanımı için gerekli ayırmayı ve sınıflamayı yapar.
B.2.2 Tehlikeli ve zararlı atıkları verilen talimatlar doğrultusunda diğer malzemelerden ayrıştırır ve gerekli önlemleri alarak geçici depolamasını yapar.
B.2.3 Yanıcı ve parlayıcı malzemelerin güvenli bir şekilde tutulmasını sağlar.
B.2.4 İşlem sırasında ve hazırlık aşamalarında kişisel koruyucu donanım ve malzemeleri kullanır veya yardımcı personelin kullanmasını sağlar.
B.2.5 Dökülme ve sızıntılara karşı kullanılacak uygun donanım, malzeme ve ekipmanı hazır bulundurur.
B.3 Ekipman ve malzemelerin kullanımında tasarruflu hareket etmek

B.3.1 Ekipman ve malzemelerin tasarruflu ve verimli bir şekilde kullanır.
B.3.2 Ekipman ve malzemelerin daha az ve verimli kullanımı için gerekli tespit ve planlama çalışmalarına katılır.
B.4 Çevre güvenliğini sağlamak
B.4.1 Yangın türüne göre müdahale tekniği ile söndürücüleri belirler ve kullanır.
B.4.2 Gaz ölçüm cihazlarını kullanır.
B.4.3 Kontrolsüz gaz çıkışına müdahale tekniklerini uygular.
C Kalite yönetim sistemi dokümanlarına uygun çalışmak
C.1 İşe ait kalite gerekliliklerini uygulamak
C.1.1 İşlem formlarında yer alan talimatlara ve planlara göre kalite gerekliliklerini belirler.
C.1.2 Uygulamada izin verilen tolerans ve sapmalara göre kalite gerekliliklerini saptar.
C.1.3 Makine, alet, donanım ya da cihazın kalite gerekliliklerine uygun çalışır.
C.2 Kalite sağlamadaki teknik prosedürleri uygulamak
C.2.1 Yapılacak işlemin türüne göre kalite sağlama tekniklerini uygular.
C.2.2 İşlemler sırasında kalite sağlama ile ilgili teknik prosedürleri uygulayarak, özel kalite şartlarının karşılanmasını sağlar.
C.3 Proseslerde saptanan hata ve arızaları engelleme çalışmalarına katılmak
C.3.1 Çalışma sırasında saptanan hata ve arızaları yetkili kişilere bildirir.
C.3.2 Hata ve arızaları oluşturan nedenlerin belirlenmesine ve ortadan kaldırılmasına katkıda bulunur.
C.3.3 Hata ve arıza gidermeyle ilgili temel uygulama ve yöntemlerini uygular.
C.3.4 Yetkisi dahilinde olmayan veya gideremediği hata ve arızaları amirine bildirir.
D İş organizasyonu yapmak
D.1 Çalışma alanının özelliklerini belirlemek
D.1.1 Çalışmaların kesintisiz ve uygun şekilde sürdürülmesi için, iş alanını inceler.
D.1.2 İş alanının olumsuz özelliklerinin iyileştirilmesine katkıda bulunur.
D.1.3 Çalışmanın türü ve kullanılan iş yöntemine göre düzeni sağlar.
D.1.4 Çalışma alanının genişliğini ve ilgili çalışma noktalarının kapsamını belirler.
D.2 Gerekli makine, donanım ve malzemeyi çalışmaya hazırlamak
D.2.1 Kullanılacak malzemeleri yapılacak çalışma ile ilgili işlem formu ve yöntemlerine uygun olarak seçer ve hazırlar.
D.2.2 Belirlenen işleme göre, kontrol ve muayene araçlarını ve cihazlarını kullanır.
D.2.3 Çalışma için gerekli aparat, makine ve donanımları çalışmaya hazır hale getirir.
D.2.4 Çalışma süresince kullanılacak malzeme, araç ve gereçlerin İSG kapsamında uygunluğunu denetler.
D.3 İş bitiminde donanım ve iş alanı temizliğini yapmak
D.3.1 Çalışma alanını düzgün ve temiz tutar.
D.3.2 Temizlik yaparken iş güvenliği şartlarını gözetir.
D.3.3 Kullanılan makine ve ekipmanları iş bitiminde kaldırır ve temizler.
D.3.4 İş güvenliğine zarar verebilecek maddelerin kullanımı sırasında gereken özeni gösterir ve belirlenmiş yerlerde uygun bir şekilde depolar.
D.3.5 Çalışma alanını daha sonra gerçekleştirilecek işlemlere uygun bırakır. Doğal Gaz Isıtma ve Gaz Yakıcı Cihaz Servis Personeli (Seviye 4)
E İş taleplerini alarak planlama yapmak
E.1 Yetkili servis biriminden gelen talebi incelemek E.1.1 Servis programını kullanarak cihaza ait geçmişteki servis bilgilerini inceler.
E.2 Ulaşımı planlamak
E.2.1 İş taleplerine göre ulaşım için en uygun güzergâhı/sıralamayı oluşturur.
E.2.2 Saatlere bağlı trafik yoğunluğunu takip eder.
E.3 Hizmet sunumuna hazırlık yapmak
E.3.1 Kişisel bakımını yapar ve servis kıyafetini giyer.
E.3.2 Müşterinin talebi olmaksızın, servis kimlik kartını gösterir.
E.3.3 Servis ve bakım kılavuzuna göre işlemleri gerçekleştirir.
F Yakıcı cihazların montajını yapmak
F.1 Montaj mahallinin uygunluğunu kontrol etmek F.1.1 Montaj noktasını montaj kılavuzuna göre kontrol eder.
F.2 Montaj yapmak

F.2.1 Uygulamayı montaj kılavuzuna uygun olarak yapar.
F.2.2 Açık hava ve kazan dairesindeki cihazların ısı yalıtımını gerçekleştirir.
F.3 Test ve kontrolleri yapmak
F.3.1 Montajın uygunluğunu fiziksel ve işlevsel olarak kontrol eder.
F.3.2 Cihaz bağlantı noktasındaki elektrik sigortasının işlevselliğini kontrol eder.
G Yakıcı cihazları devreye almak
G.1 Doğal Gaz Dağıtım Firmasının "Tesisat Uygunluk Belgesi" ni kontrol etmek
G.1.1 Gaz Dağıtım Şirketi tarafından verilen "Tesisat Uygunluk Belgesi"ni inceler uygunluğunu teyit eder.
G.2 Yakıcı cihazın tesisat bağlantılarını kontrol etmek
G.2.1 Cihaz baca bağlantılarının, ilgili standartlara uygunluğunu kontrol eder.
G.2.2 Yakıcı cihazın montaj yerinin ve havalandırmasının uygunluğunu ve ilgili standarda göre kontrol eder.
G.2.3 Tesisattaki statik gaz basıncını test noktasından kontrol eder.
G.2.4 Isıtma tesisatındaki su basıncını manometreden kontrol eder.
G.3 Gerekli durumlarda ısıtma ve yakıcı cihaz bağlantılarını gerçekleştirmek
G.3.1 Cihaz içerisindeki elektrik bağlantısını montaj kılavuzuna göre yapar.
G.3.2 Topraklama hattının varlığını kontrol eder.
G.3.3 Cihaz ile gaz tesisatı bağlantısını, montaj kılavuzuna uygun olarak yapar.
G.3.4 Cihaz ile elektrik tesisatı bağlantısını montaj kılavuzuna uygun olarak yapar.
G.4 Doğal gaz dönüşümü yapmak
G.4.1 Doğalgaz haricinde (LPG, propan vesaire.) yakıt yakan cihazların doğalgaz dönüşümü sağlamak amacıyla dönüşüm setini kullanır.
G.4.2 Doğal gaz yanma basıncını, bakım kılavuzuna göre ayarlar.
G.4.3 Yanma kontrolü yapar.
G.5 Son kontrol ve raporlama yapmak
G.5.1 Cihaz çalışırken, dinamik doğal gaz basıncını ve bacanın çekişini kontrol eder.
G.5.2 Hava kirliliği ile ilgili yönetmeliğe göre baca gazı analizi yapar.
G.5.3 Cihaz çalışırken, sistemin ısınmasını ve sıcak su verimini kontrol eder.
G.5.4 Sıcak su verimine göre debi ayarı yapar.
G.5.5 Doğal gaz sızdırmazlık testi yapar.
G.5.6 Elektrik ve su bağlantılarını kontrol eder.
G.5.7 Cihazın garanti belgesini imzalar ve müşteriye bırakır.
H Isıtma ve yakıcı cihazların bakımını yapmak
H.1 Isıtma ve yakıcı cihazı incelemek
H.1.1 Bakımın yerinde veya servis merkezinde yapılmasına karar verir.
H.1.2 Bakımın servis merkezinde yapılmasına karar verdiği durumlarda prosedürüne uygun şekilde demontajını gerçekleştirir.
H.2 Bakım hazırlığı yapmak
H.2.1 Bakım aletlerini seçer.
H.2.2 Gerekli elektrik, gaz, su, tesisat bağlantılarını kapatır.
H.2.3 Basınç ve sıcaklığı düşürür.
H.3 Bakım yapmak
H.3.1 Cihazın gerekli parçalarını söker.
H.3.2 Cihazın ilgili kısımlarını temizler.
H.3.3 Cihazın çalışma kontrolünü yapar.
H.3.4 Filtrelerin temizliğini yapar.
H.3.5 Gaz ayarlarını kontrol eder.
H.3.6 Genleşme tankının gaz basıncını kontrol eder.
H.3.7 Emniyet kontrollerini yapar.
H.3.8 Ücretli yedek parça değişimlerinde müşteriden onay aldıktan sonra değişimi yapar
H.3.9 İşlem yaparken, müşteriye ait eşyaların zarar görmemesine özen gösterir.
H.3.10 Cihaz servis ve bakım kılavuzunda belirtilen bakım malzemelerini eksiksiz bulundurur.
H.3.11 İş bitiminde, çalışma alanında oluşan kirliliği; uygun temizlik malzemesi ve gereçleri ile temizler.
I Isıtma ve yakıcı cihazların tamirini yapmak
I.1 Isıtma ve yakıcı cihazı incelemek

