ASSESSING TEACHER EDUCATION STUDENTS' BEHAVIORS AND INTERNAL LOCUS OF CONTROL PERTINENT TO SUSTAINABLE DIETS

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ABSTRACT

ASSESSING TEACHER EDUCATION STUDENTS' BEHAVIORS AND INTERNAL LOCUS OF CONTROL PERTINENT TO SUSTAINABLE DIETS

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The main purposes of this study were defined as (1) to examine teacher education students' familiarity and understanding on “sustainable development” term, (2) to define their behaviors and internal locus of control towards sustainable diets, (3) to examine relationship between students’ behavior and internal locus of control pertinent to sustainable diets, and (4) to investigate differences of gender and teacher education programs in behavior and internal locus of control pertinent to sustainable diets.

The study was conducted on 556 teacher education students at Middle East Technical University by direct administration strategy in May-June 2017. The results of the present study showed that teacher education students have lack of understanding toward sustainable development. Moreover, the students did not demonstrate usually behaviors toward sustainable diets while they had high internal locus of control on sustainable diet. There was a statistically significant association between internal locus of control and behaviors toward sustainable diets. Furthermore, while female students had significantly higher internal locus of control toward sustainable diets than males, there was not a statistically significant difference in behaviors pertinent to sustainable

diets in terms of gender. In addition, students pursuing Elementary Science Education and Early Childhood Education programs exhibited more frequently behaviors toward sustainable diets than Foreign Language Education students. However, internal locus of control pertinent sustainable diets did not differ regarding teacher education programs.

Keywords: Sustainable Diets, Teacher Education, Behaviors, Internal Locus of Control, Education for Sustainable Development

ÖZ

ÖĞRETMEN EĞİTİMİ ÖĞRENCİLERİNİN SÜRDÜRÜLEBİLİR BESLENMEYE İLİŞKİN İÇSEL KONTROL ODAĞI VE DAVRANIŞLARININ DEĞERLENDİRİLMESİ

Doğrubak, Ayşe
Yüksek Lisans, İlköğretim Fen ve Matematik Alanları Eğitimi
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Ekim 2017, 154 sayfa

Dört basamaktan oluşan bu çalışmanın amaçları, (1) Eğitim Fakültesi öğrencilerinin sürdürülebilir kalkınma terimine yönelik aşinalık ve anlayışlarını belirlemek, (2) sürdürülebilir beslenmeye ilişkin içsel kontrol odağı ve davranışlarını saptamak, (3) olası sürdürülebilir beslenme davranışları ve içsel kontrol odakları arasındaki ilişkiyi belirlemek ve (4) sürdürülebilir beslenmeye ilişkin davranış ve içsel kontrol odağının cinsiyet ve eğitim fakültesi alanlarına göre farklarını araştırmaktır.

Bu çalışmanın verileri 556 Orta Doğu Teknik Üniversitesi Eğitim Fakültesi öğrencisinden Mayıs- Haziran 2017 de doğrudan toplanmıştır. Bu çalışmanın sonuçları Eğitim Fakültesi öğrencilerinin bütünsel olarak sürdürülebilir kalkınma terimi anlayışlarının eksik olduğunu göstermiştir. Ayrıca, Eğitim Fakültesi öğrencilerinin içsel kontrol odağının yüksek olduğunu ancak sürdürülebilir beslenme davranışlarının olumlu yönde gelişmediğini göstermiştir. Bu çalışma sonuçları ayrıca göstermiştir ki, öğrencilerin sürdürülebilir beslenmeye ilişkin içsel kontrol odağı ve davranışları arasında istatistiksel olarak pozitif bir ilişki vardır. Cinsiyet farkı açısından, kadın Eğitim Fakültesi öğrencileri erkek Eğitim Fakültesi öğrencilerden

daha yüksek sürdürülebilir beslenme ilişkili içsel kontrol odağına sahipken, kadın öğrenciler ve erkek öğrencilerin sürdürülebilir beslenme davranışları arasında istatistiksel bir fark bulunmamıştır. Ayrıca eğitim fakültesi programları açısından, İlköğretim Fen Bilgisi Öğretmenliği ve Okul Öncesi Öğretmenliği programlarında okuyan öğrencilerin İngilizce Öğretmenliğinde okuyan öğrencilerden istatistiksel olarak daha sıklıkla sürdürülebilir beslenme davranışları gösterdikleri ancak öğrencilerin içsel kontrol odağının eğitim fakültesi programlarına göre değişmediği saptanmıştır.

Anahtar Sözcükler: Sürdürülebilir Beslenme, Öğretmen Eğitimi, Davranış, İçsel Kontrol Odağı, Sürdürülebilir Kalkınma için Eğitim

To My Family

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LIST OF ABBREVIATIONS

CEIT	Computer Education and Instructional Technology
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
EME	Elementary Mathematics Education
ESD	Education for Sustainable Development
ESE	Elementary Science Education
ESME	Elementary Science and Math Education
ELE	Elementary Education
ECE	Early Childhood Education
FLE	Foreign Language Education
HLTF	High Level Task Force
LoC	Locus of Control
METU	Middle East Technical University
SD	Sustainable Development
SDG	Sustainable Development Goals
SSME	Secondary Science and Math Education
UNSCN	United Nations System Standing Committee on Nutrition

CHAPTER 1

INTRODUCTION

To handle social, economic and environmental challenges emerging from human activities in the 20th century; sustainable development has been placed as a critical multilateral solution in the report titled with Our Common Future (World Commission on Environment and Development, 1987). Sustainable Development was described as *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (World Commission on Environment and Development, 1987, p.43). In consideration of current problems of the World such as poverty, hunger, malnutrition, gender inequality, environmental problems; land degradation, famine, loss of biological diversities and resources depletion etc., United Nations General Assembly adopted Sustainable Development Goals (SDG) in 2015. SDGs with 169 targets were declared to combat unsustainability problems and to provide sustainability of our World (Transforming our World: Agenda 2030, 2015).

Considering the widely cited definition of sustainable development, SDGs which stated in 2015 aim to combat current problems of the World. Regarding these current problems, food related issues such as hunger, nutrition related diseases (e.g malnutrition, obesity), food insecurity, and degradation of agriculture are also stated as critical problems which should be solved significantly to create sustainable development. Therefore, food related issues are integrated into several SDGs and related targets such as Zero Hunger, Responsible Consumption and Production, Climate Action (United Nations System Standing Committee on Nutrition (United Nations System Standing Committee on Nutrition (UNSCN), 2014; Food and Agricultural Organization (FAO), 2015; EAT Initiative; Sustainable Development Solutions Network (SDSN), 2015; High Level Task Force (HLTF), 2015). With the

food related sustainable development goals, creating sustainable food systems arises as an important target for a sustainable World hope (FAO, 2012).

A sustainable food system was identified as "a food system that delivers food and nutrition security for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised." (HLTF, 2015, p.1). As the definition put an emphasis on three aspects of sustainable development; economic, social and environmental perspectives, building a sustainable food system is crucial in order to attain food and nutrition for all generations without detriment to environment. In the unbalanced present food system, a number of people suffer from undernourishment, micronutrient deficiencies and also over-nutrition which increase food insecurity. Moreover, in the present food system, unsustainable agricultural practices are mainly used and high level food loss and waste are produced so these cause crucial effects on agriculture, natural resources and also climate change. Therefore, to create a sustainable food system, today's food production, distribution and, definite consumption and dietary patterns should be converted into a sustainable system considering the relationship of each other (HLTF, 2015). Specifically, consumers are seen powerful stakeholder to create sustainable food system because food system as supply-driven structure is driven by consumers. Therefore, if consumers want to have healthy, society, environment and economy friendly dietary patterns, they can mainly contribute to shift present unsustainable food system. In fact, for the conversion of present food system to a sustainable one, sustainable diet is regarded as one of the most effective main determinants rather than a goal (Gitz, 2015).

FAO (2010) defined sustainable diets as "diet with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generateons. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources" (p.7). In specifically, sustainable diet is stated as healthy and nutritious diet and food consumption which is society, economy and environment friendly on the contrary of present unsustainable dietary pattern (Johnston et al, 2014). LiveWell for

Life guideline (World Wildlife Fund (WWF), 2014) on sustainable diets suggested some recommendations for consumers to have sustainable diet, which was prepared based on the definition of sustainable diets by FAO (2010). The guideline stated some principles consumers to have sustainable diets handled three main themes as purchasing, eating and waste reduction. Moreover, it stated that sustainable diets can contribute decreasing greenhouse gas emissions released from food chain, decreasing nutrition related diseases such as obesity and malnutrition, protection of food culture and heritage and increasing affordable and healthy food, in contrast with present dietary patterns (WWF, 2014).

There are many serious costs of present food system on sustainability of the World, which is especially related to unsustainable diets and food consumption. First of all, unlike some part of the World, especially in developed countries, food consumption is extremely high because of increasing demands of food. Huge demand for food is also mainly to supply animal feed, bioenergy crops, foods with low nutritional value rather than healthy and nourishing food (WWF,2013; 2016). Unlike these patterns of developed countries, many people do not supply the needs among poor people who do not have enough food, school, hospitals and medication and home (UNSCN, 2015).

Regarding the impacts of developed countries on food system leading unsustainability trends, there are serious health-related social issues covering malnutrition and hunger in underdeveloped and developing counties because of food unavailability. Food crisis and world hunger are also stated as inevitable social issues in an unsustainable food system (UNESCO, 2009; WWF, 2016). One of the nine people in the World suffered from malnutrition in 2014-2016 while obesity affects around 500 million people (FAO, 2014) and is regarded as one of the main problems in children. As stated by UN (2015), 161 million of children up to five years old do not develop enough physically. In addition, nutritional deficiency affects poverty, labor productivity, and gender equivalence and education adversely (UNSCN, 2015). Moreover, present unsustainable food system includes many processed foods which are harmful for health and also affect traditional food culture negatively, which means that it affects negatively on society and cultural lives (Ministry of Health of Brasil, 2014).

Present food system has many detrimental impacts on environmental quality. Considering effects of unsustainable diets on food demands, current dietary patterns create pressure on agriculture in an unsustainable way such as high usage of fertilizer to supply the demand of feeds for livestock and foods for human. Therefore, it causes severe environmental problems like agricultural degradation, famine and loss of biological diversity (WWF, 2016).

In a national context, WWF (2012) reported that the "Ecological Footprint of Consumption" which is 2.7 gha in Turkey in 2007 equals the world average. In other words; if everyone in the world consumed as much as an average Turkish citizen, we would need 1.5 planets. The Ecological Footprint of consumption in Turkey which has not changed much over the years is over 50% of the global biological capacity per capita. In addition, the consumption level in Turkey is more than 100% of the amount of natural resources that the country produces sustainably (national biological capacity) and it is over 50% of the worldwide biological capacity per capita. Approximately 35% of Turkey's Ecological Footprint comes from demand for agricultural land (about 0.96 gha per capita). Regarding ecological footprint due to personal consumption, the report also stated that the largest of the Ecological Footprint components of Turkey is personal consumption at an 82% rate of 2,26 gha per person. Specifically, Ecological Footprint due to personal consumption is predominantly related to food (52%) (1.18 gha per person) in Turkey, which is mainly related to agricultural cropland demand (35%). The other Ecological Footprint due to personal consumption are related to the products required for manufacturing, transportation, service such as built-up areas and resources used for living spaces respectively (WWF, 2012).

Current food system has adverse impacts on also global climate change. The present food system produces about 15,000 megatons greenhouse gas in the year of 2008, which was calculated by considering whole process of foods in their life cycle assessment (LCA) steps such as “production, consumption, distribution, waste disposal etc.” (Vermeulen, Campbell, & Ingram, 2012). Fossil fuels are main energy source mostly used in the number of the stages of present food systems such as agriculture, production of farming products and fertilizers, cooling and transportation (FAO, 2013). Furthermore, it is stated in the report that "when food is discarded in a

landfill and decomposes anaerobically, it yields methane emissions, a gas more than 25 times as potent as carbon dioxide at trapping heat" (p.2). Specifically, considering the food related greenhouse gas emissions, current food system causes extreme climate events.

Considering economic consequences, the cost of food related problems is estimated $750 billion annually (FAO, 2013). Moreover, present food system is managed by global business and firms, which affects local and small farmers negatively. The most of the cost of food products are spent in other parts of food cycle such as in packaging, transportation stages rather than producer which causes that local farmers earn less than they deserve because of unfair trade and economy (Environmental Practice at Work, 2005) Briefly, present diets and food consumption have many adverse impacts on society, economy and environment to sustain the World. These indicators showed that the present food system should be altered in order to ensure healthy, environmental friendly, society sensitive and sustainable regularity. Therefore, to create such a food system, today's diets require a shift for balanced, healthy, minimized waste and local food based eating pattern. Then, to create a sustainable food system, increasing consumer awareness toward sustainable eating patterns, as sustainable diets are crucial (FAO& BIODIVERSITY, 2010).

To mitigate adverse consequences of unsustainable human activities, accelerating education for sustainable development, especially to increase public awareness, has been declared among the main goals of sustainable development (Global Sustainable Development Report, 2015). Moreover, according to Agenda 2030 (United Nations (UN), 2015) education for sustainable development should be vitally provided for everyone to eliminate the consequences of unsustainable systems such as extreme poverty, hunger, income and gender inequality, huge economic and social costs of food consumption, increasing endangering species and climate change. While the importance of the problems related to unsustainable food system is accounted, to create a sustainable food system, education is an important tool to handle food correlated problems (Garnett, 2012). Education is stated as an effective way for people to be adopted into sustainable diets because it is not only politically acceptable but also cost-effective tool in order to create sustainable food system. Therefore, education is a tool

to teach how people have sustainable diets in terms of eating and reducing food waste in a sustainable and healthy way (Department for Environment, Food & Rural Affairs (DEFRA), 2012; WWF, 2014). These all can be eliminated by increasing awareness and education, especially by the help of ESD.

In the context of education for sustainable development, the role and significance of teachers have been addressed widely. UNESCO (2012) states that to create ESD, *teachers have one of the most powerful roles succeeding the sustainability process that should be given concernment. Therefore, to increase awareness on sustainable development and to attain SD goals, teachers have been regarded as an essential element. Teacher education is vital because it shapes educators and teachers who are responsible for learning of future generations towards sustainable development and how to actualize it (United States Teacher Education for Sustainable Development Network (USTESD), 2013).* Therefore, to achieve quality education for sustainable development, it is ensured that "teachers are empowered, well trained, professionally qualified and motivated. (The Incheon Declaration for Education, 2015).

Altering behaviors toward creating sustainable lives is one of the main aims of ESD (Arbuthnott, 2009; Chung, 2013; UNESCO, 2017). ESD is seen one of the most important elements to alter behaviors through sustainable lifestyles and create sustainable societies not only today but also in futures (Taylor, Quinn & Eames, 2015; UNESCO, 2017). Regarding importance of teacher to construct sustainable World, adapting ESD into the teacher education programs is seen as an important element for transforming behaviors with respect to SDGs (UNESCO, 2014; UNESCO, 2017; USTESD, 2013; Venkataraman, 2009) In addition, integrating environmental education into teacher education programs is essential because teachers are important role models for students with in respect to perform favorable environmental behavior. With this consideration, it is proposed that studies to define teacher and preservice teacher environmental behaviors, and to compare environmental behavior of teachers and pre-service teachers pursuing into various teacher training programs are made (Timur, Timur, & Yılmaz, 2012).