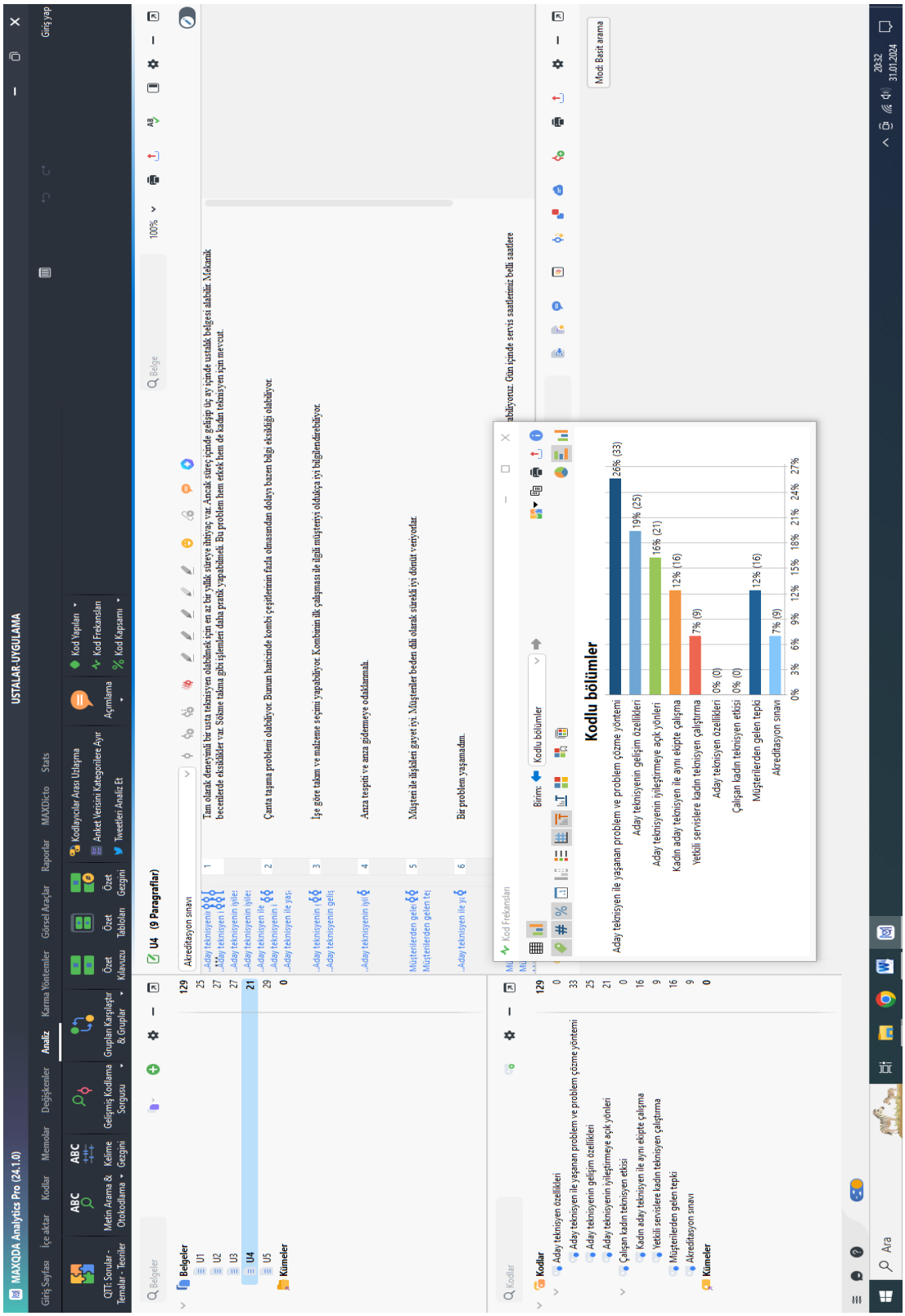
I.1.1 Tamiratın yerinde veya servis merkezinde yapılmasına karar verir.
I.1.2 Tamiratın servis merkezinde yapılmasına karar verdiği durumlarda prosedürüne uygun şekilde demontajını gerçekleştirir.
I.2 Tamir hazırlığı yapmak
I.2.1 Tamir aletlerini seçer.
I.2.2 Tamir ortamını hazırlar.
I.2.3 Tamir için gerekli yedek parçaları hazırlar.
I.2.4 Cihazın enerjisini keser, basınç ve sıcaklığı düşürür.
I.3 Tamir işlemi yapmak
I.3.1 Tamir için gerekli parçaları söker.
I.3.2 Cihazın ilgili kısımlarını temizler.
I.3.3 Cihazın çalışma kontrolünü yapar.
I.3.4 Cihaz servis ve bakım kılavuzunda belirtilen bakım malzemelerini eksiksiz bulundurur.
I.3.5 Cihazı, emniyet açısından kontrol eder.
I.3.6 Ücretli yedek parça değişimlerinde müşteriden onay aldıktan sonra değişimi yapar.
I.3.7 İşlem yaparken, müşteriye ait eşyaların zarar görmemesine özen gösterir.
I.3.8 İş bitiminde, çalışma alanında oluşan kirliliği; uygun temizlik malzemesi ve gereçleri ile temizler.
J Müşteriyi (kullanıcıyı) bilgilendirmek
J.1 Cihaz hakkında bilgilendirme yapmak
J.1.1 Devreye almalarda cihaz kullanımı, bakımı ve emniyet kuralları hakkında müşteriyi bilgilendirir.
J.1.2 Bakım ve tamir hakkında yapılan işlemi müşteriye anlatır.
J.2 Cihaz hakkında raporlama yapmak
J.2.1 Teknik servis raporunu hazırlayarak müşterinin imzasına sunar ve bir nüshasını müşteriye teslim eder.
J.2.2 Bir nüshayı servis merkezine teslim eder, bir nüshayı kendinde muhafaza eder.
J.3 Faturalandırma ve tahsilât yapmak
J.3.1 Faturalandırma yapılacak kişi/kurum bilgilerini alır.
J.3.2 Malzeme ve işçilik fiyat listelerini kullanarak, işlem hacmine göre faturalandırma ve tahsilâtı yapar

Kaynak: Mesleki Yeterlilik Kurumu (VQA). Erişim:file:///C:/Users/lenovo/Downloads/09UMS0007-4%20Rev%2001%20Do%C4%9Fal%20Gaz%20Is%C4%B1tma%20ve%20Gaz%20Yak%C4%B1c%C4%B1%20Cihaz%20Servis%20Personeli.pdf

APPENDIX İ: INSTITUTIONS AND ORGANIZATIONS NEGOTIATED DURING THE DETERMINATION OF PARTICIPANTS

Number	Organisation	Process	History
1	Yeditepe University Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Inc.	Within the scope of the cooperation protocol, work has begun to identify learners for employment purposes and for training purposes.	21.04.2022
2	Republic of Turkey Ministry of Labor and Social Security Turkish Employment Agency (İŞKUR) İŞKUR Pendik Service Center Directorate	Information was received regarding the on-the-job training law. The processes of identifying participants for employment were discussed.	22.03.2022
3	Turkish Employment Agency (İŞKUR) Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Inc.	A protocol was signed for employment throughout the country within the scope of on-the-job training.	26.07.2022
4	Istanbul Metropolitan Municipality (IMM), Istanbul Personnel Management (İSPER) Inc. Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm	Cooperation & Protocol to find potential technician participants in Istanbul.	15.05.2023
5	Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm Yeditepe University Istanbul Metropolitan Municipality (IMM) Istanbul Instheute (ISMEK)	The organization of personal development trainings by İSMEK was evaluated, but it was not planned for this year due to the busy schedule of 2023.	22.05.2023
6	Ankara Metropolitan Municipality (AMM) Career Center Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm	Cooperation was made with ABB Ankara Career Center to find potential technician participants in Ankara.	28.04.2023
7	Ankara Metropolitan Municipality (AMM) Department of Women and Family Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Inc.	5 suitable participants for this job were selected from the Women's Shelter, and it was decided to proceed with one of them.	01.03.2023
8	-Izmir Governorship European Union and Foreign Relations Office -Izmir Chamber of Tradesmen and Craftsmen Union (IESOB) -Vocational Education Program for Employment (İMEP) -Chamber of Plumbers -Association for Solidarity with Refugees and Immigrants (SGDD-ASAM) – -Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Inc.	After the meeting for cooperation, the agenda changed due to the earthquake disaster of February 6, 2022 and cooperation could not be achieved.	20.01.2023

APPENDIX J: MAXQDA 2024 WORKING SCREEN



APPENDIX K: CONTENT AND COMPETENCIES OF THE DEVELOPED CURRICULUM

Basic Definitions and Units	Having an idea about heating devices	Knows the general features of heating devices.
	Having an idea about natural gas	Knows the properties of natural gas.
	Having an idea about Basic Electricity and Measurement	Knows Basic Electricity and Measurement.
	Having an idea about Basic Plumbing	Knows basic plumbing equipment.
Communicating Effectively	Having an idea about the concept of communication	Knows the concept of interpersonal communication.
		Knows the elements of interpersonal communication
		Knows the types of interpersonal communication
	Having an idea about communication barriers	Recognizes communication barriers
		Recognizes communication obstacles encountered in communication processes with the end user
	Creating solutions in problem situations	Provides solutions to communication-related problems
		Directs communication according to the current situation
		Develops effective communication behaviors.
		Develops a perspective on effective communication.
Gender	Evaluates gender and gender discrimination	Defines concepts related to sex and gender.
		Distinguishes discrimination based on gender.
		Distinguishes gender-based discrimination, divisions of labor and tools.
		Interprets material consequences based on gender.
	Evaluates the relationship between gender and business life	Understands the relationship between gender and business life.
		Analyzes the labor market from a gender-sensitive perspective.
		Examines approaches that will enable women to participate more in the labor market.
		They develop behavioral patterns towards gender equality in both private and public spheres in their future lives.
Evaluate the precautions taken for occupational health and safety	Analyzes legal and workplace rules regarding occupational health and safety.	In order to understand the norms on occupational health and safety, the student understands the importance of occupational health rules and legal legislation by participating in trainings organized by the workplace or trainings of institutions outside the workplace.
		Understands the importance of using work clothes and personal protective equipment appropriate to the work done in terms of occupational health and safety.
		Understands why it is necessary to have occupational health and safety protection and intervention tools in appropriate and working order.

		Understands the reason and importance of placing warning signs and signs for the work carried out in accordance with the instructions in ensuring workplace and occupational safety.
		Understands the importance and reasons for placing warning signs and signs for the work carried out in accordance with the instructions, in ensuring the safety of the work area and employees by protecting the personnel during work.
		Understands the importance of attending occupational health and safety training.
		Understands why and how to use the equipment required for service.
	Analyzes measures to reduce harmful factors that threaten occupational health and safety.	Understands and analyzes the risks and hazards related to the work he does, by evaluating them at his own level within the scope of relevant regulations and standards.
		Understands the necessity of studies aimed at reducing harmful factors.
	Analyzes emergency procedures in case of danger within the scope of occupational health and safety.	Understands the importance of taking precautions to detect dangerous situations and eliminate them quickly.
		Understands the importance of reporting hazardous situations that cannot be eliminated immediately to superiors and authorities or, when necessary, to relevant institutions outside the business.
		Understands the importance of emergency routes and methods.
	Analyzes emergency exit routes and methods within the scope of occupational health and safety.	Understands the importance of exit or escape routes and methods in emergency situations.
		Understands the importance of participating in periodic studies and drills to share experiences regarding emergency exit or escape with relevant parties and colleagues.
Organizing and evaluating work	Analyzes the characteristics of the work area.	Understands the importance of preparing the work area so that work can be carried out uninterruptedly and appropriately.
		Understands the importance of contributing to the improvement of the negative characteristics of the business field.
		Understands the organization of work according to the type and work method used.
		Understands the importance of determining the breadth of the work area and the scope of relevant work points.
	Prepares the necessary machinery, equipment and materials for work.	Selects the materials to be used in accordance with the process forms and methods related to the work to be done.
		Prepares the materials to be used in accordance with the process forms and methods related to the work to be done.
		Uses control and inspection tools and devices according to the determined process.

		Makes the necessary apparatus, machinery and equipment ready for operation.
		It checks the suitability of the materials, tools and equipment to be used during the work within the scope of OHS.
	Cleans the equipment and work area at the end of the job.	Keeps the work area neat and clean.
		Observes occupational safety conditions while cleaning.
		Removes and cleans used machinery and equipment at the end of the job.
		Takes necessary care when using substances that may harm occupational safety and stores them appropriately in designated places.
		It leaves the work area suitable for later operations.
Planning by taking job requests	Reviewing the request from the authorized service unit	It examines the past service information of the device using the service program.
	planning transportation	It creates the most appropriate route/sequence for transportation according to business demands.
		It monitors hourly traffic density.
	Preparing for service delivery	He does his personal grooming and wears his service uniform.
		Shows the service ID card without the customer's request.
		Performs operations according to the service and maintenance manual.
Yakıcı cihazların montajını yapmak	Checking the suitability of the mounting site	Checks the mounting point according to the mounting manual.
	Make mounting	It carries out the implementation in accordance with the installation manual.
		It provides thermal insulation of devices in open air and boiler rooms.
	Conducting tests and checks	It checks the suitability of the montage physically and functionally.
		Checks the functionality of the electrical fuse at the device connection point.
Commissioning the burner device	Checking the "Installation Compliance Certificate" of the Natural Gas Distribution Firm	It examines the "Installation Compliance Certificate" issued by the Gas Distribution Firm and confirms its suitability.
	Checking the installation connections of the burning device	It checks the compliance of the device chimney connections with the relevant standards.
		It checks the suitability of the mounting location and ventilation of the burning device and in accordance with the relevant standard.
		It controls the static gas pressure in the installation from the test point.
		It controls the water pressure in the heating installation from the manometer.