Sustainable development and SDGs were addressed with a holistic approach which are stated interrelationship between multiple-perspectives "to acknowledge that there are many sides, or perspectives, to understanding community events and challenges" (UNESCO, 2014, p.19; UNESCO, 2017). Therefore, to understand sustainable development, dimensions of the sustainable development as environment, society and economy should be handled together. Knowledge and skills are also seen necessary to comprehend sustainable development and to promote lifestyles (UNESCO, 2017; UNEP, 2016). Therefore, taking into consideration that sustainable lifestyles including sustainable behaviors were handled as a holistic approach (Indo German Expert Group, 2015), understanding holistic approach is seen required to understand and to influence behavior (UNESCO, 2017). In addition, considering familiarity with sustainable development, knowledge and skills as a part of understanding can be affected by formal and informal experience such as education and media respectively (UNESCO, 2017; UNEP, 2016).

One of the important purpose of SDGs was stated to create sustainable lifestyle (UN, 2015). In addition, behaviors as actions and choices are seen important determinant to contribute and to create sustainable lifestyles (UNEP, 2016). According to OECD (2008), to design influential policies with respect to sustainable lifestyle, it is seen essential to increase awareness toward consumer behavior. Therefore, understanding of consumer behavior is important to increase exhibiting more favorable sustainable consumption behaviors. Specially, sustainable food consumption behaviors are stated as important element of sustainable diets on a large scale (Galli, & Lacirignola, 2015). Therefore, behaviors toward sustainable diets as purchasing, eating and waste reduction were seen important to adopt healthy, environment, society and economy friendly diet (WWF, 2014).

Rotter (1960) proposes the idea of locus of control as beliefs on which degree to change and control on people's own life's happening, consequences and outcomes, which affects behaviors and actions within the level of expectancy. Internal locus of control, especially, is defined as beliefs on people can change the positive or negative situations in their life by the way of their "own attitude, preparation and effort" (Grinnel, 2016). Internal locus of control is seen essential to behavior and action

change because of the relationship between behaviors and internal locus of control, especially, in terms of environmental, health related and consumption issues (Ahn et al., 2014; Bamberg & Möser, 2007; Boubonari et al., 2013; Cleveland et al., 2005).

Gender is seen one of the central determinants regarding sustainable food choice, diets, and food security (FAO, 2013, WWF, 2013), and to create food security for all female and male, it is important to shift present dietary choice and actions to balance and nutritious one (FAO, 2013). According to FAO (2017) to actualize food security, and sustainable food system, creating gender equality and increase women empowerment as a cross-cutting issue in across all SDGs are vitally important. Regarding gender determinant with respect to internal locus of control, it is stated that females have higher internal locus of control than males within respect to dietary choice in some studies. Regarding healthy eating habits, it is stated that female students are more oriented by internal locus of control than boys with respect to healthy eating habits. Furthermore, females believe that they can affect their health by their own actions toward health than males (Zhang & Jang, 2016).

Present study purposes to examine the familiarity and understanding of teacher education students on the term “sustainable development”, to define behaviors and internal locus of control towards sustainable diets, to examine relationship between students’ behaviors and internal locus of control pertinent to sustainable diets, and to investigate differences of gender and teacher education programs in behavior and internal locus of control pertinent to sustainable diets.

1.1 Purpose of the study

The research questions are defined as;

1. How much familiar is the term "sustainable development" to teacher education students?

2. What are the understanding of teacher education students toward “sustainable development”?

3. What are teacher education students’ behaviors toward sustainable diets regarding eating, waste reduction and purchasing actions?

4. What are the teacher education students’ internal locus of control pertinent sustainable diets?

5. What are the relationships between behavior and internal locus of control on sustainable diets of teacher education students?

6. Is there a significant difference between females and males in terms of behavior and internal locus of control on sustainable diets of teacher education students?

7. Are there significant differences among teacher education programs in terms of behavior and internal locus of control pertinent to sustainable diets of teacher education students?

8. Is there a significant interaction between gender and teacher education programs in terms of behavior and internal locus of control pertinent to sustainable diets of teacher education students?

Null Hypothesis: The problems defined above were tested with the following null hypotheses;

1. There is no statistically signifcant relationship between between behavior and internal locus of control on sustainable diets of teacher education students.

2. There is no statistically significant difference between females and males in terms of behavior and internal locus of control on sustainable diets of teacher education students.

3. There is no statistically significant difference between students from different teacher education programs in terms of behavior and internal locus of control on sustainable diets of teacher education students.

There is no significant interaction between students from different teacher education programs and gender in terms of behavior and internal locus of control on sustainable diets of teacher education students.

1.2 Definition of key terms

Sustainable development: is identified as *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (World Commission on Environment and Development, 1987, p.43).

Sustainable diet: Sustainable diet is stated as healthy and nutritious dietary pattern and food consumption which is society, economy and environment friendly (Johnston et al, 2014). In the Live well for Life guideline (WWF, 2014), there were stated some principles to consumers to have sustainable diets, which were handled three main themes as *eating, food purchasing, and waste reduction*. Then, in the present study, the term of sustainable diet is used as healthy, society, economy and environment friendly diet and food consumption based on three main themes as eating, purchasing and waste reduction.

Understanding: is stated as *"*a broad and balanced foundation knowledge of sustainable development, its key principles and the main debate within them, including its contested and expanding boundaries" (Kagawa, 2007).

Familiarity: In the present study familiarity was used as the state of recognizing sustainability or sustainable development.

Behavior: In the present study, the term of behavior is used as food related choice and actions as a consumer in terms of sustainable diets, which was based on three main themes as purchasing, eating and waste reduction for the last one year.

Internal Locus of Control: Locus of control was defined as beliefs on which degree to change and control on people's own life's happening, consequences and outcomes, which affects behaviors and actions within the level of expectancy (Rotter,1960). In the present study internal locus of control is used as beliefs toward reducing the threats to meet the needs of future generations and today's people by actualizing by demonstrating some certain food related behaviors as purchasing, eating and waste reduction related to sustainable diets.

Teacher Education Students: Teacher education students refer to undergraduate and graduate students registered on Elementary Science Education (ESE), Early Childhood Education (ECE), Elementary Mathematics Education (EME), Computer Education and Instructional Technology (CEIT), Foreign Language Education (FLE), Chemistry Education (CHED), Physics Education (PHED); and graduated programs of these teacher education programs which are Elementary Science and Math Education (ESME), Secondary Science and Math Education (SSME), M.S and PhD programs in Early Childhood Education (ECE), in Foreign Language Education (FLE), Computer Education and Instructional Technology (CEIT) programs in Faculty of Education at a public university in Ankara, Turkey.

1.3 Significance of the Study

ESD has been regarded as an important agent in order to actualize SDGs and a sustainable future. Within this respect, educators were seen vitally responsible to achieve SDGs by application and integration of ESD (UNESCO, 2017). Moreover, it was declared that ESD should be integrated into all education from early childhood education through higher education (UNESCO, 2012). Therefore, role of teacher is important because of responsibility of providing knowledge and skills and also the

specific behaviors (Brophy & Good, 1986) including sustainable dietary behaviors. In fact, School-age children imitate their teachers' eating behaviors and dietary patterns as role models typically, rather than imitating their parents (Turkey Public Health Agency, 2013).

Regarding present unsustainable lifestyles on current World problems, behavior change has a critical role on solution for environmental, social and economic issues. (Reisch, Eberie, & Lorek, 2013; Vinnari & Tapio, 2012). Then, in order to change behaviors, to ascertain behaviors is seen essential. In this aspect, researchers studied to explain human behaviors with a various variable which one of them is internal locus of control. Internal locus of control is seen as an effective element to explain human behavior (Ahn et al., 2014; Bamberg & Möser, 2007; Boubonari et al., 2013; Cleveland et al., 2005). In the literature, a number of study stated that internal locus of control influences behaviors, actions and choice. (Busseri, Lefcort, Kerton, 1998; Rosina, 2001). Moreover, internal locus of control is mentioned as "a positive way of addressing sustainable development" and it is proposed to be studied in more studies on sustainability related issues (Kim, & Reid 2016). In addition, internal locus of control is reported as predictive factor to increase environmental and sustainable actions and behaviors (Karbalae et al. 2013). It was also reported that internal locus of control was related with having healthy and nutritious eating pattern and living a healthy life; and performing favorable behaviors toward eating healthier food. (Clark et al., 2013). However, educational studies which are related to locus of control toward environmental education and ESD were stated as a gap in the literature (Hines, Hungerford, & Tomera, 1987, Kim, & Reid, 2016) and more studies to reveal possible relationship between locus of control pertinent to sustainable development issues are seen necessary. Moreover, it has been stated that there is a big gap on the area of food education studies in the literature with related preparation of pre-service teachers with respect to environment, health, governance (Elsten, & Futter, 2015). In addition, it has been proposed that more studies on locus of control toward ESD and sustainable development is also addressed on the area of educational studies in the literature (Kim, & Reid, 2016). Therefore, it should be handled in more studies on sustainability related issues.

Regarding examining gender differences, it is stated that in order to actualize Sustainable Development Goals examining of various variables such as age, ethnicity, education, and especially gender is an important tool to track inequalities which were studied by researchers. Gender is seen one of the main integrated indicators for sustainable food system which is essential to be examined in order to reveal the inequities with respect to resilience of food system (EAT Initiative, the Sustainable Development Solutions Network (SDSN) and CGIAR Consortium, 2015) Therefore, studies which evaluate the gender difference in sustainable development issues placed essential.

Concerning teacher education program differences, understanding of behavior is important to develop favorable dietary and behaviors (Galli, & Lacirignola, 2012). With this consideration, it is seen necessary that studies to define behaviors of teachers and preservice teachers, and to compare behavior of teachers and pre-service teachers pursuing into various teacher training programs are made (Timur, Timur, & Yılmaz, 2012) to shed light toward differences of the behaviors with respect to teacher education programs and may develop favorable behaviors regarding these differences.

In this aspect, to ascertain behaviors and internal locus of control of the teacher education students toward sustainable diets, and examine to relationship between related constructs and maybe shed light toward current situation of teacher education programs in terms of sustainable diets and may contribute improvement of teacher education programs toward ESD.

CHAPTER 2

REVIEW OF LITERATURE

In this chapter, summary of related literature is consisted. Accordingly, the chapter is comprised of four sections. The first section is related with sustainable development, sustainable development goals and food related sustainable goals. The second part is interrelated with sustainable diets, in global aspects and the effects of unsustainable eating pattern. Education for sustainable development (ESD) and sustainable diets in ESD are stated in the third part of the literature review. Finally, behavior and internal locus of control researches were stated.

2.1. Sustainable development

A very well-known definition of Sustainable Development is stated as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (World Commission on Environment and Development, 1987, p.43). Sustainable development arises as an important solution to manage handle social, economic and environmental problems mainly produced by human related actions in 20th century. In a detailed manner of these problems, firstly, many numbers of people are in poverty and hunger line, which accompany health related problems such as malnutrition etc. Moreover, gender inequalities and poverty increases among humans and countries day by day. Environmental degradations such as, land degradation, famine, loss of biological diversities and resources depletion also occurs in many place of the world. In addition, Climate change is a huge problem all people faced with as increasing global temperature, rising sea levels, ocean acidification and other impacts of climate change on coasts (Transforming our World: Agenda 2030, 2015). In consideration of current problems of World, SDGs for 2030

are declared to combat these problems and to provide sustainability of our World (Transforming our World: Agenda 2030, 2015).

2.1.1 Sustainable Development Goals

United Nations General Assembly accepted 17 Sustainable Development Goals with 169 related targets to develop sustainably in 2015. The goals and targets, such as Zero Hunger, Climate Action, Quality Education, are handled in three dimensions of sustainable development; environment, social and economic in balanced, which are comprise extensive issues from zero hunger to climate change and food sustainability. UN aims, with these goals and targets, not only integrated additional social issues like gender equality into development goals but also realizing Millennium Development Goals which do not actualize before (Agenda 2030, 2015).

Therefore, the 2030 SDGs and related targets are stated to change World current situation toward resilient, which are seen essential implementations for sustainable development and, planet and human beings in next 15 years (UN, 2015). In this context, for resilience of food sustainability, ending hunger and other food related problems, food sustainability and food related issues are integrated into most of these SDGs and related targets (FAO, 2015).

2.1.2 Food Related Sustainable Development Goals

To actualize development sustainably, meeting ‘Food and nutrition needs’ for all generations without harm to environment, construction of food sustainability is essential. In this consideration, for food sustainability, UN Global Sustainable Development report (2015) includes many foods related Sustainable Development Goals (SDGs) to decrease environmental, social and economic impacts of foods as targets for 2030. These targets for 2030 aim also to combat environmental impacts of

food, unsustainable agriculture and food related disease such as malnutrition etc. (UNSCN, 2014; FAO, 2015; EAT Initiative, SDSN & CGIAR, 2015, HLTF, 2015). Food related Sustainable Development Goals and related problem examples are shown in Table 2.1.

In these food related SDGs, most of them are closely associated with sustainable and healthy diets and food consumption which are mentioned with "*" in Table 2.1. "Goal 2; Zero Hunger" "Goal 3; Good health and well-being", "Goal 12; Responsible Consumption and Production" "Goal 13; climate action" and "Goal 15; life on land" mainly support sustainable eating patterns with their targets. These SDGs with their critical targets aims to directly struggle with problems caused by present unsustainable and unhealthy diets and food consumption such as, malnutrition, hunger, food insecurity, environmental degradation especially climate change and biodiversity (EAT Initiative, SDSN & CGIAR, 2015), which are also mentioned how they occur and why they are related with eating pattern in the next part. Therefore, to struggle with problems mentioned in GSDR (2015) and to achieve SDGs, present diets and food consumption should be changed toward sustainable ones (UNSCN, 2015).

Table 2.1. *Food related Sustainable Development Goals and related Problems Sustainable, healthy diets and food consumption related SDGs are shown with**

Sustainable Development Goals		***Problems***
Goal 1	End poverty in all its forms everywhere	Malnutrition
Goal 2*	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.	Hunger, land degradation
Goal 3*	Ensure healthy lives and promote well-being for all at all ages.	Obesity, malnutrition
Goal 5	Achieve gender equality and empower all women and girls.	Gender inequality in agricultural labor
Goal 6	Ensure availability and sustainable management of water and sanitation for all.	Insufficient agricultural production
Goal 12*	Ensure sustainable consumption and production patterns.	Decreasing food waste
Goal 13*	Take urgent action to combat climate change and its impacts	Emission of Greenhouse gases from food cycle
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Massive overfishing
Goal 15*	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat deforestation, and halt and reserve land degradation and halt diversity loss.	Loss of biodiversity in local seeds

2.2. Sustainable Diets

Sustainable diets are defined as eco-friendly and healthy diets which are responsible for environment and biodiversity while supplying food demands by considering food security- meeting available, adequate and accessible food for all- safely for not only todays but also future. The diets are nutrition rich, reasonably priced, available and accessible, traditionally sensible and protective the continuity of natural sources. (FAO 2010). Toward this definition modifying diets and food consumption toward sustainable habits is seen vital aim to achieve a sustainable food system. Furthermore, related importance of achieving food consumption and sustainable diets are stated that

accepting of healthier and sustainable diets by everyone must requires a better understanding of food consumption behaviors and of their various determinants in order to favor desirable changes through actions and regulations on buying and consumption behaviors, the food environments, the relative prices of foodstuffs as well as the behavior of the food and food industry. Therefore, sustainable diets are considered as important to achieve all these aims (Guyomard et al., 2012). Moreover, Johnston, Fanzo and Cogil (2014) regulate the "key components, determinants, factors" of sustainable diets based on definition of FAO & BIODIVERSITY (2010) with a figure (see Figure 2.1). In the figure, the researcher represented the key components of sustainable diets defined by FAO (2010) as "wellbeing, health", "biodiversity, environment, climate", "equity, fair trade" "ecofriendly, local, seasonal foods", "cultural heritage, skills" and "food and nutrient needs, food security, and accessibility". The researcher collected these key components into five main categories as "agriculture, health, sociocultural, environmental, and socioeconomic". Also the research states that sustainable diets concept is a complicated issue which key determinants and categories are interrelated with each other, then it can be challenging to understand the importance of sustainable diets and management toward actualizing it. Also supporting, processing and consuming of sustainable diets can be difficult because of the complicated and abstruse structure of sustainable diets. Therefore, to comprehend sustainable diets, it is stated as important that determinants of the sustainable diets as agricultural, environmental, social–cultural, economic and health as well as comprising determinants stated by FAO (2010). Furthermore, to handle the complicated structure of sustainable diets, a number of stakeholders should attend to manage these diets, which one of them is consumers. Consumers have major role on sustainable diets with their food related behaviors and choice. To incorporate consumers into sustainable diets, education and increasing awareness studies are considered crucially important (Johnston et al, 2014; Live Well for Life, 2014).

Figure 2.1. The key components, determinants, factors and processes of a Sustainable Diet. Reprinted from "Understanding Sustainable Diets" by J. L. Johnston, J. C. Fanzo and B. Cogill, 2014, *Advances in Nutrition, 5*, p. 421. Copyright 2014 by American Society for Nutrition.

According to WWF (2014) consumers are in their power to change present food system because food is an important part of life and supply-driven food system driven by consumers. If consumers want to have healthy, society, environment and economy friendly dietary patterns, they can mainly contribute to shift present unsustainable food system. WWF (2014) report LiveWell for Life guideline on sustainable diets to give recommendations to have sustainable diet. The guideline was prepared based on definition of sustainable diets by FAO (2010). In the guidelines, there were stated six main principles to consumers to have sustainable diets, which were handled three main themes as purchasing, eating and waste reduction. These purchasing, eating and waste reduction related principles were specifically stated as eating as "eating more plant";

"eating a variety of food", "eating fever food high in fat, salt and sugar" and "moderating meat consumption"; waste reduction as "wasting less food"; and purchasing as "buying food that meets a credible certified standard" and (WWF, 2014, p.17). The aim of these principles was stated as "to facilitate the adoption of diets which help curb climate change, are healthy, not wasteful and encourage the consumption of foods produced in line with high social and environmental standards" (WWF, 2014, p.16). Specifically, adoption of sustainable diets based on the guideline dietary principles can contribute decreasing greenhouse gas emissions from food chain, decreasing nutrition related diseases such as obesity and malnutrition, protection of food culture and heritage and increasing affordable and healthy food. (WWF, 2014). Similarly, the report of Principles of Healthy and Sustainable Eating Pattern (Food Climate Researh Network, 2012) also suggested dietary practices to improve eating consuming and waste management in sustainable and heathy way such as reducing waste, consuming considering the distribution and life cycle assessment steps.

Considering importance of gender in sustainable diet, according to FAO (2017) to actualize nutrition and food security, and sustainable food system, create gender equality and increase women empowerment, which are included as a cross-cutting issue in across all SDGs, are vitally important. Females are seen central part of the food system because they have many critical roles in production, processing preparation and distribution of food (FAO, 2013). However, females and girls were represented as one of the most food insecure population as not accessing enough and nutritional food, which cultural norms, socially constructed gender roles and poverty cause gender inequalities regarding food and nutrition intake and food security (SIDA (Swedish International Development Cooperation Agency), 2015). Moreover, increasing level malnutrition among females affect not only females but also their families and their children and the future generations, for instance, malnutrition in pregnancy and children during their first years of their life impact development process mentally and physically through whole life (FAO, 2013). In addition, undernourished females cannot benefit from "microcredit, schooling or paying jobs" (p.4) since nutritional disease, lower work capacity, and powerlessness regarding undernutrition (UNESCO, 2015). Therefore, gender is seen one of the central determinants regarding sustainable food choice, diets, and food security (FAO, 2013, WWF, 2013), and to

create food security for all female and male, it is important to shift present dietary choice to balance and nutritious one (FAO, 2013).

2.2.1 Global Perspectives of Sustainable Diets

Sustainable diets are important issue in international aspects. Therefore, international conferences, agreements and researches, especially with the scope of food sustainability issues are summarized in historical order in this part.

Food related environmental problems is firstly reported in 1972 UN report of the human environment. According to the report developing countries cannot afford the future needs ahead of their important needs for food, which is also problem related with the interests of future generations. Environmental factors in a valid part of development strategy with necessity of the emergency of development and environment (UN, 1972). While the report is not stated exactly "food sustainability", it puts the problems environmental problems related food. Also, Limits to Growth (1972), which is seen as an important milestone of sustainability, takes the public attention on these problems such as improper consumption patterns, process of food production, resource depletion and nutrition related diseases.

The Brundtland Report, proposed as also Our Common Future, (1987) states that present patterns have crucial impacts on World systems and food related sustainability issues. The report mentions challenge of increasing food demand and production; and food safety. Moreover, it states that pressure on the ecological and agriculture increase and they affect human needs, ecology and economy. Moreover, Agenda 21, (UN, 1992) declare food issues as food security, sustainable agriculture, food quality and sustainable consumption. Moreover, is also clearly assert present agriculture system and dietary patterns have critical influences on environment, biodiversity, natural resources and human culture so present system should be shift toward sustainable ones.

European Union (EU) Action Plan for Sustainable Consumption and Production (2008) stated that the problems faced todays are directly connected to our life styles. Present production and consumption patterns including dietary patterns contributes to pollution, global warming, material use, and depletion resource. The effects of consumption in the Europe show impacts on globally because of the using resources in much extend. Natural resources produced in the other part of the World are used in EU and excessive amount of products produced in other parts of the World but consumed in Europe.

According to (UK Sustainable Development Commission, 2005, 2009) one of the major challenges related food sustainability is achieving more sustainable dietary patterns. Dietary patterns comprised many food LCA steps such as marketing, freezing, cookery styles, and disposing of food wastes which all effects on environment. One of strategy recommend of UK report to handle these impacts is acting together with people and administrators to construct a sustainable food system to a better environment and healthy communities. Moreover, food preferences also shape food industry because of supple-demand balance and determine which foods are produced in what ways. Moreover, as in many guideline reports stated, consumers are crucially important on creating sustainable food system by their food choice on sustainable diets, especially on purchasing, eating and waste management levels (BMCC 2000; FAO,2016; WWF, 2014). Therefore, result of food preferences should be stated clearly and people's awareness should be increased toward sustainable diets; which can be achieved by food education (FAO&BIODIVERSITY, 2010).

2.2.2 Consequences of Unsustainable Diets

While modern World contends amounts of the sustainable challenges, unsustainable diets have critical results on environmental, social and economic issues. (Reisch, Eberie, & Lorek, 2013; Vinnari & Tapio, 2012). FAO and Biodiversity (2010) state present consumption patterns in the World as "elephant in the room" because of not considering any cost of it and also not taking any responsibility to change it. According

to Global Footprint Network (2012), If World population and insatiable consumerism continue to increase as today, human being will need additional two planets similar the Earth till 2030. In this part, effects of unsustainable eating patterns, included diets, on society, health, economy and environment are stated.

Firstly, food security is the one of the effected social issue of the unsustainable diets in two ways. First of all, developed and developing countries over consume in current food system then these effect the food costs so the food availability is influenced negatively, especially for 3th World countries. Even if global agriculture and food production can be able to supply food in enough for all, the food is not available in where people need it (WCED, 1987). The second that, intensive production of food in current system increases the pressure, then it depletes the agro- ecological resource, water and other production of plentiful foods, natural resources.

Secondly, unsustainable diets affect human health with causing dietary illnesses such as obesity, malnutrition etc. 795 million people, which accounted for one of the nine people in the World, were suffering from malnutrition in 2014-2016, while obesity affects around 500 million people (FAO, 2014) and is regarded as one of the main valid problem in children. As stated by UN (2015) Children up to five years old, 161 million of children do not develop enough physically and, then billions of them have nutrition deficiency causing several diseases such as, loss of sight, mental problems etc. Furthermore, nutrition deficiency also effects seriously productivity and mental health of people, who are necessary with their labor and effort for ending poverty, agricultural productivity, gender equivalence and education (UNSCN, 2015). Moreover, present unsustainable food system includes many processed foods, which are not only be harmful for health but also effect traditional food culture, which means affects negatively on society and cultural lives (Dietary Guidelines for the Brazilian Population, 2014).

Thirdly, the amount of food loss and waste generated by unsustainable diets affect also economy. As stated by FAO (2011) one third of annual foodstuff are loss and waste which equals to about 1.3 billion tones waste and loss. In economic way, food wastage affects economy directly about 680billion dollars in developed countries and

310billion dollars in developing countries annually (FAO, 2011). In addition, these wastes produce 3.3 billion tons of CO2 gases released to atmosphere annually (UNEP, 2013), and it is not only environmental effect of unsustainable diets. Moreover, present food system is managed by global business and firms, which affects negatively local and small farmers because the most of the price of products were spent at other part of the food cycle as packaging, transportation rather than producer, which causes local farmers earn less many than they deserve while on the going unfair trade and unfair economy (Environmental Practice at Work, 2005).

Finally, unsustainable diets which includes to consume products produced by unsustainable agricultural and manufacturing systems cause to environmental complications which are decreasing natural resources, huge amount of waste, soil fertility and agro ecologic degradation, water depletion, loss of biodiversity (UNEP, 2012). Unsustainable diets affect depletion of natural resources by increasing demand on the sources. In fact, Global food production comprises more than 70% of consumption of fresh water, land-use change, production of more than 30% of greenhouse gas, for 80% of deforestation (Nellemann et al, 2009). Furthermore, unsustainable diets cause to loss huge amount of species, especially in local species, because global food patterns, industrialism in food system as agricultural and industry, and simplification of diets affect eating pattern negatively (FAO, 2010). Therefore, with population growth and rising prosperity and consumption, included unsustainable diets, ecosystem services and ecosystems are expected collapsed by 2050 if current consumption trends do not change (SCAR, 2011).

Current food system has adverse impacts on also global climate change. The present food system produces about 15,000 megatons greenhouse gas in the year of 2008, which was calculated by considering whole process of foods in their life cycle assessment (LCA) steps such as “production, consumption, distribution, waste disposal etc.” (Vermeulen, Campbell, & Ingram, 2012). Food and Agricultural Organization (FAO, 2013) stated that fossil fuels are main energy source mostly used in the number of the stages of present food systems such as agriculture, production of farming products and fertilizers, cooling and transportation. Furthermore, it is stated in the report that "when food is discarded in a landfill and decomposes anaerobically,

it yields methane emissions, a gas more than 25 times as potent as carbon dioxide at trapping heat." Specifically, considering the food related greenhouse gas emissions, current food system causes extreme climate events.

2.3 Education for Sustainable Development and Sustainable Diets

2.3.1 Education for Sustainable Development

Global Sustainable Development Report (2015) education is the one of the main goals to draw a sustainable development and eliminate most of the impacts by the unsustainable activities. As the sustainability is an interdisciplinary concept, according to the UN Shaping the Education of Tomorrow report (2012), ESD which is the integrative theme included a lot of educational issues focuses on various viewpoints of sustainability like biodiversity, climate change, consumption pattern etc. Moreover, ESD is crucial to translate lives towards sustainable lifestyles and practices and actualize sustainable development as guiding principle of citizens lives (Venkataraman, 2009).

In Agenda 21 (1992), “education, training and public awareness” were stated as crucial aims to develop countries sustainably. These aims were connected with each aims of the agenda with including each chapter of the agenda. In other word, the importance of education and increasing awareness are emphasized in each chapter because achieving these aims such as poverty combating, changing consumption patterns or protecting health is not seen possible without ESD. In the education chapter of Agenda 21, “Reorienting education towards sustainable development” is placed as a main topic, which states that education should be directed toward good for environment and sustainability and efficient application of the education should be incorporated with other sustainable development subjects in all form of education. Moreover, education has numerous linkage between all 2030 Sustainable Development Goals, except from oceans related one, when 40 international documents, mostly UN documents, were examined. Although all these linkage and documents show the significance of

education and increasing awareness on sustainable development goals, there is huge number of shortage in literature related beliefs, behaviors and value based study related education for sustainable development (Vladimirova, La Blanc, 2015).

When state of ESD in the Turkey education program is examined, the subject and objectives related ESD is not enough and efficient. Moreover, education for environmental sustainability have already not been in the part of the education of Turkey because the interdisciplinary approach of the ESD is not included in it but the only environmental way is handled rather than social and economic aspects. In these gaps are considered, within the context of teacher and student education, environmental education programs should be revised toward education for environmental sustainability education and, then the education should comprise not only environmental issues but also social and economic issues, and as a solution of the present unsustainable problems (Tanrıverdi, 2009). Moreover, Teksöz (2013) declares that ESD is important that people gain responsibility and awareness concerning sustainable development goals and carry this awareness into future generations. To reach this aim, ESD should be applied into Turkey conditions as cultural, values and educational courses. On the other hand, while there are many experts on sustainable development issues and also some researches, projects related aspects, present ESD applications in Turkey is not satisfactory for this aim. Because of the reason of that, these do not act and organize together, therefore, do not serve the Turkey's Sustainable development goal. To develop ESD in Turkey, all determinants should work together by "taking lesson from past".

2.3.2 Sustainable Diets in Education for Sustainable Development

Importance of education on food sustainability, included sustainable food system and diets, agriculture and nutrition issues, is mentioned in various UN reports especially in last years. In the global reports, education and increasing awareness are stated supporter key determinant to create a sustainable food system. Moreover, education and food related sustainable development goals (SDG) such as zero hunger,

sustainable consumption and production, climate action etc. are linked in the UN reports, which also underlines the significance of education on food sustainability (Vladimirova, La Blanc, 2015). In this part, linkage of ESD and major SDGs related food are stated, rather than indirectly linked goals. In addition, position of sustainable diets in Turkey education is mentioned in that part.