	Making heating and burning device connections when necessary	It makes the electrical connection within the device according to the installation manual.
		It checks the existence of the grounding line.
		It connects the device to the gas installation in accordance with the installation manual.
		Makes the connection between the device and the electrical installation in accordance with the installation manual.
	Converting natural gas	It uses the conversion set to provide natural gas conversion of devices burning fuel other than natural gas (LPG, propane, etc.).
		Adjusts the natural gas combustion pressure according to the maintenance manual.
		It controls combustion.
	Making final checks and reports	While the device is operating, it controls the dynamic natural gas pressure and draft of the chimney.
		It performs flue gas analysis in accordance with the regulations on air pollution.
		While the device is operating, it controls the heating of the system and the hot water efficiency.
		It adjusts the flow rate according to hot water efficiency.
		Performs natural gas tightness test.
		Checks electricity and water connections.
		He signs the warranty document of the device and delivers it to the customer.
Heating and burning maintaining devices	Inspect the heating and burning device	It decides whether the maintenance operation will be carried out on site or at the service center.
		In cases where it is decided that the maintenance will be carried out at the service center, it carries out the dismontage in accordance with the procedure.
	prepare for maintenance	Selects maintenance tools.
		It closes the necessary electricity, gas, water and plumbing connections.
		It reduces pressure and temperature.
	Performing device maintenance	Disassembles the necessary parts of the device.
		Cleans the relevant parts of the device.
		It checks the operation of the device.
		It cleans the filters.
		Controls gas settings.
		It controls the gas pressure of the expansion tank.
		Conducts safety checks.
		In case of paid spare parts replacement, the replacement is made after receiving approval from the customer.
		While performing the transaction, he/she takes care not to damage the customer's belongings.
		The device contains all the maintenance materials specified in the service and maintenance manual.
		At the end of the work, the pollution in the work area; cleans with appropriate cleaning materials and equipment.

Heating and burning repairing devices	Inspect the heating and burning device	Decides whether the repair will be carried out on site or at the service center.
		In cases where it is decided that the repair will be carried out at the service center, it carries out the dismontage in accordance with the procedure.
	Preparing for repairs	Selects repair tools.
		Prepares the repair environment.
		Prepares the necessary spare parts for repair.
		It cuts off the energy of the device and reduces the pressure and temperature.
	Doing device repairs	Dismantles the parts required for repair.
		Cleans the relevant parts of the device.
		It checks the operation of the device.
		The device contains all the maintenance materials specified in the service and maintenance manual.
		Checks the device for safety.
		In paid spare parts replacement, the replacement is made after receiving approval from the customer.
		While performing the transaction, he/she takes care not to damage the customer's belongings.
		At the end of the work, the pollution in the work area; cleans with appropriate cleaning materials and equipment.
Inform the customer	Provide information about the device	Informs the customer about device use, maintenance and safety rules during commissioning.
		Explains the maintenance and repair process to the customer.
	Reporting about the device	Prepares the technical service report, submits it for the customer's signature and delivers a copy to the customer.
		He delivers one copy to the service center and keeps one copy himself.
	Invoicing and collecting	Retrieves the information of the person/institution to be billed.
		Performs invoicing and collection based on transaction volume, using material and labor price lists.
Engaging in activities related to professional development	Working on individual professional development	Attends trainings organized by the business and maintains the documents received.
		Follows new technologies and developments regarding natural gas systems.
	Providing professional training to subordinates and other employees	He transfers his knowledge and experiences to the people he works with.
		Applies limited information and training regarding natural gas systems.
Evaluating environmental	Analyzes environmental protection standards and methods	Understands the importance of periodic training on environmental protection requirements and practices.

security precaution		Observes the environmental impacts during the implementation of business processes and understands the importance of preventing harmful consequences.
	Analyzes the contribution to reducing environmental damaging factors.	Understands the importance of separation and classification required for the recovery of recyclable materials.
		Understands the importance of temporary storage of hazardous and harmful waste by separating it from other materials in accordance with the instructions given and taking the necessary precautions.
		Understands the importance of keeping flammable and combustible materials safely.
		Uses personal protective equipment and materials during the procedure and preparation stages, or understands the importance of using it by auxiliary personnel.
		Understands the importance of having the appropriate hardware, materials and equipment available to use against spills and leaks.
	Analyzes how to act efficiently in the use of equipment and materials.	Understands the importance of using equipment and materials efficiently.
		Understands the importance of identification and planning studies required for the efficient use of equipment and materials.
	Analyzes ensuring environmental safety	Understands the importance of determining and using intervention techniques and extinguishers according to the type of fire.
		Understands the importance of using gas measuring devices.
		Understands intervention techniques for uncontrolled outgassing.

Evaluating the quality management system	Analyzes the quality requirements of the job.	Understands quality requirements according to instructions and plans contained in process forms.
		Understands quality requirements according to tolerances and deviations allowed in practice.
		Understands the importance of operating the machine, tool, equipment or device in accordance with quality requirements.
	Analyzes technical ways and methods in ensuring quality.	Understands the importance of quality assurance techniques according to the type of operation to be performed.
		Understands the importance of applying technical methods and methods related to quality assurance and meeting special quality conditions during operations.
	Analyzes efforts to prevent errors and malfunctions detected in routes and methods.	Reports errors and malfunctions detected during operation to authorized persons.
		It contributes to the identification and elimination of the causes of errors and malfunctions.
		Applies basic practices and methods related to error and troubleshooting.
		Reports errors and malfunctions that are not within his/her authority or cannot be corrected to his/her superior.

APPENDIX L: DEVELOPED "NATURAL GAS HEATING AND GAS BURNING DEVICE SERVICE PERSONNEL LEVEL (4)" COMPETENCY BASED CURRICULUM CONTENT

BASIC DEFINITIONS AND UNITS

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
TB	Basic Definitions and Units	TB.1	Having an idea about heating devices	TB.1.1	Knows the general features of heating devices.
		TB.2	Having an idea about natural gas	TB.2.1	Knows the properties of natural gas.
		TB.3	Having an idea about Basic Electricity and Measurement	TB.3.1	Knows Basic Electricity and Measurement.
		TB.4	Having an idea about Basic Plumbing	TB.4.1	Knows basic plumbing equipment.

COMMUNICATION

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
A	Communicating Effectively	A.1	Having an idea about the concept of communication	A.1.1	Knows the concept of interpersonal communication.
				A.1.2	Knows the elements of interpersonal communication
				A.1.3	Knows the types of interpersonal communication
		A.2	Having an idea about communication barriers	A.2.1	Recognizes communication barriers
				A.2.2	Recognizes communication obstacles encountered in communication processes with the end user
		A.3	Creating solutions in problem situations	A.4.1	Provides solutions to communication-related problems
				A.4.2	Directs communication according to the current situation
				A.4.3	Develops effective communication behaviors.
				A.4.4	Develops a perspective on effective communication.

GENDER EQUALITY

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
B	Gender	B.1	Evaluates gender and gender discrimination	B.1.1	Defines concepts related to sex and gender.
				B.1.2	Distinguishes discrimination based on gender.
				B.1.3	Distinguishes gender-based discrimination, divisions of labor and tools.

				B.1.4	Interprets material consequences based on gender.
		B.2	Evaluates the relationship between gender and business life	B.2.1	Understands the relationship between gender and business life.
				B.2.2	Analyzes the labor market from a gender-sensitive perspective.
				B.2.3	Examines approaches that will enable women to participate more in the labor market.
				B.2.4	They develop behavioral patterns towards gender equality in both private and public spheres in their future lives.

OCCUPATIONAL HEALTH AND SAFETY

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
C	Evaluate the precautions taken for occupational health and safety	A.1	Analyzes legal and workplace rules regarding occupational health and safety.	A.1.1	In order to understand the norms on occupational health and safety, the student understands the importance of occupational health rules and legal legislation by participating in trainings organized by the workplace or trainings of institutions outside the workplace.
				A.1.2	Understands the importance of using work clothes and personal protective equipment appropriate to the work done in terms of occupational health and safety.
				A.1.3	Understands why it is necessary to have occupational health and safety protection and intervention tools in appropriate and working order.
				A.1.4	Understands the reason and importance of placing warning signs and signs for the work carried out in accordance with the instructions in ensuring workplace and occupational safety.
				A.1.5	Understands the importance and reasons for placing warning signs and signs for the work carried out in accordance with the instructions, in ensuring the safety of the work area and employees by protecting the personnel during work.
				A.1.6	Understands the importance of attending occupational health and safety training.
				A.1.7	Understands why and how to use the equipment required for service.
		A.2	Analyzes measures to reduce harmful factors that threaten occupational health and safety.	A.2.1	Understands and analyzes the risks and hazards related to the work he does, by evaluating them at his own level within the scope of relevant regulations and standards.
				A.2.2	Understands the necessity of studies aimed at reducing harmful factors.