According to 2030 SDGs, one of the main linked goal with education on food sustainability is Climate Action. In the targets of Climate Action goal, education target is mentioned clearly as "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning." While we concern that present diets emit huge amount of greenhouse gas and accelerate climate change, to actualize the target, food effects on climate change are importantly placed in education to shift present eating patterns towards sustainable ones (Karlson, Gonza'lez, 2009).

Another focal linked SDG with education and sustainable eating pattern is Sustainable Consumption and Production Patterns. Education is included in targets of the goal as stated that to create sustainable life styles, education should be integrated national education programs for not only students but also teacher education (UN, 2015). Furthermore, OECD (2008) stated that one of the most powerful tools is education to grow individuals with useful skills for being sustainable consumers. Related with sustainable diets, education is also crucial to combat health related and environmental effects of present food dietary patterns. To create sustainable diets, people should be aware of which foods they consume to protect not only their health but also environment (FAO& Biodiversity, 2010, Ruini et al., 2015). Therefore, today, many number of countries develop and use educational organizations, campaigns, action plans and programs to promote sustainable consumption within the scope of ESD. In fact, in some countries, such as Finland, sustainable consumption plan in education is a main goal to actualize sustainable education. Food sustainability related issues such as, nutrition related diseases, poverty, gender equity, agriculture etc., are also included in action plan of sustainable consumption plan education.

When food sustainable issues in education of Turkey are examined, there are some objectives related the issue in health concepts but the objectives are not based on the important sustainability aspects of the topic such as decreasing waste, food security and equity, social and cultural aspects of food. Moreover, the subject of consumption is handled only to increase awareness and development of positive attitudes to environment (Tanrıverdi, 2009). Turkey had also a nutrition program named as "Nutrition Friendly Schools Initiatives" which is also in place 17 European countries. The nutrition program include mainly healthy food based eating patterns, correcting nutrition disorders and education to change unhealthy and unregulated eating habits. The program also mentions the social and cultural way of food. On the other hand, the program is not included any environmental impacts of food and changing eating habits toward sustainable eating patterns (Turkey Ministry of Health, 2013). Corresponding with the nutrition program, according to Şahin and Teksöz (2016), "Nutrition Friendly Schools Initiatives" program is stated reasonable program for integration of SDGs and, integration of sustainable dietary patterns into Turkey formal and informal education programs is seen as a requirement for sustainable development.

2.4 Familiarities and Understandings towards Sustainable Development

Sustainable development is addressed with a holistic approach which are stated interrelationship between multiple-perspectives "to acknowledge that there are many sides, or perspectives, to understanding community events and challenges" (UNESCO, 2014, p.19). Therefore, to understand sustainable development, dimensions of the sustainable development as environment, society and economy should be handled together, not just separately. By this means, sustainable development can contribute to solve current World problems and conflicts. Within this context, SDGs were also emerged as holistic and comprehensive goals comprising multi-disciplinary issues to create sustainable development regarding these three dimensions (UNESCO, 2017).

Ensuring sustainable lifestyles was stated as one of the aims of SDGs. In fact, UN (2016) declared the year of 2016 the year of sustainable living to contribute shifting

present behaviors and adopting sustainable behaviors. Sustainable lifestyles as an SDG issue, including sustainable behaviors are also handled as a holistic approach (Indo German Expert Group, 2015). It is stated that understanding toward what holistic approach is related lifestyle and how different contexts require different lifestyle solutions. Therefore, without understanding holistic approach of sustainable development and sustainable living (UNESCO, 2017, UNEP, 2016), sustainable lifestyles may not be comprehended and lack of understanding can affect to change todays lifestyles as behaviors and actions to sustainable lifestyles.

To create sustainable development, knowledge and skills which are seen necessary to comprehend sustainable development are required elements as cognitive domain (UNESCO, 2017). Knowledge is also seen an element to promote lifestyles (UNEP, 2016). Moreover, to understand and to influence behavior, multi-disciplinary approach is seen required (UNESCO, 2017). Considering familiarity with sustainable development, knowledge and skills are affected by formal and informal experience. Regarding informal experiences, media is seen one of the main effective influence on lifestyles (UNEP, 2016). Furthermore, regarding formal experiences, education influence individuals to create lifestyles. Specifically, ESD is stated one of the main contributor to fulfil SDGs which includes sustainable lifestyles (UNESCO, 2017). Therefore, considering sustainable dietary patterns as a part of individuals' lifestyles (FAO, 2014), sustainable dietary behaviors may be influenced by formal and informal experience as education and media respectively.

2.5. Behaviors and Internal Locus of Control

One of the important purpose of SDGs is stated to create sustainable lifestyle (Agenda 2030, 2015). UNEP (2016) define sustainable lifestyles as following definition.

> A “sustainable lifestyle” is a cluster of habits and patterns of behavior embedded in a society and facilitated by institutions, norms and infrastructures that frame individual choice, in order to minimize the use of natural resources and generation of wastes, while supporting fairness and prosperity for all. (p.6)

Considering this definition, behaviors as actions and choices is seen important determinant to contribute and to create sustainable lifestyles. Behaviors are regarding to live individuals their lives including actions and choices toward using, consuming, wasting, purchasing etc. Food related behaviors comprising sustainable dietary patterns are also importantly placed in lifestyles as specifically with respect to eating, waste reduction and purchasing (FAO, 2014; UNEP, 2016). Regarding present lifestyles, todays dietary behaviors with respect to eating, wasting, purchasing have impact on society, environment and economy adversely such as obesity, increasing amount of waste, unfair trade etc. (UNEP, 2016; WWF, 2014) To shift todays behaviors to sustainable ones and support sustainable lifestyles, understanding behaviors and impacts of behaviors and lifestyle choices were stated as an essential step (UNEP, 2016). Therefore, in this study, behavior, as an important determinant of sustainable lifestyles, was defined as food related choice and actions as a consumer in terms of sustainable diets, which was based on three main themes as waste reduction, eating and purchasing.

Considering three main themes of sustainable dietary behaviors, firstly, behaviors toward food waste reduction comprise waste prevention actions such as storage, preparation, planned buying, planning of meal and portions, composting, recycling packaging wastes etc. Consumer behaviors are seen important because food wastes are mainly related with consumer behaviors in developed and developing countries. Therefore, changing consumer behaviors are necessary to reduce food waste in food chain (FAO, 2014; FAO, 2015; United States Environmental Protection Agency, 2017). In addition, sustainable eating behaviors include actions such as eating of various foods, consumption of nutritious, non-processed and health food, keeping balanced diet, and using top water etc. (FAO & University of Oxford, 2016). Sustainable eating is seen important to create resilient food system (FCRN, 2014). Finally, food purchasing behaviors are stated as purchasing from small local shops and

farms, purchasing fresh and in season foods, and buying sustainably produced and credible certified standards foods, and purchasing with considering fair trade. Food purchasing behaviors are seen important to develop sustainably. For instance, purchasing from small local shop and farms contribute the ecological and cultural diversity, local economy. Moreover, purchasing behaviors with respect to buying sustainably produced foods contribute to reduce greenhouse gas emission from production of foods and decrease the impacts of climate change (Sustainable Agriculture Research and Education, 2011& WWF, 2014).

Rotter (1960) proposed the idea of internal locus of control as beliefs on which degree to change and control on people's own life's happening, consequences and outcomes by individuals' own actions which affects behaviors and actions within the level of expectancy. Internal locus of control was stated as "a belief about whether the outcomes of our actions are contingent on what we do" (Zimbardo, 1985, p. 275). This means that people with intense internal locus of control consider that they can make difference on results of life occurrence by their own individual skills, personality, ability etc. Therefore, internal locus of control is stated as beliefs toward reducing the threats to meet the needs of future generations and today's people by actualizing by demonstrating some certain food related behaviors as purchasing, eating and waste reduction related to sustainable diets in the present study.

Internal locus of control is seen affecting and related with behaviors, actions and choice (Busseri et al., 1998). To predict, especially, environmental behaviors a number of study support that internal locus of control have strongly effects on environmental behavior and actions (Ahn et al., 2014; Bamberg & Möser, 2007; Boubonari et al., 2013 Cleveland et al., 2005). Moreover, people having higher pro-environmental behaviors are also more internally controlled locus ones, which were examined by a meta-analysis study on fifteen altered researches then this showed that internal locus of controlled people act more sustainable behaviors (Hines et al, 1987). Moreover, Kim (2012) assessed that Swedish students attended ESD related courses have higher internal locus of control toward creating sustainable future. The outcome of this study showed that most of the students attended the items toward "benefits of personal efforts for sustainable development", "ability to bring about change through their own

behavior", "I believe we can create a sustainable future". Moreover, the behaviors of students such as waste management, consumption patterns, using public transportation, to create sustainable future are also evaluated high but the reason of that also was inferred as high behaviors on sustainable development in developed countries but these behaviors may not develop as much as Sweden in developing and undeveloped countries. Furthermore, how degree people consider their behaviors strongly effects on environmental wellness, their environmental behaviors and actions are shaped toward positive and active way with internal locus of control (Bamberg & Möser, 2007). Therefore, internal locus of control is also important issue with respect to behavioral change into environmental education and education for sustainable development. In fact, when looking on the environmental and sustainable way of behavior in education, according to Boyes & Stanisstreet (2012), one of the aims of environmental education is to be able to inform about choices and behaviors toward environment, which is important for the solution of environmental problems. Moreover, teacher behavior maximizes the student achievement and for educational effectiveness, role of teacher is important because of responsibility of providing knowledge and skills and also the specific behaviors (Brophy & Good, 1986), which is also affected by internal locus of control of teachers and pre-service teachers. Rose and Medway (1981) high internal locus of controlled teachers are more effective on increasing students' achievement. Moreover, they can efficiently organize learning-friendly-environment and are successful to improve students' behavior in task.

The study of Boubonari et al., 2013 in which examine behaviors, locus of control and relationship between each other toward marine pollution and solution, states that teacher candidates do not high environmental behaviors but their internal locus of control toward struggle these problems are high. In addition, their internal locus of control scores and behaviors are significant relationship ($r=.27$ $p<.01$). Furthermore, in another study, in terms of environmental problems all around the world and local, teacher candidates' behaviors and attitudes, includes internal locus of control related items. Likewise, the previous study, results of the study showed that behaviors on not only local but also world as environmental problems are not highly developed, but their attitudes are high. In addition, there is a significant relationship between attitudes and behaviors of teacher candidates ($r=.49$, $p=<.05$). Furthermore, Alper (2014)

studied on "environmentally friendly behaviors" of teacher candidates in Turkey based on respondents' knowledge, attitude, internal locus of control and futuristic optimism towards present and future situations in earth and local environment. The study was conducted by path analysis and outcomes show that respondents having satisfactory "knowledge, ecocentric attitude; and powerful internal locus of control and futuristic optimism toward environment" behave more environmental friendly when comparing respondents as less knowledgeable, and pessimist toward environmental issues, anthropocentric and present optimistic. In addition to environmental behaviors, locus of control and teaching behaviors relationship is also examined in literature. According to Becker (1987) classroom behaviors of teachers; and classroom management and student success are correlated ($p<.01$). In other words, teachers with high internal locus of control rather than external teachers are more successful on controlling comprehension of students in the class, providing classroom management well during the class, and providing student and school success well.

Internal Locus of control were also searched in health, healthy food and consumption related studies. Zhang & Jang (2016) searched on internal LoC related health effects on "self-rated health" on which is a significant effects of internal locus on older adults than 60 aged. Also gender differences were examined. In the light of results, in females ($r = .36$, $p < .001$) "self-rated health" score was affected by internal health locus of control than males ($r = .21$, $p < .001$) respondents. In addition, according to Busseri et al. (1998), internal locus of control towards consumption was also significantly related with consumption behaviors ($\boldsymbol{r} = -.48$, $p < .001$). these results showed that respondents having internal consumption related locus of control scores have mostly planned and goal-oriented purchasing behaviors and they tend to purchase "higher quality goods, experience less regret, and have greater overall satisfaction with the things they buy". Furthermore, food consumption and dietary behaviors are also related with internal locus of control study results. Tabak et al (2009) studied on teenager students' food consumption and diet related behaviors and health related locus of control ($p<.05$). The study result showed that having more internal locus of control participants behave more health considering than external ones. Moreover, girls have more oriented by internal locus of control than boys and they have more responsibility on their own health ($t = 2.11$, $p < 0.05$). Sarıçam (2012) also examined that female preservice

teachers in state universities have higher internal locus of control compared with male pre-service students who have mostly externalized locus of control.

2.5.1. Summary of the Literature

In this chapter, sustainable development, SDGs and food related SDGs; and sustainable diets and food consumption in literature was summarized. Studies about teacher education, theory and researches on behaviors and internal locus of control in sustainable diets and food consumption and ESD aspects were handled in the literature review.

In the light of these researches, determining teacher education students' behaviors and internal locus of control toward sustainable diets are required because these may affect their teaching quality in their professional lives. Due to lack of sustainable diets based on behavior and internal locus of control of teacher education students in not only Turkey but also in international literature, stated of these are primarily purposed. In this study beliefs which refers to teacher education students' internal locus of control as beliefs to change threats on sustainable development by own attitude, preparation, and effort towards sustainable diets and sustainable diets and food consumption behavior which refers to related students' specific behaviors and practices of dietary and food consumption related sustainable issues. Moreover, especially educational aspects, teacher education students' possible relationships between behaviors and internal locus of control; and possible difference of gender and teacher education programs od related students in terms of sustainable diets were shown.

CHAPTER 3

METHOD

This chapter covers the parts of research design, population and sampling, procedure, variables, selection and development of the measuring tools including validity and reliability issues, data collection and data analysis, internal validity, and finally, assumptions and ethical issues of the present study.

3.1 Research Design

In this study cross-sectional survey research methodology, and associational research methodologies as correlational research and causal comparative research were used. The cross-sectional survey is described as a quantitative research methodology type to collect information from sample from predetermined population in just one point a time (Fraenkel, Wallen & Hyun, 2012). As to cross sectional survey, METU Teacher education students' behaviors and internal locus of control towards Sustainable Diets as well as familiarity and understandings toward sustainability and sustainable Development concept of the students were examined. In addition, correlational research design was used to define relationship between these constructs, and gender and teacher education programs differences in terms of these constructs were examined by using causal- comparative research design which used to define differences among groups (Fraenkel, Wallen & Hyun, 2012).

3.2 The Population and Sample

In the current study, the target population was defined as all the students enrolled in the undergraduate and graduate programs in Faculty of Education at the public universities in Ankara, Turkey. The accessible population, however, was determined as undergraduate and graduate programs in Faculty of Education at Middle East Technical University in Ankara, Turkey. Convenience sampling, which is selecting the participants who are available for the study (Fraenkel, Wallen & Hyun, 2012) was used in the study. These students enrolled in the teacher education programs was used to collect the data due to their accessibility for the researcher in terms of time, money and affordability. This study considered undergraduate programs which are; Elementary Science Education (ESE), Early Childhood Education (ECE), Elementary Mathematics Education (EME), Computer Education and Instructional Technology (CEIT), Foreign Language Education (FLE), Chemistry Education (CHED), and Physics Education (PHED); as well as the graduate programs relevant to these disciplines. Considering the population of the present study, Table 3.1 shows the population distributions of Teacher education studentsat METU in terms of grade levels and teacher education programs. Accessible population in Faculty of Education at METU was entirely 1686 for 2016-2017 spring academic semester.

Table 3.1. *Distribution of Teacher Education Students undergraduate and graduate programs*

Teacher Education Programs	**Freshman**	**Sophomore**	**Junior**	**Senior**	**Master/PhD**	**N**	**Percentages**
Early Childhood Education (ECE)	47	35	40	51	46	219	12.98
Elementary Science Education (ESE)	50	55	32	59	-	196	11.62
Foreign Language Education (FLE)	141	111	84	24	96	456	27.04
Computer Education and Instructional Technology (CEIT)	32	42	43	55	82	254	15.06
Elementary Mathematics Education (EME)	62	50	34	50	-	196	11.62
Secondary Science and Math Education (SSME)	44	28	12	67	73	224	13.28
Elementary Science and Math Education (ESME)	-	-	-	-	66	66	3.91
Elementary Education (ELE)	-	-	-	-	75	75	4.44
Total						1686	100

In the main study, the sample consisted of 556 teacher education students. Most of the participants were female (*N=462*, 83.1%) while percentages of male participants were 16.9% (*N=94*). The mean age of the participants was calculated as 22.51 years. Table 3.2 reveals the sampling distribution of the frequency distributions of teacher education students at METU in terms of gender, grade levels and teacher education programs. As revealed in the Table 3.2, most of the participant are from ECE (29%) and ESE (24.6%) programs respectively while the lowest participants are from SSME (5.9%) program. On the contrary, of the participants, 74 (13.3%) were Freshman, 161 (29%) were Sophomore, 122 (21.9%) were Junior, 141 (25.4%) were Senior and 58 (10.4 %) were Master and PhD grade level students.

Table 3.2. *Sampling Distributions of the Teacher Education Students*

Gender	**N**	**Percentages**
Female	462	83.1
Male	94	16.9
Total	556	100
Programs of Faculty of Education	**N**	**Percentages**
Early Childhood Education (ECE)	161	29.0
Elementary Science Education (ESE)	137	24.6
Foreign Language Education (FLE)	98	17.6
Computer Education and Instructional Technology (CEIT)	66	11.9
Elementary Mathematics Education (EME)	61	11.0
Secondary Science and Math Education (SSME)	33	5.9
Total	556	100
Grade Levels	**N**	**Percentages**
Freshman	74	13.3
Sophomore	161	29
Junior	122	21.9
Senior	141	25.4
Master and PhD	58	10.4
Total	556	100

The socioeconomic states of the participants were also examined in the main study. Table 3.3 demonstrates that the distribution of the sample number and percentages of students' monthly income of their families. Most of the participants reported the monthly income of their families were between 1001 and 3000 TL (40.6%) while the percentages of participants reported their family incomes as higher than 10000 TL was only 1.4%.

Table 3.3. *Sampling Distributions of Monthly Income of Participants' Families*

Monthly Income of the Family	**N**	**Percentages**
Less than 1000 TL	30	5.4
1001-3000 TL	226	40.6
3001-5000 TL	202	36.3
5001-10000 TL	90	16.3
Higher than 10000 TL	8	1.4
Total	506	100

In the main study, the participants were also asked whether their family grow vegetables/fruits or not. It was found out that almost half of the families (%50.9) do not grow fruit or vegetables, the other half of the families (%49.10) grow vegetable or fruit with a close rate proportions. In addition, the participants whose families grow fruits or vegetables were asked to select the reasons of their families growing fruits and vegetables among three options. The participants were informed that they could select more than one of these options. Then toward these options which were "leisure activities", "supporting family needs", and "providing financial gain", the number of the selected options were 354. Growing fruit or vegetables for leisure activities (174) % 49,15 consisted of about half of the selected reason. Furthermore, respond rate of supporting family needs was (144) % 40,67 while percentages of providing financial gain was (36) %10,16 within the lowest respond of the last demographic item of the scale. Table 3.4 shows frequencies and percentages of whether growing fruit or vegetables of participants' families and responds reasons of growing fruit or vegetables of participants' families.

Table 3.4. *The frequencies and percentages of whether growing fruit or vegetables of participants' families and responds reasons of growing fruit or vegetables of participants' families*

Whether growing vegetables/fruits or not	**N**	**P**
Growing	283	50.9
Not Growing	273	49.1
Total	556	100
Reasons of growing fruit or vegetables	**N**	**P**
Leisure activities	174	49.2
Supporting family needs	144	40.7
Providing financial gain	36	10.2
Total number of answers	354	100

There are some given must and elective courses based on ESD and nutrition education given toward teacher education students in Faculty of Education at METU. Table 3.5 showed these ESD, environment, nutrition and sustainable development related courses as well as teacher education programs, the grade level of the courses given, semester, and content and objectives of these courses which were taken from METU Faculty of Education web site. Most of the courses were given ESE and ECE teacher education programs.

Table 3.5. *Sustainable Development, ESD and Nutrition Related Courses given from METU Faculty of Education*

Courses	Program	Grade Level	Semester	Content
Must Courses				
Environmental Science	ESE	4th	Fall	*SD issues as a solution for environmental problems by making connections between three pillar of SD.*
Maternal and Child Nutrition	ECE	1st	Spring	*Fundamental concepts and principles of nutrition including sustainable food issues.*
Elective Courses				
Education and Awareness for Sustainability	ESE	Undergraduate	Fall	*Acquiring awareness and sensitivity to environment and sustainability issues*
Climate Change Education for Sustainability	ESE	Undergraduate	Fall	*Understanding, and adapting issues of climate change by SD view*
Laboratory Applications in Environmental Education	ESE	Undergraduate	Fall	*Improving skills and understanding to protect environment through SD comprising real life issues*
Methods of Teaching Current Issues on Sustainable Development	ESE	Undergraduate	Spring	*Teaching and learning issues on SD toward ESE with respect to ESD pedagogies and SD*
New Trends in Education: ESD	ESE	Graduate	Fall/Spring	*Understanding and İmproving skills toward ESD*

3.3 Variables of the Study

Familiarity and Understanding toward sustainable development, Behaviors towards Sustainable Diets and Internal Locus of Control towards Sustainable Diets were the dependent variables of the study. Moreover, gender and teacher education program were independent variables of the study.

3.4 Selection and Development of Measurement Tools

The measurement tools used in the present study comprised of four main scales which were titled as: "Demographic Information Questionnaire", "Familiarities and Understandings of Sustainability and Sustainable Development Questionnaire", **"**Behaviors towards Sustainable Diets Questionnaire", and "Internal Locus of Control towards Sustainable Diets Questionnaire". The procedure of selection and development, and usage of purpose of the measurement scales were shown in Table 3.6. The detailed information related these questionnaires were explained in the next parts.

Table 3.6. *Procedure of Selection and Development, and Purpose of Measurement Scales*

Scales	**Procedure of Selection and Development**	**Purpose**
Demographic Information Questionnaire	- Demographic Information scale include 6 items. -Item 5 and item-6 which are related with growing fruits or vegetables were developed by Lea and Worsley (2008), and adopted into Turkish in the present study	-To gather data associated with students' *gender, age, teacher education programs and grade level, family income* as well as *whether their families grow fruits or vegetables* with *reasons.*
Familiarities and Understandings of Sustainable Development	-Item 1 and item 3 were developed as 5 point Likert type and keyword question respectively by Kagawa (2007) and adopted into Turkish by Şahin (2008). -Item 2 was developed as multiple choice question by Şahin (2008).	-Item 1 was used to explore *familiarity* with the SD term with respect to usage in media and academia. -Item 2 aims to explore *understandings* toward SD. -Item 3 was used to assess *deeper understandings* toward SD.
Behaviors towards Sustainable Diets	The behavior scale with 12 items was prepared as 5 point Likert-type scale in the present study.	-To explore *food related choice and actions* as a consumer in terms of sustainable diets, which was based on three main themes as *purchasing, eating and waste reduction* for the last one year.
Internal Locus of Control towards Sustainable Diets	The scale with 15 items was prepared as 5 point Likert-type scale in the present study.	To explore *internal locus of control* as belief to reduce threats toward sustainable development via performing some certain food related actions related sustainable diets

3.4.1 Demographic Information of the Measurement Scale

Demographic information questionnaire was applied to gather data associated with students' gender, age, teacher education programs and grade level of the programs. In addition, participants were asked whether their families grow fruits or vegetables and to select the reasons of their families growing fruits and vegetables, which were taken from Lea and Worsley (2008) and adopted into Turkish in the present study.

3.4.2 Familiarities and Understandings towards Sustainable Development Scale

"Familiarities and Understandings towards Sustainable Development Scale" was used to search participants' familiarities and understandings toward "sustainability" and "Sustainable Development". There were three items used in the "Familiarities and Understandings towards Sustainable Development". The Item 1 and Item 3 were firstly developed as the items of the questionnaire of "A Questionnaire on Sustainable Development" by Kagawa (2007), and then adopted into Turkish as a part of the questionnaire namely as "a Questionnaire on University Students' Views on Sustainable Development" by Şahin (2008). Item 1 was used to explore Familiarity with the Terms of "Sustainable Development" or "Sustainability" with respect to usage in popular media and academic fields with 5-point scale. Moreover, item 3 was included in the scale to assess deeper understandings of students on these terms by keywords which participants write about sustainable development. The item 2 was developed by Şahin (2008), which aims to explore students' understandings toward Sustainability and Sustainable Development by a multiple choice question with five alternatives.

3.4.3 Behaviors towards Sustainable Diets Scale

The behavior toward sustainable diets questionnaire was a five-point Likert type scale. Firstly, relevant literature associated with sustainable diets was reviewed to prepare questionnaire (e.g.; FAO, 2015; HLTF, 2015; Lea and Worsley, 2008; UNEP, 2012; UNSCN, 2014; SDSN & CGIAR, 2015). The behavior toward sustainable diets scale was 5 Point-Likert scale and consisted 12 items at the final stage of the scale. For each of the items, participants were asked to how frequently they have done each behavior item for the last one year. The behavior scale was prepared to examine students' behaviors on food related choice as a consumer in terms of sustainable diets, which was based on, especially, Live well for Life (WWF, 2014) guidelines on sustainable diets. The guideline was prepared based on definition of sustainable diets by FAO (2010). In the guidelines, there were stated six main principles to consumers to have sustainable diets, which were handled three main themes as purchasing, eating and waste reduction. These purchasing, eating and waste reduction related principles were specifically stated as "eating more plant"; "eating a variety of food"; "wasting less food"; "moderating meat consumption"; "buying food that meets a credible certified standard" and "eating fever food high in fat, salt and sugar" (WWF, 2014, p.17). The aim of these principles was stated as "to facilitate the adoption of diets which help curb climate change, are healthy, not wasteful and encourage the consumption of foods produced in line with high social and environmental standards" (WWF, 2014, p.16). Then, in the procedure of preparing behavior scale, these principles and themes as purchasing, waste reduction, and eating behaviors were mainly considered in the study.

3.4.3.1 Pilot Study for Behaviors toward Sustainable Diets Scale

The sample was selected for pilot study from Sophomore, Junior, Senior and graduated level; ECE, ESE and ESME teacher education students at METU. The number of the participants in the pilot study were 149.

3.4.3.1.1 Validity Evidences in Pilot Study

First of all, for content validity of the scale, two experts were consulted toward reasonability of the content of the scale assessing behaviors on sustainable diets and food consumptions. Then, two items were revised in order to ensure content validity of the scale considering the expert opinions. Moreover, participants were debriefed based on the content, including clarity of items of the scale. To support construct validity of the scale, Explanatory Factor Analysis (EFA) was conducted in the pilot study, which is used to state whether a number of items can be defined by a few factors (Fraenkel, Wallen, & Hyun, 2012), and to supply evidence on construct related validity (Büyüköztürk, 2002). To provide factorability conditions, Barlet sphericity should be supported ($p<0.05$) (Bartlett, 1954), and the value of Kaiser Meyer Olkin should be higher than 0.6 (Tabachnick, Fideli, 2001). In addition, number of the participants in a study should be more five times of total number of items administered (Tabachnick, Fideli, 2007). In the pilot study of the research, Barlet sphericity was supported ($p=.000$) and Kaiser Meyer Olkin value was.89, which showed the reasonability for the factor analysis of the data. Furthermore, the sample size of the data was satisfactory with 149 participants. Therefore, these evidences supported the idea in that exploratory factor analysis could be used for this data set.

In the pilot study, there were 14 items in the behavior scale toward sustainable diets at the beginning. Principle component factor analysis method was applied. Furthermore, orthogonal varimax rotation was used as a rotation technic while conducting EFA. Eigenvalues and scree plot graph were examined to define total number of factors of the scale. Then, factor loadings, communalities, scree plots were considered to examine construct validity of the scale. Therefore, according to outcome of EFA, the scale had two-dimensions as *waste reduction*, and *eating and purchasing*. Moreover, after checking the factor loadings of the items in the pilot study, there was no item which was extracted from the scale, on the other hand, two items (item-3 and item-11) were revised considering construct validity of the scale.

3.4.3.1.2 Reliability Analysis in Pilot Study

While examining the reliability of the scale, Cronbach's alpha value was calculated as.88. According to Pallant (2011), Cronbach's alpha value calculated as 0.60 – 0.70 refers to adequate internal consistency, 0.70 – 0.90 shows good internal consistency, and 0.90 and higher indicates excellent internal consistency. Based on this criteria, Cronbach's alpha value of the scale showed good internal consistency.

3.4.3.2 The Final Version of Behaviors toward Sustainable Diets Scale in Main Study

Principle component factor analysis was used to provide evidence toward construct validity. Moreover, reliability analysis, as examining Cronbach alpha value, was used in the main study to examine internal consistency. The total number of the participants in the main study was 556 participants.

3.4.3.2.1 Validity Analysis in Main Study

To examine construct validity, firstly factorability of the scale was analyzed as examining Kaiser Meyer Olkin value and Barlet sphericity. According to analysis results, Barlet sphericity was supported (*p=.000*) and Kaiser Meyer Olkin value was found as.89 which supported the factorability of the main study. Furthermore, the sample size which consisted of 556 participants, was sufficient to factorability as five times more than the number of items in the scale. Secondly, for determination of the factor numbers, eigenvalues and scree plot were investigated. In addition, according to Catell (1966) significant and important factors for the study can be found with observation of breaking points in the scree plot, and the meaningful factors were placed before the breaking points. Figure 3.1 shows the scree plot of the behavior scale towards sustainable diets scale in the main study. According to results of EFA, the scale

contained two factors which explained a total of 54.4% of the variance. In addition, the first factor of the scale included nine items while second factor included three items. These two factors were named as “behaviors related purchasing and eating pattern” and “behaviors related waste reduction” respectively. The communalities and factor loadings of the behavior items were shown Table 3.7 In the process of scale preparation, the three consumption and dietary action categories such as eating, purchasing and waste management which can easily make as a consumer. Then, factor analysis results show that the two action type as purchasing and eating pattern behaviors were collected into one factor while waste management related behaviors are loaded another factor. On the other hand, different from the pilot study results, two items did not load these factors and they were not consistent with factors loaded, therefore, they were extracted from the scale. The extracted items were related with *consumption of fresh vegetables* and *fruits and consumption of vegetables and fruits in seasons*.