		A.3	Analyzes emergency procedures in case of danger within the scope of occupational health and safety.	A.3.1	Understands the importance of taking precautions to detect dangerous situations and eliminate them quickly.
				A.3.2	Understands the importance of reporting hazardous situations that cannot be eliminated immediately to superiors and authorities or, when necessary, to relevant institutions outside the business.
				A.3.3	Understands the importance of emergency routes and methods.
		A.4	Analyzes emergency exit routes and methods within the scope of occupational health and safety.	A.4.1	Understands the importance of exit or escape routes and methods in emergency situations.
				A.4.2	Understands the importance of participating in periodic studies and drills to share experiences regarding emergency exit or escape with relevant parties and colleagues.

WORK ORGANIZATION – WORK PREPARATION

Tasks		**Transactions**		**Success Criteria**	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
D	Organizing and evaluating work	D.1	Analyzes the characteristics of the work area.	D.1.1	Understands the importance of preparing the work area so that work can be carried out uninterruptedly and appropriately.
				D.1.2	Understands the importance of contributing to the improvement of the negative characteristics of the business field.
				D.1.3	Understands the organization of work according to the type and work method used.
				D.1.4	Understands the importance of determining the breadth of the work area and the scope of relevant work points.
		D.2	Prepares the necessary machinery, equipment and materials for work.	D.2.1	Selects the materials to be used in accordance with the process forms and methods related to the work to be done.
				D.2.2	Prepares the materials to be used in accordance with the process forms and methods related to the work to be done.
				D.2.3	Uses control and inspection tools and devices according to the determined process.
				D.2.4	Makes the necessary apparatus, machinery and equipment ready for operation.
				D.2.5	It checks the suitability of the materials, tools and equipment to be used during the work within the scope of OHS.
		D.3	Cleans the equipment and work area at the end of the job.	D.3.1	Keeps the work area neat and clean.
				D.3.2	Observes occupational safety conditions while cleaning.
				D.3.3	Removes and cleans used machinery and equipment at the end of the job.

				D.3.4	Takes necessary care when using substances that may harm occupational safety and stores them appropriately in designated places.
				D.3.5	It leaves the work area suitable for later operations.

WORK PLANNING

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
E	Planning by taking job requests	E.1	Reviewing the request from the authorized service unit	E.1.1	It examines the past service information of the device using the service program.
		E.2	planning transportation	E.2.1	It creates the most appropriate route/sequence for transportation according to business demands.
				E.2.2	It monitors hourly traffic density.
		E.3	Preparing for service delivery	E.3.1	He does his personal grooming and wears his service uniform.
				E.3.2	Shows the service ID card without the customer's request.
				E.3.3	Performs operations according to the service and maintenance manual.

BURNER DEVICE MOUNTING

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
F	Yakıcı cihazların montajını yapmak	F.1	Checking the suitability of the mounting site	F.1.1	Checks the mounting point according to the mounting manual.
		F.2	Make mounting	F.2.1	It carries out the implementation in accordance with the installation manual.
				F.2.2	It provides thermal insulation of devices in open air and boiler rooms.
		F.3	Conducting tests and checks	F.3.1	It checks the suitability of the montage physically and functionally.
				F.3.2	Checks the functionality of the electrical fuse at the device connection point.

COMMISSIONING THE BURNER DEVICE

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
G	Commissioning the burner device	G.1	Checking the "Installation Compliance Certificate" of the Natural Gas	G.1.1	It examines the "Installation Compliance Certificate" issued by the Gas Distribution Firm and confirms its suitability.

			Distribution Firm		
		G.2	Checking the installation connections of the burning device	G.2.1	It checks the compliance of the device chimney connections with the relevant standards.
				G.2.2	It checks the suitability of the mounting location and ventilation of the burning device and in accordance with the relevant standard.
				G.2.3	It controls the static gas pressure in the installation from the test point.
				G.2.4	It controls the water pressure in the heating installation from the manometer.
		G.3	Making heating and burning device connections when necessary	G.3.1	It makes the electrical connection within the device according to the installation manual.
				G.3.2	It checks the existence of the grounding line.
				G.3.3	It connects the device to the gas installation in accordance with the installation manual.
				G.3.4	Makes the connection between the device and the electrical installation in accordance with the installation manual.
		G.4	Converting natural gas	G.4.1	It uses the conversion set to provide natural gas conversion of devices burning fuel other than natural gas (LPG, propane, etc.).
				G.4.2	Adjusts the natural gas combustion pressure according to the maintenance manual.
				G.4.3	It controls combustion.
		G.5	Making final checks and reports	G.5.1	While the device is operating, it controls the dynamic natural gas pressure and draft of the chimney.
				G.5.2	It performs flue gas analysis in accordance with the regulations on air pollution.
				G.5.3	While the device is operating, it controls the heating of the system and the hot water efficiency.
				G.5.4	It adjusts the flow rate according to hot water efficiency.
				G.5.5	Performs natural gas tightness test.
				G.5.6	Checks electricity and water connections.
				G.5.7	He signs the warranty document of the device and delivers it to the customer.

MAINTENANCE OF HEATING AND BURNER DEVICES

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
H	Heating and burning maintaining	H.1	Inspect the heating and burning device	H.1.1	It decides whether the maintenance operation will be carried out on site or at the service center.

	devices			H.1.2	In cases where it is decided that the maintenance will be carried out at the service center, it carries out the dismontage in accordance with the procedure.
		H.2	prepare for maintenance	H.2.1	Selects maintenance tools.
				H.2.2	It closes the necessary electricity, gas, water and plumbing connections.
				H.2.3	It reduces pressure and temperature.
		H.3	Performing device maintenance	H.3.1	Disassembles the necessary parts of the device.
				H.3.2	Cleans the relevant parts of the device.
				H.3.3	It checks the operation of the device.
				H.3.4	It cleans the filters.
				H.3.5	Controls gas settings.
				H.3.6	It controls the gas pressure of the expansion tank.
				H.3.7	Conducts safety checks.
				H.3.8	In case of paid spare parts replacement, the replacement is made after receiving approval from the customer.
				H.3.9	While performing the transaction, he/she takes care not to damage the customer's belongings.
				H.3.10	The device contains all the maintenance materials specified in the service and maintenance manual.
				H.3.11	At the end of the work, the pollution in the work area; cleans with appropriate cleaning materials and equipment.

REPAIR OF HEATING AND BURNER DEVICES

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
I	Heating and burning repairing devices	I.1	Inspect the heating and burning device	I.1.1	Decides whether the repair will be carried out on site or at the service center.
				I.1.2	In cases where it is decided that the repair will be carried out at the service center, it carries out the dismontage in accordance with the procedure.
		I.2	Preparing for repairs	I.2.1	Selects repair tools.
				I.2.2	Prepares the repair environment.
				I.2.3	Prepares the necessary spare parts for repair.
				I.2.4	It cuts off the energy of the device and reduces the pressure and temperature.
		I.3	Doing device repairs	I.3.1	Dismantles the parts required for repair.
				I.3.2	Cleans the relevant parts of the device.
				I.3.3	It checks the operation of the device.
				I.3.4	The device contains all the maintenance materials specified in the service and

					maintenance manual.
				I.3.5	Checks the device for safety.
				I.3.6	In paid spare parts replacement, the replacement is made after receiving approval from the customer.
				I.3.7	While performing the transaction, he/she takes care not to damage the customer's belongings.
				I.3.8	At the end of the work, the pollution in the work area; cleans with appropriate cleaning materials and equipment.

INFORMING THE CUSTOMER

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
J	Inform the customer	J.1	Provide information about the device	J.1.1	Informs the customer about device use, maintenance and safety rules during commissioning.
				J.1.2	Explains the maintenance and repair process to the customer.
		J.2	Reporting about the device	J.2.1	Prepares the technical service report, submits it for the customer's signature and delivers a copy to the customer.
				J.2.2	He delivers one copy to the service center and keeps one copy himself.
		J.3	Invoicing and collecting	J.3.1	Retrieves the information of the person/institution to be billed.
				J.3.2	Performs invoicing and collection based on transaction volume, using material and labor price lists.