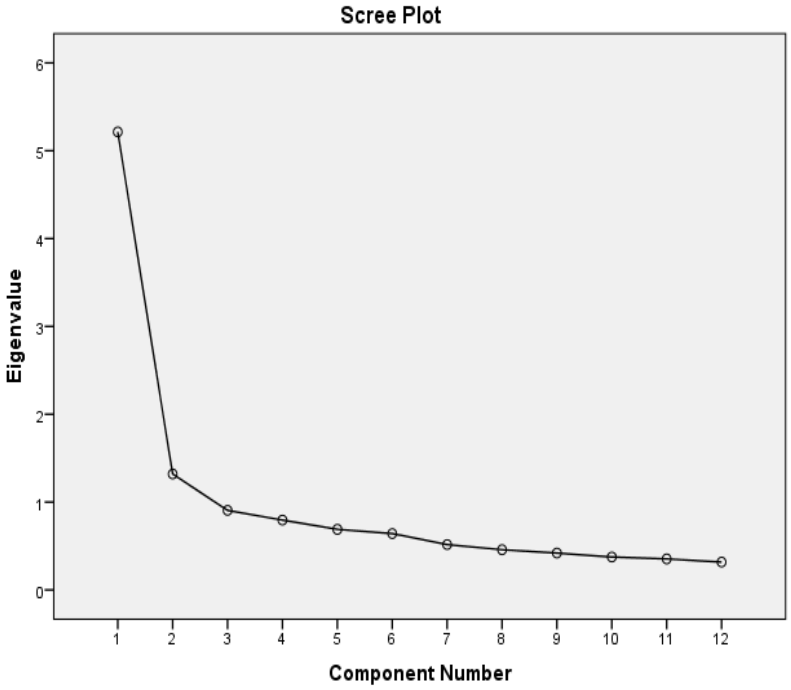

Figure 3.1. The scree plot of the Behaviors Toward Sustainable Diets scale in the Main Study

According to result of factor analysis, regarding the three behavior categories on sustainable diets, eating pattern and purchasing behaviors were collected into one factor while waste management related behaviors are loaded another factor. The reason of purchasing and eating related items loading in a same factor may be related with that students need to behave two dimensions with together because at first students purchase their foods then they eat these food, if they cannot grow their own foods. In other words, to eat some specific foods, or having an eating habit such as eating healthy food, people firstly need to purchase these foods. Furthermore, according to sampling analysis of the present study more than half of the students also stated that their families do not grow their own foods and students which stated their families growing food are mostly reported the reason of growing food as leisure activities rather than supplying their food needs and financial reasons. This may also show that student need to purchase their food to eat because they do not supply their foods to eat.

Table 3.7. *The communalities and factor loading of items of Two Dimension of Behaviors toward Sustainable Diets*

The Dimensions of Behaviors toward Sustainable Diets			
Behaviors related purchasing and eating pattern towards Sustainable Diets			
Items*	**Item Number**	**Communalities**	**Factor Loadings**
I have reduced consumptions of processed food. (e.g. junk foods, salami, sausage, frozen pizza)	Item 6	.597	.760
I have eaten packaging foods after looking ingredients.	Item 7	.565	.738
I have eaten variety of foods sufficiently instead of consuming too much one or two kinds of food.	Item 9	.516	.691
I have eaten high nutrition value foods (e.g. fiber, protein, vitamin – rich foods)	Item 8	.508	.689
I have avoided to consume Genetically Modified Foods (GMOs)	Item 5	.516	.679
I have reduced the consumption of fast foods.	Item 12	.469	.673
I have tried to consume organic foods.	Item 4	.473	.668
Considering all stages of food system, I have consumed foods which are environment, economy and society friendly	Item 11	.536	.653
I have purchased foods from small local shops and bazaars.	Item 10	.387	.578
Behaviors related waste reduction towards Sustainable Diets			
I have reduced food waste.	Item 1	.764	,855
I have reduced food packaging waste. (e.g. Glass bottles, jars, canned food boxes, processed food packages)	Item 2	.709	,823
I have reduced wasting the food.	Item 3	.494	,660

**For each of the items, participants were asked to how frequently they have done each behavior item for the last one year*

3.4.3.2.2 Reliability analysis in Main Study

Reliability analysis was conducted with Cronbach alpha value analysis. The Cronbach alpha value of total scale was found as.88 which was stated as good reliability (Pallant, 2011). Furthermore, the reliabilities of the scale's sub-dimensions and number of the items in the factors were measured, which was demonstrated Table 3.8. Moreover, corrected item- total correlations value of the items was also analyzed and all of the items were higher than.30 and positively correlated, which states that all items evaluate same things in terms of internal consistency (Pallant, 2007).

Table 3.8. *The Cronbach alpha values of the Dimensions Behaviors towards Sustainable Diets*

Sub-Dimension of Behavior Scale	**N of Item**	**Cronbach Alpha Value**
Behaviors related to Purchasing and Eating Pattern	9	.88
Behaviors related Waste Decreasing	3	.74

3.4.4 Internal Locus of Control towards Sustainable Diets Scale

Locus of control pertinent to sustainable diets questionnaire was prepared to examine students' internal locus of control toward sustainable diets. The development procedure of this scale began with literature review on about environmental psychology considering locus of control, sustainable development and sustainable diets (e.g. Alper, 2014; FAO, 2015; Grinnel, 2016; HLTF, 2015; Lea and Worsley, 2008; Rotter, 160; UNEP, 2012; UNSCN, 2014; SDSN & CGIAR, 2015; Smith-Sebasto, 1992). The internal locus of control toward sustainable diets scale was 5 Point-Likert scale and consisted 15 items. For each of the items, participants were asked to complete the sentence of "I can reduce the threats to meet the needs of future generations and today's people by actualizing …." with each 15 items to state to what extend they agree with

these statements. This sentence was modified from Environmental Action Internal Control Index scale which was originally developed by Smith-Sebasto (1992) and implemented in Turkish conditions by Alper (2014) to examine pre-service teachers' internal locus of control on resolving environmental issues.

3.4.4.1 Pilot Study for Internal Locus of Control toward Sustainable Diets Scale

For the first draft of the scale included 16 items related locus of control toward sustainable diets. The sample was selected for pilot study from METU ECE, ESE and ESME teacher education students who were Sophomore, Junior, Senior and graduated level students, which number of them 149.

3.4.4.1.1 Validity Analysis

To support content validity of the scale, reactive comments were taken from two experts who have comprehensive knowledge on sustainable diets. After revising some items towards expert opinions in terms of appropriateness for the content, Explanatory Factor Analysis (EFA) was conducted to provide construct related validity evidence (Büyüköztürk, 2002). To support factorability, Kaiser Meyer Olkin value should be more than 0.6 and Barlet sphericity should be supported (Tabachnick, Fideli, 2001). In addition, the sample size should be higher five times of the number of items in the scale to conduct EFA (Tabachnick, Fideli, 2007). According to evidence for factorability in the study, Kaiser Meyer Olkin value was.90 which is higher than 0.6 and Barlet sphericity was supported ($p=.000$). Besides, the sample size of the pilot study was higher 5 times than the item numbers of the study with 149 participants (Tabachnick, Fideli, 2007). Therefore, evidences for factorability were supported.

In the pilot study, there were 16 items in the internal locus of control scale toward sustainable diets. Principle component factor analysis method was utilized with varimax rotation which is one of the mostly used orthogonal rotation technique for EFA (Pallant, 2011). To determine the factor number of internal locus of control scale,

eigenvalues and scree plot were analyzed. Then, to decide items' consistency with factors, communalities, rotated factor loadings and consistency of items with loaded factors were examined. According to result of EFA, the scale reflected unidimensional structure. Moreover, after checking the factor loadings of the items in the pilot study, one item, which was related consuming food with considering all stages of food system, was extracted from the scale as they did not load main factor and were not consistent with factor loaded. In addition, two items (item-1 and item-15) were revised considering construct validity of the scale.

3.4.4.1.2 Reliability Analysis

To determine the internal consistency of the scale, coefficient alpha of the scale was analyzed. According to Pallant (2011), Cronbach's alpha value among 0.60 – 0.70 refers to adequate internal consistency, 0.70 – 0.90 indicates good reliability, and 0.90 and higher indicates excellent internal consistency. Based on the criteria reliability values was measured as 0.889 which shows the scale as good reliability. The reliability result was reported after analyzing corrected-item total correlation of the items' convenience and regulations towards validity analysis of the scale.

3.4.4.2 The Final Version of Internal Locus of Control towards Sustainable Diets Scale

After conducting of the internal Locus of Control towards sustainable diets scale on 556 teacher education students at METU, principle component factor analysis and reliability analysis were utilized in the main study to support construct validity and internal consistency respectively.

3.4.4.2.1 Validity Analysis for Main Study

EFA was applied as principle component analysis to support construct validity. For factorability, Kaiser Meyer Olkin value was.95 and Barlet sphericity was supported (*p=.000*), which confirmed the factorability of the main study. In addition, the sample size of the main study was sufficient to factorability because it was five times more than the number of items as 15 items in the scale. To define the factor numbers, eigenvalues and scree plot graph were examined. Via the scree plot test, significant and important factors for the study can be found with observation of breaking points in the plot. The meaningful factors were placed before the breaking points (Catell, 1966). According to this information, after examining of scree plot, it was stated that there was one main dimension of the scale in which all 15 items loaded. Figure 3.2 shows the scree plot of the internal Locus of Control scale in the main study. Moreover, the scale consisted of one factor which explained a total of 50.1 % of the variance. The communalities and factor loading of internal locus of control items were shown Table 3.9.

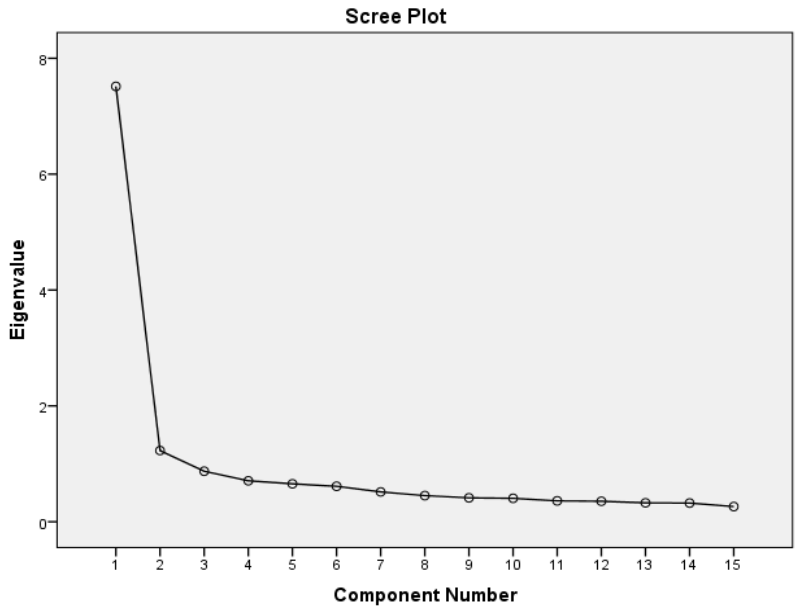

Figure 3.2. The scree plot of the internal Locus of Control toward sustainable diets scale in the main Study

Table 3.9. *The communalities and factor loading of items of the main dimension of internal locus of control toward sustainable diets*

The Main Dimension of internal Locus of Control toward Sustainable Diets			
Items	**Item Number**	**Communalities**	**Factor Loadings**
…avoid Genetically Modified foods.	Item 12	.645	.803
…prefer organic foods.	Item 11	.645	.803
…buy seasonal fruits and vegetables.	Item 7	.602	.776
…avoid eating processed foods.	Item 9	.597	.773
...eat adequate and balanced nutrition.	Item 10	.588	.767
… reduce to waste foods.	Item 8	.583	.763
…use sustainable farming products (free-range chickens and eggs; foods produced by sustainably).	Item 4	.516	.718
…purchase foods by taking into consideration of fair trade.	Item 13	.507	.712
…reduce food waste.	Item 14	.488	.698
…purchase food from small local shops and bazaars.	Item 5	.476	.690
… choose traditional kitchens instead of fast foods	Item 6	.419	.647
…compost food waste	Item 2	.390	.624
…keep balance diet rather than consuming excessive red meat	Item 15	.374	.612
…recycle food packaging waste (e.g. paper packaging, glass jar, etc.)	Item 1	.367	.606
... use potable tap water	Item 3	.318	.564

3.4.4.2.2 Reliability Analysis for Main Study

Cronbach alpha value was revealed in the main study because to support internal consistency. The Cronbach alpha value was measured as.93 and, according to Pallant (2011), 0.90 and higher of the Cronbach alpha values as measured in the main study for internal consistency analysis of this scale, states excellent internal consistency. The Cronbach alpha value in main study was also higher than Cronbach alpha value in pilot study. Moreover, corrected item- total correlations value of the items was higher

than.30 and all of them are positively correlated, which states that all items evaluate same things in terms of internal consistency (Pallant, 2007). In addition, Table 3.10 showed the summary of the behavior and internal locus of control constructs' number of items, reliabilities and explained total variance.

Table 3.10. *Reliability and total variance explained of the Constructs in the Main Study*

Constructs	**Number of Items**	**Total Variance Explained (%)**	**Cronbach alpha**
Behaviors towards Sustainable Diets	12	54.4	.88
- *Waste Reduction Sub-dimension*	3	10.9	.74
-*Eating and Purchasing Sub-dimension*	9	43.4	.88
Internal LoC towards Sustainable Diets (*unidimensional structure*)	15	50.1	.93

3.5 Procedure

In this study, views and understandings of sustainability and Sustainable Development; behaviors, and internal locus of control towards Sustainable Diets Teacher education studentsat METU were examined. Moreover, gender difference, difference among teacher education programs, and interaction of the independent variables on the dependent variables were examined. In addition, the relationship between behaviors toward sustainable diets and internal locus of control toward sustainable diets was explored. The beginning of the study, firstly, related literature on sustainable development, ESD, sustainable diets, and behavior and internal locus of control theories were reviewed. Considering the related literature (FAO, 2015; HLTF, 2015; SDSN & CGIAR, 2015; UNEP, 2012; UNSCN, 2014; WWF, 2014), the measurement scales of behavior and internal locus of control on sustainable diets were prepared. Moreover, to examine views and understandings of sustainability and Sustainable Development, the part of the scale of "A Questionnaire on Sustainable Development" developed by Kagawa (2007) and adapted to Turkish condition by Şahin (2008) was used.

Pilot study was administered on 149 ECE, ESE and ESME students, at METU during December- 2016 - January-2017. Then, to administer questionnaire, the required approvals was taken from Research Center for Applied Ethics (UEAM) at METU because of ethical concerns (APPENDIX-C). Administering the measurement tool for main study was actualized during May- June 2017. The pilot and main data were collected via direct administration method in classroom settings and students were invited to participate in the present study voluntarily without their identity defined. Moreover, they were informed about the purpose of the study. Data collection procedure was handled by researcher. Approximately 15 minutes were enough as time to complete all of the questionnaire using in the study.

3.6 Statistical Analysis in the Study

After applications of the instrument, the data were analyzed with descriptive methods and inferential methods by SPSS 22. IBM program. In addition, to analyze and support measurement scales' validity and reliability concerns, also SPSS 22. IBM program was utilized.

3.6.1 Descriptive Statistic

In descriptive statistic, the mean, percentages and standard deviations of teacher education students' behaviors and locus of control toward sustainable diets were presented with graphs and writing. Behavior items were executed with "never" coded as 1, "rarely" as 2, "sometimes" as 3, often" as 4, "always" as 5; and internal locus of control items were calculated with ''strongly disagree'' coded as 1, ''disagree'' as 2, ''neutral'' as 3, ''agree'' as 4 and ''strongly agree'' as 5. In addition, frequencies and percentages of participants' response toward familiarities and understandings in terms of "sustainability" and "Sustainable Development" part of the scale were examined and shown in bar graph and table for keywords on the related topic.

3.6.2 Inferential Statistic

Inferential statistics was utilized to examine whether there are relationships between behaviors toward sustainable diets and internal locus of control toward sustainable diets. To analyze the relationship between the variables, bivariate correlation statistic method was used. In addition, to examine the differences between genders and among teacher education programs; and interaction these independent variables on dependent variables, two way MANOVA and for follow up analysis ANOVA with post hoc were applied.

3.6 Internal Invalidity Issues

Internal validity description is stated as "observed differences on the dependent variable are directly related to the independent variable, and not due to some other unintended variable." (Fraenkel, Wallen & Hyun, 2012, p. 166). In this study, possible internal validity threats are presented as subject characteristic, data collector characteristic, social desirability bias and location.

Subject characteristics threat is selection of participants causes differences on variables in unintendedly (Fraenkel, Wallen & Hyun, 2012). In this study, convenience sampling was used, which could be cause differences of subject characteristics. This threat should be cared because extraneous variables, such as background knowledge, experience of participants, attitude, age or interest could affect variables (Fraenkel, Wallen & Hyun, 2012). Therefore, subject characteristics could be a threat in this study and the extraneous variable could be regarded on further researches relate issue.

Secondly data collector characteristics may be one of the internal validity threat in present study. The data collectors can affect participants in positive or negative way because characteristics of data collector might affect data obtained (Fraenkel, Wallen & Hyun, 2012). To eliminate this threats only the researcher collected data.

Social desirability bias was stated as “one of the recognized types of measurement error and occurs when a respondent provides an answer which is more socially acceptable than his / her true attitude or behavior” (Kaminska, Foulsham, 2013, p.1). In this study, behavior toward sustainable diets and internal locus of control pertinent to sustainable diets were examined. Then, teacher education students may state more socially acceptable answers than their own behaviors and internal locus of control. Therefore, social desirability bias which is one of the most effecting bias of the survey research validity (Nederhof, 1985) may be an internal validity threat of the study, and prevention and detection methods such as social desirability scales, using forced-choice items can be applied to cope with social desirability bias (Nederhof, 1985) in the further studies.

Fraenkel, Wallen & Hyun (2012) stated as “location threat” that “the particular locations in which data are collected, or in which an intervention is carried out, may be alternative explanations for results.”. (p. 169). To control this threat, location which instruments was applied can be hold constant (Fraenkel, Wallen, 2009). Then, to be able to standardize location, data collection procedure was conducted in classroom settings for all participants.

3.7 Assumptions, Limitations and Ethical Issues

3.7.1 Assumptions

In this study statements below will be assumed;

1. Participants of the research answered each item of questionnaire sincerely.
2. The questionnaire of the research was conducted under normal conditions.

3.7.2 Limitations

In the current study has following limitations;

1. Self-reported questionnaire was used for instrument of the research, which could not represent objectivity totally.

2. Social desirability scale was not used in the study to prevent or detect the social desirability bias, which may affect the result of the survey research.

3. This study was limited with one state university in Ankara district so the results may be not representative for all faculty of education in state and private universities in Ankara.

4. In the study, convenience sampling technique was uses. Therefore, the results are not generalized all teacher education students in Ankara.

3.7.3 Ethical Concern

The study concern following ethical issues

1. Participants' identities and information about private life were not taken and stated.

2. The participants were informed about the aim of the study.

3. The study did not harm psychological or physical to participants.

CHAPTER 4

RESULTS

In this part of the study, the findings of the study focusing on teacher education students' familiarity and understandings on Sustainability and Sustainable Development; behavior and internal locus of control toward sustainable diets; relationship between behavior and internal locus of control on sustainable diets; and differences of gender and teacher education program on teacher education students' behavior and internal locus of control toward sustainable diets were given.

4.1 Familiarity and Understandings of Sustainability and Sustainable Development Concept of Teacher Education Students in the METU

Teacher education students at METU were asked to how familiar they are with "Sustainable Development" and "Sustainability" terms with respect to the usage in popular media and their academic field. Firstly, participants' familiarity with the terms of "Sustainable Development" or "Sustainability" with respect to popular media were presented in Figure 4.1. Majority of teacher education students (62,95%) stated themselves familiar with sustainable development term regarding popular media. It was found out that about one-third of the participants (36,3%) stated that they are "somewhat familiar" with the terms with respect to usage in popular media. Furthermore, participants declared themselves (21,2%) "moderately familiar" and (5,4%) "extremely familiar" with the terms in terms of their usage in popular media. Furthermore, the rate of teacher education students in the METU stating their familiarity with these terms in popular media as "not at all familiar" and "quite unfamiliar" was 20,3 % and 16,7%, respectively. Considering gender, majority of female (61,2%) and male (60,43%) students stated themselves familiar of sustainable

development with respect to usage in popular media with similar rate.With respect to teacher education programs, students who stated *familiar* the sustainable development with respect to popular media mostly pursued in in ECE (69,54%) and ESE (71,06%), whereas students who mostly stated that they were *unfamiliar* sustainable development regarding popular media were pursuing in FLE (75,05%).

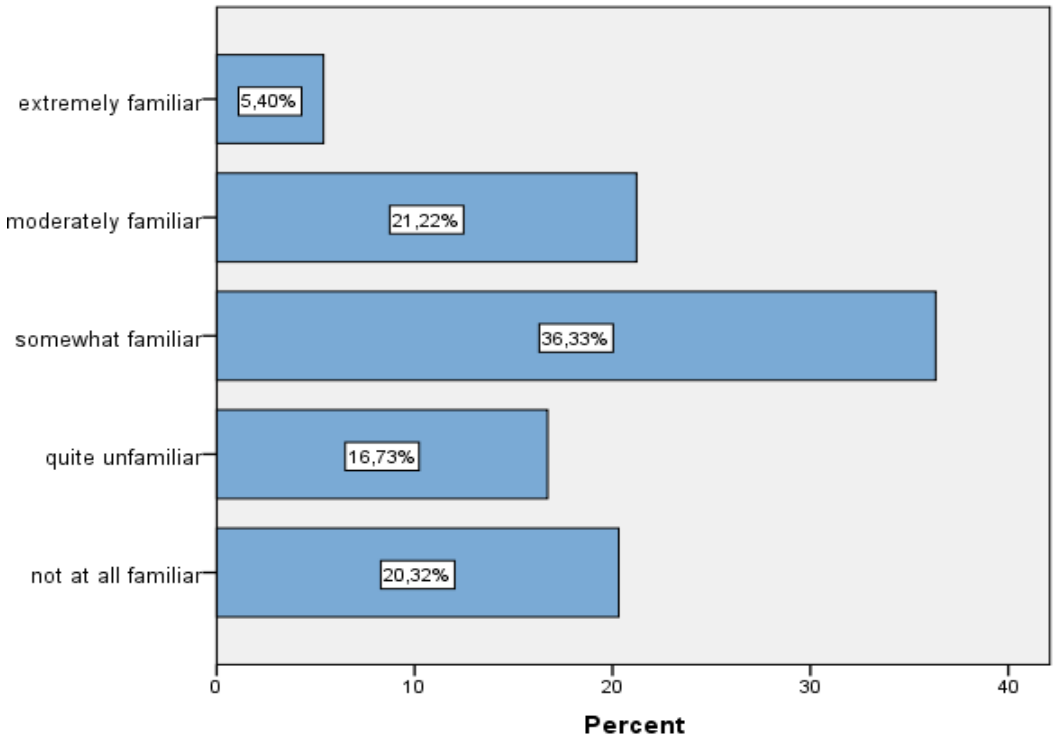

Figure 4.1. METU Teacher Education Students' Familiarity with the Terms of "Sustainable Development" or "Sustainability" with respect to usage in popular media

Figure 4.2 showed the familiarity with the terms of "Sustainable Development" or "Sustainability" with respect to the participants' academic usage. Majority of teacher education students (63 %) stated themselves familiar with sustainable development term regarding About one quarter of the students (29,3%) stated themselves "somewhat familiar" with these terms usage in their academic fields. Furthermore, students who identified their familiarity with the terms in their academic field usage as "moderately familiar" (21,8%) were more than one-fifth of the participants and 11,9

% of the participants declared themselves “extremely familiar” with these terms in academy. Furthermore, the rate of teacher education students stated the familiarity with these terms in academic usage as “quite unfamiliar” and “not at all familiar” were 17,3% and 19,8% respectively. Considering gender, majority of female (61,8%) and male (57,1%) students stated themselves familiar of sustainable development with respect to usage in academia with rate. Regarding teacher education programs, students which stated familiar the sustainable development with respect to academia mostly pursued in in ECE (86,5%) and ESE (76,6%) while students who at least stated that they were familiar sustainable development regarding academia were pursuing in FLE (25%).

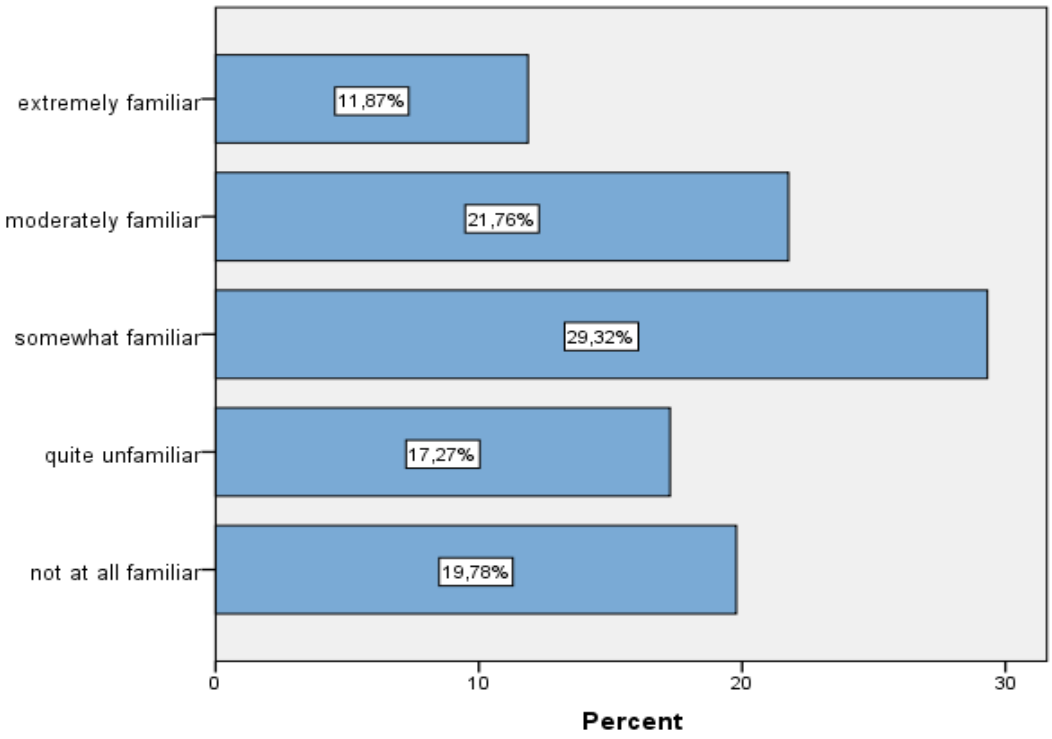

Figure 4.2. METU Teacher Education Students’ Familiarity with the Terms of “Sustainable Development” or “Sustainability” with respect to academic usage

The participants who stated themselves as familiar with “sustainable development” or “sustainability” were asked to state their own definition of these terms. These students

(60,6%) mostly considered Sustainable Development as a very well-known definition of "*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*" (World Commission on Environment and Development, 1987, p.43). Furthermore, one-fourth of these participants (25,8%) viewed the term as *"development that aims to preserve environment and our natural resources in order to overcome the "ecological crisis" that we face with*". In contrast, the rate of these students identified the Sustainable Development term as *"growth that sustain the provision of goods and services as well as the enhancement of their qualities for long term"* was 6,8 %. Furthermore, *"economic growth which meets the needs of society for both long and short term by showing no concern for environmental protection" (*2,8%) and *"development which allows individuals to live according to their own views of good life"* (4,8%) were stated by the students as their own "sustainability" and "sustainable development" descriptions with the lowest percentage rates. In addition, considering definition with respect to gender, female students (59,7%) and male students (64,6%) mostly defined sustainable development as "*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*" (World Commission on Environment and Development, 1987, p.43). Besides, regarding definition with respect to teacher education programs, majority of FLE (66,6%), ESE (63,7%), CEIT (62,9%), ECE (60,1%), EME (50,1%) and SSME (45,5%) defined sustainable development as the very well-known definition of sustainable development respectively.

The students were requested to write "sustainable development" or "sustainability" related keywords to attain deep information about understandings of these students on the terms. There were entirely 812 written keywords signified the participants understanding of related terms. Some examples of the related keywords identified by the students and wider categories comprised the keywords (Kagawa, 2007; Şahin, 2008) were presented in Table 4.1.