PROFESSIONAL DEVELOPMENT

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
K	Engaging in activities related to professional development	K.1	Working on individual professional development	K.1.1	Attends trainings organized by the business and maintains the documents received.
				K.1.2	Follows new technologies and developments regarding natural gas systems.
		K.2	Providing professional training to subordinates and other employees	K.2.1	He transfers his knowledge and experiences to the people he works with.
				K.2.2	Applies limited information and training regarding natural gas systems.

ENVIRONMENTAL SAFETY PRECAUTIONS

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
L	Evaluating environmental security precaution	L.1	Analyzes environmental protection standards and methods	L.1.1	Understands the importance of periodic training on environmental protection requirements and practices.
				L.1.2	Observes the environmental impacts during the implementation of business processes and understands the importance of preventing harmful consequences.
		L.2	Analyzes the contribution to reducing environmental damaging factors.	L.2.1	Understands the importance of separation and classification required for the recovery of recyclable materials.
				L.2.2	Understands the importance of temporary storage of hazardous and harmful waste by separating it from other materials in accordance with the instructions given and taking the necessary precautions.
				L.2.3	Understands the importance of keeping flammable and combustible materials safely.
				L.2.4	Uses personal protective equipment and materials during the procedure and preparation stages, or understands the importance of using it by auxiliary personnel.
				L.2.5	Understands the importance of having the appropriate hardware, materials and equipment available to use against spills and leaks.
		L.3	Analyzes how to act efficiently in the use of equipment and materials.	L.3.1	Understands the importance of using equipment and materials efficiently.
				L.3.2	Understands the importance of identification and planning studies required for the efficient use of equipment and materials.
		L.4	Analyzes ensuring environmental safety	L.4.1	Understands the importance of determining and using intervention techniques and extinguishers according to the type of fire.
				L.4.2	Understands the importance of using gas measuring devices.
				L.4.3	Understands intervention techniques for uncontrolled outgassing.

QUALITY MANAGEMENT SYSTEM

Tasks		Transactions		Success Criteria	
Code	**Name**	**Code**	**Name**	**Code**	**Explanation**
M	Evaluating the quality management system	M.1	Analyzes the quality requirements of the job.	M.1.1	Understands quality requirements according to instructions and plans contained in process forms.
				M.1.2	Understands quality requirements according to tolerances and deviations allowed in practice.

				M.1.3	Understands the importance of operating the machine, tool, equipment or device in accordance with quality requirements.
		M.2	Analyzes technical ways and methods in ensuring quality.	M.2.1	Understands the importance of quality assurance techniques according to the type of operation to be performed.
				M.2.2	Understands the importance of applying technical methods and methods related to quality assurance and meeting special quality conditions during operations.
		M.3	Analyzes efforts to prevent errors and malfunctions detected in routes and methods.	M.3.1	Reports errors and malfunctions detected during operation to authorized persons.
				M.3.2	It contributes to the identification and elimination of the causes of errors and malfunctions.
				M.3.3	Applies basic practices and methods related to error and troubleshooting.
				M.3.4	Reports errors and malfunctions that are not within his/her authority or cannot be corrected to his/her superior.

APPENDIX M: TRAINER TRAINING PROGRAM

Content of the Training of Trainers Who Will Work Within the Scope of Development of the Gas Burning Device Service Personnel Vocational Curriculum

Meeting Place: Bosch A.Ş. Manisa

Meeting Date: 22-23 June 2022 (Two Full Days)

Participants in the Meeting: Volkan BİNİCİ, Suat EYİ, Erçin TEOMAN

Purpose of the Meeting:

1. Heating and gas burning device service personnel content study
2. Explanation of needs analysis approaches
3. Examination of the Teaching Environment
4. Trainer Training
    a. Information about the competency-based approach
    b. Basic information about UbD
    c. Information about SUPSKY curriculum development model
    d. Information about curriculum evaluation

Meeting Content:

1. Examination and evaluation of the education and training environment
2. Task Analysis – VQA processes
3. Sharing information about curriculum contents
4. Explaining the competency-based approach and discussing its suitability
    a. Review of qualifications
    b. Determination of qualification periods
    c. Determining the competencies to be taught online
    d. Determination of qualifications for face-to-face teaching
    e. Determining the units to be hybrid applied
5. Review of semi-structured survey questions for service managers
6. Studying customer opinions
7. Sharing information about the UbD framework
8. UbD sample unit plan design
9. Explaining the SUPSKY Model
10. Information about curriculum evaluation

APPENDIX N: FORMATION OF TEAMS

Stages	Formation of Group
Needs analysis Curriculum design Instructional design Review and feedback Training of trainers	**Desk-based design team** • Assoc. Dr.Dilara DEMİRBULAK (Yeditepe University Curriculum and Instruction) • Volkan BİNİCİ (Yeditepe University Curriculum and Instruction, Doctorant) • Suat EYİ (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training Manager, Technical Educator) • Erçin TEOMAN (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm, Technical Educator) **Review board** • Prof. Dr. Ayşe Münire ERDEN (Yeditepe University Curriculum and Instruction) • Prof. Dr. Ruçhan UZ (Uludağ University Curriculum and Instruction) • Assoc. Dr.Dilara DEMİRBULAK (Yeditepe University Curriculum and Instruction **Trainer training planning and implementation team** • Doç. Dr. Dilara DEMİRBULAK (Yeditepe University Curriculum and Instruction • Volkan BİNİCİ (Yeditepe University Curriculum and Instruction, Doctorant) • Suat EYİ (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training Manager, Technical Educator) • Erçin TEOMAN Eyi (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm, Technical Educator)
Preparation for implementation İmplementation	**Experiment evaluation team** • Assoc. Dr.. Dilara DEMİRBULAK (Yeditepe University Curriculum and Instruction) • Volkan BİNİCİ (Yeditepe Üniversitesi, Doktorant) • Nazif ÖZAKINCI (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training

İmplementation evaluation	Manager, Technical Educator After Sales Services Manager) • Özlem BAYBORA (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training Manager, Technical Educator Proje Yöneticisi) • Suat EYİ (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training Manager, Technical Educator) • Erçin TEOMAN (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm, Technical Educator) • Nazmi ÖZDEMİR (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm, Technical Educator) • Gökmen UZUN (Republic of Turkey Ministry of National Education, Plumbing Technologies Field Expert) • M. Erdal KÜÇÜKOĞLU (Authorized Certification Board Expert)
Curriculum evaluation	**Program evaluation team** • Prof. Dr. Ayten ULUSOY (Curriculum and Instruction) • Prof. Dr. Kıymet SELVİ (Curriculum and Instruction) • Prof. Dr. Hülya GÜVENÇ (Curriculum and Instruction) • Assistant Professor Gülriz İMER (Curriculum and Instruction) • Assistant Professor Nevriye YAZÇAYIR (Curriculum and Instruction) • Kıvanç ARMAN (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm, Türkiye Sales General Manager) • Nazif ÖZAKINCI (Bosch Thermotechnic Heating and Air Conditioning Industry and Trade Incorporated Firm,Training Manager, Technical Educator After Sales Services Manager)

APPENDIX O: SEMI-STRUCTURED INTERVIEW QUESTIONS AND RELATED GROUPS

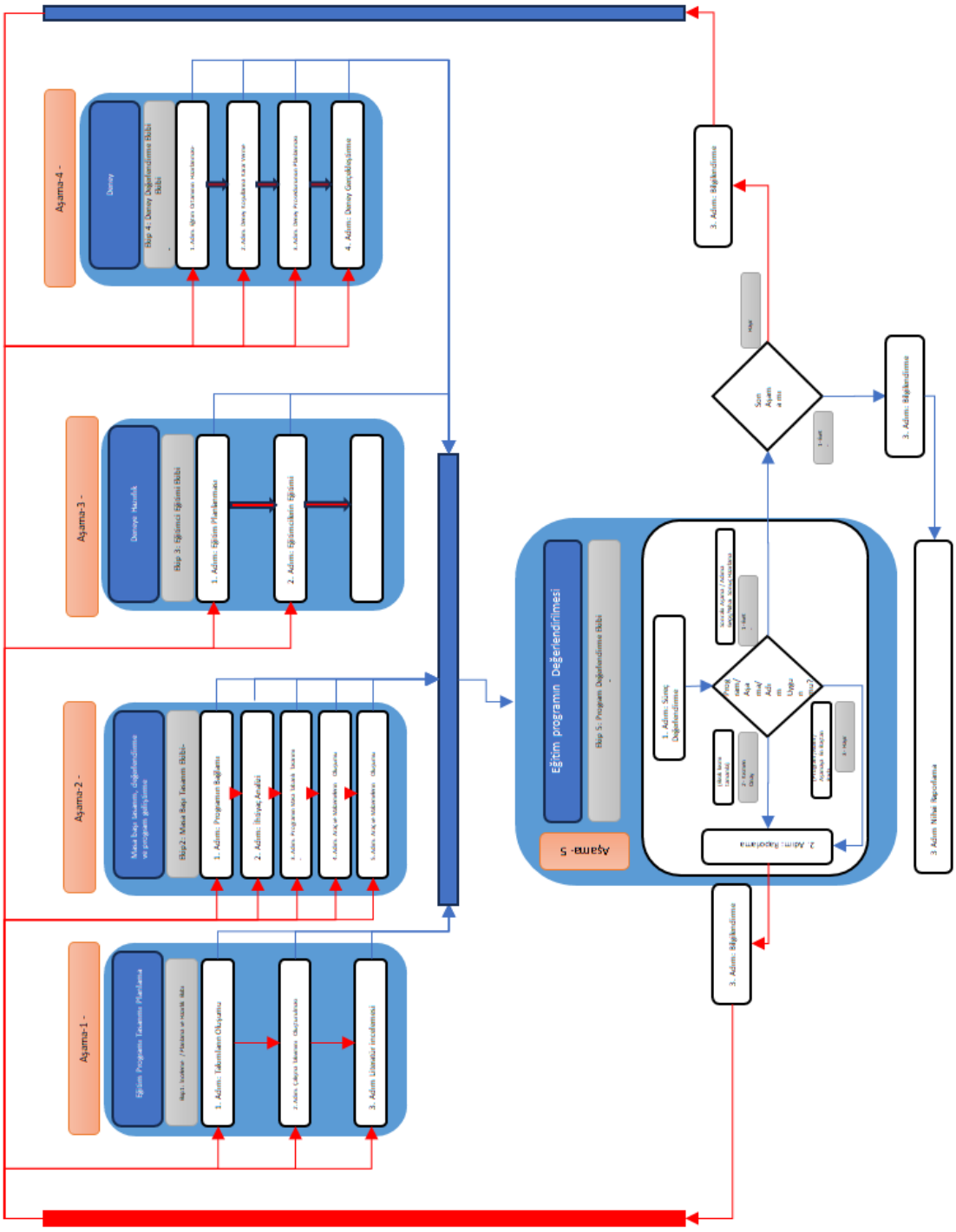
GROUP	SEMI-STRUCTURED INTERVIEW QUESTIONS
Firm decision-making manager semi-structured interview schedule (Needs analysis)	1. What are your expectations from the curriculum and the technicians to be employed in the firm's authorized service? 2. What are your other expectations from the curriculum?
Authorized service manager semi-structured interview schedule (Needs analysis)	1. What are your expectations from the "Heating and Gas Burning Device Service Technician" who works or will work in your service? 2. What are your views on the employment of women as "Heating and Gas Device Service Technicians" in your firm? 3. What advantages can male “Heating and Gas Device Service Technicians” have over female technicians? 4. What advantages can female “Heating and Gas Device Service Technicians” have over male technicians? 5. What are the difficulties you encounter in employing a "Heating and Gas Device Service Technician"?
Firm manager semi-structured interview schedule (Needs analysis)	1. In general, what are your opinions about the experiences of female technicians working in the industrial sector in the labor market? 2. What could be the reasons for the very low rate of women working as technicians in Türkiye? 3. How do you evaluate the relationship between gender equality and female technicians in Türkiye? 4. What effects can on-the-job training programs have on the employment of female technicians? 5. In general, how do you evaluate the curriculum, training and education processes, examination and evaluation system for the "Heating and Gas Device Service Personnel" training in the context of gender equality?
Senior technician semi-structured interview schedule (Needs analysis)	1. What are your expectations from the new heating and gas burning device service technician who will start working in the service? 2. What are the problems you encounter in the knowledge, skills and attheudes of new heating and gas device service technicians? 3. What are the problems you encounter in the knowledge, skills and attheudes of currently working heating and gas device service technicians? 4. What are your opinions about the “Heating and Gas Device Service Personnel (4th Level VQA)” exams and their results?

	5. What are the advantages of male "Heating and Gas Burner Device Service Technicians" who are just starting to work in the service compared to female technicians? 6. What are the advantages of female "Heating and Gas Burner Device Service Technicians" who are new to work in the service compared to male technicians? 7. What are your opinions about the labor market experiences of female technicians working in the industrial sector? (You can comment on gender differences, physical strength, ways of doing business, contributions to companies, learning abilities, exam successes and all other issues related to the profession.) 8. What are your views on the employment of women as "Heating and Gas Device Service Technicians" in the firm? 9. How do you evaluate the effects of on-the-job training programs on technician employment?
Professional field expert semi-structured interview schedule (Needs analysis)	1. What are your opinions about the labor market experiences of female technicians working in the industrial sector? (You can comment on gender differences, physical strength, ways of doing business, contributions to companies, learning abilities, exam successes and all other issues related to the profession.) 2. What could be the reasons for the very low rate of women working as technicians in Türkiye? 3. How do you evaluate the relationship between gender equality and female technicians in Türkiye? 4. How do you evaluate the effects of on-the-job training programs on the employment of female technicians? 5. In general, how do you evaluate the curriculum, training and education processes, examination and evaluation system for the "Heating and Gas Device Service Personnel" training in the context of gender?
Authorized certification body (ACB) manager semi-structured interview schedule (Needs analysis)	1. What are your opinions about the labor market experiences of female technicians working in the industrial sector? (You can comment on gender differences, physical strength, ways of doing business, contributions to companies, learning abilities, exam successes and all other issues related to the profession.) 2. What could be the reasons for the very low rate of women working as technicians in Turkey? 3. How do you evaluate the relationship between gender equality and female technicians in Turkey? 4. How do you evaluate the effects of on-the-job training programs on the employment of female technicians? 5. In general, how do you evaluate the training programs, education and training processes, examination and evaluation system for technicians in the context of gender? 6. What are your opinions about the “Heating and Gas Device Service Personnel (Level 4)” exams and their results?
Firm manager semi-structured interview schedule	1. After the implemented curriculum, did the technicians working in the sector meet the expectations of the labor market? 2. After the implemented curriculum, how do you evaluate its contribution to gender equality?

(Implementation)	
Authorized Service manager semi-structured interview schedule (Implementation)	1. What are your opinions about the learner's adaptation to the authorized service? 2. What are your opinions about the learner's behavior towards problem solving? 3. What are the difficulties experienced by the learner? 4. What are the positive aspects of the learner? 5. Does the authorized service have an orientation plan? If so, have you implemented an orientation plan for the learner? Have you evaluated the results of the orientation plan you implemented for the learner? 6. What is the feedback from customers? 7. What are your opinions about employing female technicians? 8. Would you recommend other authorized services to employ female technicians?
Senior technician semi-structured interview schedule (Implementation)	1. What are your opinions about the professional competencies of the learner? (Knowledge, skills, attheude, adaptation, communication, problem solving, etc.) 2. What are the difficulties experienced by the learner during the training? 3. What are the positive aspects and developing aspects of the learner? 4. What aspects of the learner are open to improvement/need to be developed? 5. What is the feedback from customers? 6. Have you had any problems with the learner? If there was a problem, how did you solve the problem? 7. What are your opinions about working with a female technician? 8. Would you recommend other authorized services to employ female technicians? From where? 9. Do you support the learner's preparation for the professional qualification exam (VQA)?
Participant semi-structured interview schedule (Implementation - Education in the firm)	1. Demographic characteristics (Age, marriage status, number of children, gender, livelihood, income level, education level, type of residence, family life, etc.) 2. Have you had any contact with İŞKUR? If so, when and how? What jobs have you worked in or outside this scope? 3. How would you describe yourself? 4. What are your expectations? 5. What are your opinions about the education you received? 6. Was the content fit for purpose? Will you be able to use what you learned in your business life? 7. What are your opinions about the instructor? 8. How did you find the educational environment? 9. How did you find the training method? 10. What are your opinions about your bandmates? 11. What are your other opinions?
Participant semi-structured interview schedule (Implementation - Education in the	1. Could you evaluate your working process in the field? 2. What difficulties do you experience in the field? 3. How would you describe your professional development? 4. How are your relations with the employees at the authorized service? 5. What are your thoughts on the VQ exam?

authorized service)	
Firm decision-making manager semi-structured interview schedule (Evaluation)	1. Did the developed curriculum meet expectations? 2. What are your views on disseminating the curriculum?
Curriculum and Instruction (EPÖ) Specialist semi-structured interview schedule (Evaluation)	"Heating and Gas Burning Device Service Personnel", competency-based training program; Do its design, implementation and evaluation comply with curriculum development principles?

APPENDIX P: DEBİ CURRICULUM DEVELOPMENT MODEL (SUPSKY CURRICULUM DESIGN MODEL WAS USED.)



Stages and Steps of the Curriculum Development Model		**Responsible Unit**
1. Curriculum Design and Planning		
1.1. Formation of Teams	Feedback	
1.2. Setting Work Schedule	Feedback	**Team 1: Review / Planning and Preparation Team**
1.3. Literature Review	Feedback	
Decision 1 •Approval - Switching to desk-based design •Partial Approval - Go Back to Incorrect Part •Rejection – Start over		
2. Desk-Based Design, Evaluation, and Development of Curriculum		**Team 2: Desk-Based Design Team**
2.1. Context of Curriculum	Feedback	
2.2. Conducting Needs Analysis	Feedback	
2.3. Desk-Based Design of Curriculum	Feedback	
2.4. Formation of Tools and Materials	Feedback	
2.5. Evaluation and Development of Curriculum	Feedback	
Decision 2 •Approval - Transition to implementation •Partial Approval - Go Back to Incorrect Part •Rejection – Start over		
3. Deney	Feedback	**Trainer Training Planning and İmplementation Team** **İmplementation Evaluation Team**
Implementation Preparation Phase - Implementation Phase - Evaluation and Development Phase		
3.1 Trainer Training	Feedback	
3.2 Preparation of the Educational Environment	Feedback	
3.3 Deciding on Implementation Conditions -Goals / Achievements / Competencies -Content Approach and content -Learning Situations / Learning Environments and Learning -Preparation of materials / Determination of strategies, methods, techniques and approaches -Determining Measurement and Evaluation Criteria / Test Situations	Feedback	
3.4. Planning the Implementation Procedure -Control of the Educational Environment - Deciding on Implementation Conditions - Reviewing implementation preparations	Feedback	
3.5. Performing Implementation -Participant apprentice training -Participant technician on-the-job laboratory / workshop training -Participant technician on-the-job field training	Feedback	
4. Final Evaluation	Feedback	
Decision 3 •Partial Approval - Go Back to Incorrect Part •Rejection – Start over •Approval – Dissemination decision -Disseminating the training program -Training program evaluation throughout the process -Developing training programs throughout the process	-	**Curriculum Evaluation Team**

* This model was developed using SUPSKY Curriculum Design Model.

APPENDIX Q: CURRICULUM DESIGN PRINCIPLES GUIDE QUESTIONS (CREATED BY DEVELOPING THE "CURRICULUM EVALUATION GUIDE ACCORDING TO DESIGN PRINCIPLES" PREPARED BY DILEK CANLIER.)

Curriculum Design Principles	Curriculum Design Principles Guide Questions	Response
Scope	1) Does the curriculum cover National Vocational Standards (UMS)?	
	2) Does the curriculum include National Qualifications (NQ)?	
	3) Does the curriculum meet firm expectations?	
	4) Has the target audience of the curriculum been specified?	
	5) Is the anticipated period (day, month, year) specified?	
	6) Have the recommended weekly course hours for the curriculum been specified?	
	7) Is the philosophical approach based on the curriculum stated?	
	8) Has the curriculum design approach adopted been specified?	
	9) Has the content editing approach adopted been specified?	
	10) Are the elements that make up the curriculum specified? (Target/objective, content, educational situations, measurement and evaluation)	
	11) Are the subunits that make up the curriculum specified? (Unit/Theme/Area, etc.)	
	12) Are the general objectives of the curriculum stated?	
	13) Are the achievements/objectives in the curriculum stated?	
	14) Is the limitation of the topics stated in the curriculum?	
	15) Is it clearly stated in the curriculum how the teaching process will be carried out?	
	16) Is it clearly stated in the curriculum how the measurement-evaluation process will be carried out?	
Graduality	17) Are the topics/units/themes listed from known to unknown?	
	18) Do the topics/units/themes continue to deepen and/or expand?	
	19) Do the taxonomic levels of achievements/goals continue towards higher order thinking skills (analysis, evaluation and synthesis)?	
	20) Are prerequisite learnings taken into account in the program?	
	21) Are the achievements/goals built on previous achievements/goals?	
	22) Does the curriculum observe the teaching principle of moving from easy to difficult?	
	23) Does the curriculum observe the teaching principle of moving from the immediate environment to the distant environment?	
	24) Is there a direction from the concrete to the abstract in teaching concepts in the curriculum?	
Continuity	25) Do the units/topics repeat concepts from previous units?	
	26) When a knowledge/skill or concept within the program is presented again, has care been taken to ensure that it is not enough to cause forgetting?	

	27) Are the critical concepts and skills in the program repeated at certain time intervals?	
	28) Have the goals/achievements in the program been determined taking into account the competencies expected at the next levels?	
Relatedness	29) Can the achievements/objectives within the program be associated with the achievements/objectives of other curriculum?	
	30) Has the content of the program been created taking into account the terms of the profession in the next grade levels?	
	31) Can the achievements/objectives in the curriculum be related to each other?	
	32) Are the achievements/objectives that can be associated with other curriculums clearly stated?	
	33) Have the concepts/skills in the curriculum been related to daily life?	
	34) Curriculum; Is it coherent or consistent in scope, gradualness, continuity and balance?	
Balance	35) Are the goals/achievement appropriate for the developmental periods of the learners?	
	36) Are the topics/contents in the program appropriate for the age and developmental periods of the learners?	
	37) Are the tools and methods to be used in measurement-evaluation appropriate for the age and developmental periods of the learners?	
Flexibility	38) Is it clearly stated that the curriculum is prepared by paying attention to the individual differences of the learners (interest, needs, readiness, etc.)?	
	39) Does the curriculum provide educators with options for instructional activities?	
	40) Does the curriculum allow educators flexibility by taking learner characteristics into account during the teaching process?	
	41) Does the program prioritize the free will of stakeholders in fulfilling their responsibilities?	
	42) Does the program contain statements that allow for learner and instructor autonomy?	
	43) Does the program provide flexibility for face-to-face, online or blended learning pathways?	
Usefulness	44) Is the language used in the program clear and understandable?	
	45) Have instructors been informed about how to access additional resources or materials in the program?	
	46) Has information been provided about how and where to report opinions and suggestions about the program?	
	47) Has information been given about the maximum number of learners so that the program can be implemented effectively?	
	48) Is information given in the program about the technical and physical infrastructure and equipment required for an effective teaching process?	

APPENDIX R: PROTOCOL SIGNED WITHIN THE SCOPE OF THE THESIS (YEDITEPE UNIVERSITY - BOSCH A.Ş. - VOLKAN BİNİCİ)

YEDİTEPE ÜNİVERSİTESİ

BOSCH

YEDİTEPE ÜNİVERSİTESİ

İLE

BOSCH TERMOTEKNİK ISITMA VE KLİMA SANAYİ TİCARET A.Ş.

ARASINDA

ISITMA VE GAZ YAKICI CİHAZ SERVİS ELEMANI MESLEĞİ KADIN İSTİHDAMI ODAKLI DOKTORA TEZİ İŞBİRLİĞİ PROTOKOLÜ

2022

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