Table 4.1. *Categories with the Keywords stated by METU Teacher Education Students*

Categories	**Examples**
Aspects	
Environment	Environment, Reuse, Recycle, Reduce, Renewable energy, Ecologic footprint, Biodiversity natural
Social	Society, Culture, Human rights, Women rights, Equity of people, Peace, Justice, health
Economic	Economy, Production, Productiveness, National income
Multidimensional aspects	Climate change, Genetically Modified Organisms, Organic food/agriculture, local food/agriculture
Temporal	
The Future	Inter-generational, Future generations, Needs of future generations,
Long-Term	Continuing, Eternity, Long period
Improvement	Growth, Develop, Improvement
Stability	Constant, Stable
Approaches towards Sustainable Development	
Governance, policy, politics	Policy, Capitalism, Democracy
Learning and action	Awareness, Education, Education for Sustainable Development, Education for All
Management	Goals, Sustainable Development Goals, Plan, Precautions, Strategies
Technology	Technology, Electromagnetic pollution
Homeostasis	Equilibrium, Cycle, Circle
Human attitude	Harmlessness, Responsibility, Selfishness, Forethoughtfulness
Perceptions of sustainable development/sustainability	
Feelings	Positive, Necessary, Important, Supportable, Favorable

The frequencies of the categories “sustainable development” and sustainability” related keywords based on teacher education students at METU were shown in Figure 4.3. Almost one-half of these keywords viewed by the students (47.8%) were environment related keywords as “environmental aspect of sustainable development and sustainability”. In contrast, social (9 %) and economic (9 %) aspects were merely defined about one-tenth of the participants. Furthermore, the future (7.9%) and long-

term (8,9%) related key words were stated closely to categories of social and economic aspects percentages. Moreover, multidimensional aspects (4,3%) related keywords and other keyword categories were stated less than 5 percent.

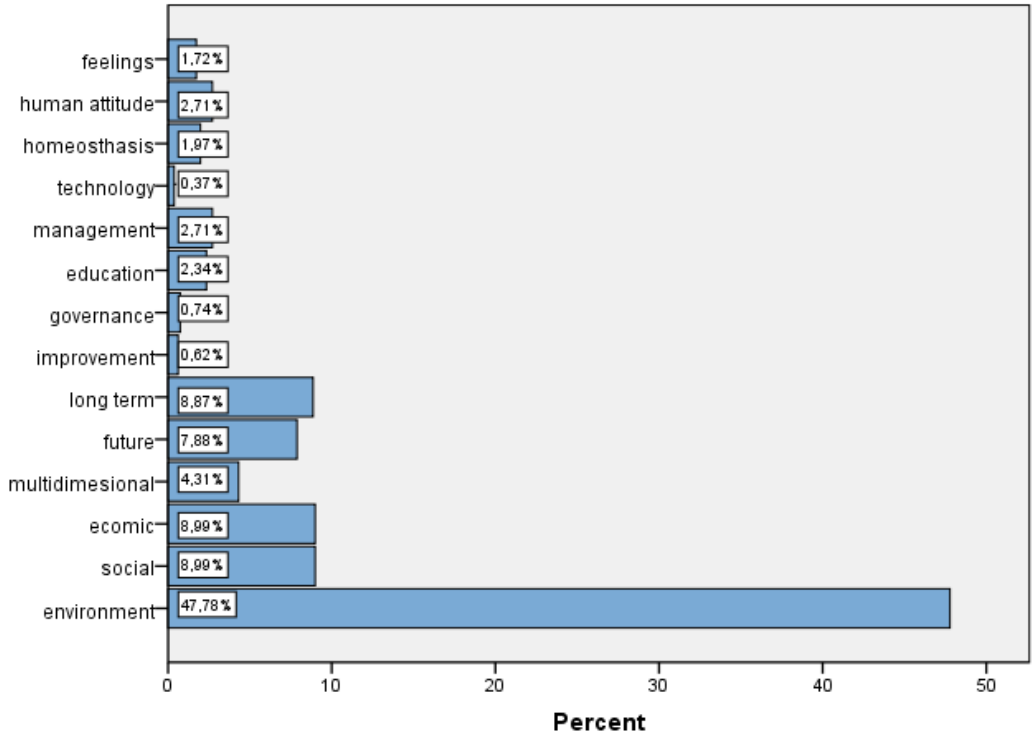

Figure 4.3. METU Teacher Education Students' Percentages of Sustainable Development Keyword Categories

Among written keywords towards "sustainability" and "sustainable development" terms, food related keywords were also examined as a part of this study. According to the content analysis, there were 45 keywords that participants wrote evoked with sustainability terms as food and food related terms. The keyword that these students used most frequently among the food related keywords was consumption (*N=16*), and waste reduction (*N=13*) respectively. Moreover, "Compost" was most stated food related keywords in the study. Lea, Worsley (2005) handled "composting" into the food related environmental issues category. In this respect, it may be stated that students defined mostly food keywords related environment. Considering the teacher

education programs that these students were pursuing, it was seen that Early Childhood and Foreign Language Education students wrote majority of the food related sustainability keywords. Table 4.2 demonstrates all keywords related food stated by participants with frequencies and frequencies of keywords in terms of programs at faculty of education at METU.

Table 4.2. *Frequencies of Food related keywords and their distributions in terms of teacher education programs*

Teacher Education Programs		**N**	**Percentages**
ECE		13	28.9
FLE		10	22.2
ESE		7	15.6
CEIT		6	13.3
SSME		5	11.1
EME		4	8.9
Total		45	100
Categories	**Food Related Keywords**	**N**	**Percentages**
Consumption	Consumption of organic food, local food, Genetically Modified food, less processed food, less red meat, healthy food, diet, palm oil	16	35.6
Waste management	Compost	13	28.9
Production	Agriculture, organic, local agriculture, fair food, seed, natural fertilizer	11	24.4
Food safety related keywords	Hunger, meeting food needs, sustainability of food resources, food safety	5	11.1
Total		45	100

4.2 Descriptive Statistics

In this part of the study, Faculty of Education behaviors and internal locus of control frequencies were examined. Mean, standard deviation and percentages of behaviors and internal locus of control pertinent to sustainable diets were stated in the next sections.

4.2.1 Behaviors toward Sustainable Diets of Teacher Education Students at METU

Behaviors toward sustainable diets scale with 12 items was used to examine eating, purchasing, and waste reduction behaviors toward sustainable diets of teacher education students. Participants were asked to state how frequently they exhibited given behaviors in the last year. The mean value of the total scale was calculated as 3.08 out of 5 (*SD=.68*). According to this results, teacher education students "sometimes" performed these behaviors toward sustainable diets. According to these results, it can be stated that participants did not have high scores on sustainable behaviors toward sustainable diets and they moderately performed related behaviors.

In the next sections, mean scores and standard deviations of sub dimensions of the behavior scale toward sustainable diets "waste reduction" and "eating and purchasing pattern" was explained.

4.2.1.1 Behaviors related Waste Reduction towards Sustainable Diets

In the sub dimension scale, there were three items evaluating participants waste reduction behaviors toward sustainable diets. The mean score on behavior items related waste reduction toward sustainable diet was calculated as 3.18 out 5 (*SD=.81*). Figure 4.4 demonstrates percentages of students' response to items of waste reduction sub-dimension.

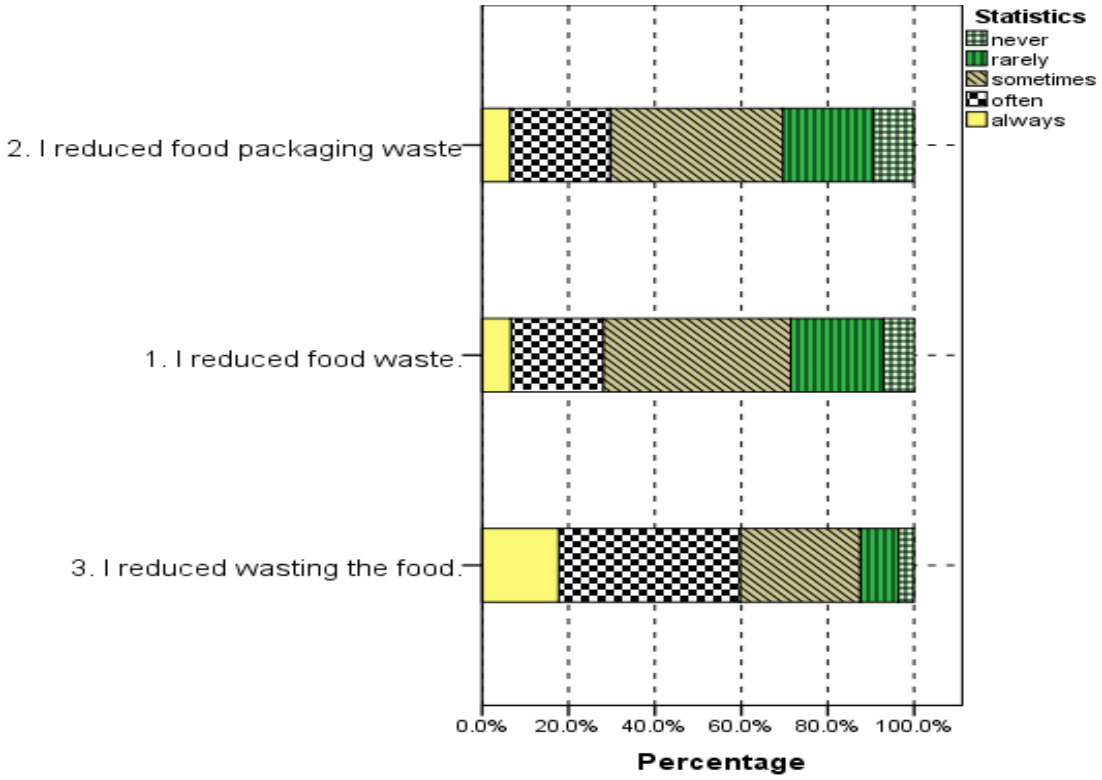

Figure 4.4. Percentages of responds on Behaviors related Waste Reduction towards Sustainable Diets

As presented in Table 4.3, majority of the students stated that they have usually (59.7%) reduced wasting the food for the last year (*M=3.61, SD=.99*). On the other hand, about one third of the participants stated that they frequently generally (29.6%) reduced their food packaging wastes and (28%) reduced their food wastes for the last one year. Participants have less scores on the item related reducing food waste (*M=2.99, SD=.98*) and reducing food packaging waste (*M=2.96, SD=1.03*) compared to mean scores reducing wasting of food item. To put it differently, it can be stated that students have usually reduced wasting their foods, however, they have not frequently reduced the food waste and food packaging waste.

Table 4.3. *Distribution of Items of Behaviors related Waste Reduction Sub-dimension*

Item	Percentages					Mean	SD
	N	R	S	O	A		
3. I have reduced wasting the food	3.6	8.9	27.8	42.0	17.7	3.61	.99
1. I have reduced food waste.	7.1	21.5	43.4	21.3	6.7	2.99	.98
2. I have reduced food packaging waste (e.g Glass bottles, jars, canned food boxes, processed food packages)	9.4	20.9	40.1	23.1	6.5	2.96	1.03
Total						3.18	.81

4.2.1.2 Behaviors related Purchasing and Eating Pattern towards Sustainable Diets

In the sub scale, there were 9 items evaluating purchasing and eating patterns related behaviors towards sustainable diets. According to results of frequency analysis, the mean score of the sub dimension was calculated as 3.05 out 5 (*SD=.75*). Figure 4.5 shows percentages of items related purchasing and eating patterns. The results showed that teacher education students moderately performed behaviors related eating and purchasing toward sustainable diets.

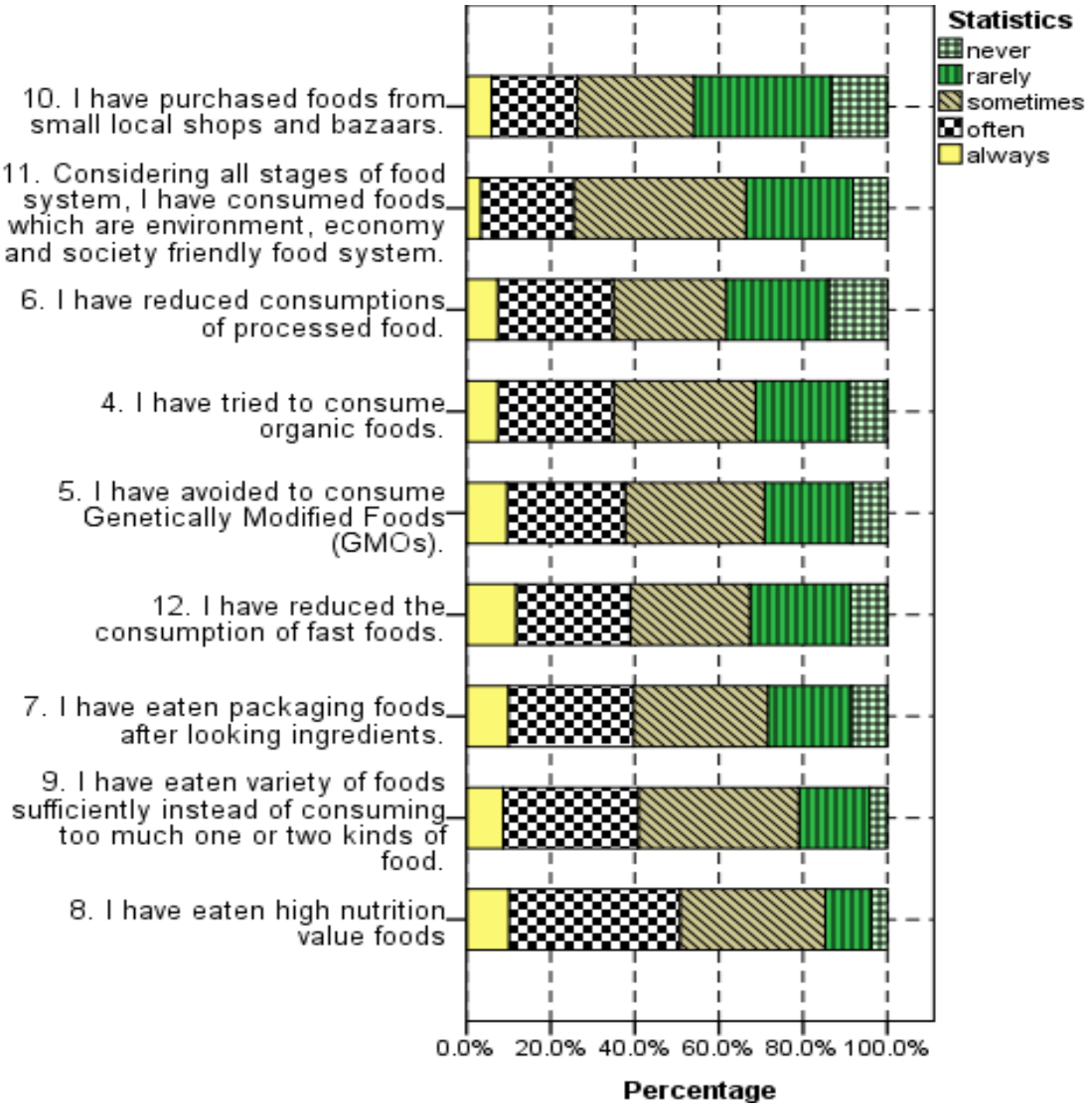

Figure 4.5. Percentages of Behaviors related Purchasing and Eating Pattern

As presented in Table 4.4, half of the students stated that they have frequently (50.7%) eaten high nutrition value foods for the last year (*M=3.42, SD=.94*) and majority of the students affirmed they have usually (40.8%) eaten variety of foods sufficiently instead of consuming too much one or two kinds of food. (*M=3.24, SD=.96*). Moreover, more than one third of the students affirmed that they have frequently (39.7%) eaten packaging foods after looking ingredients (*M=3.12, SD=1.10*) and (38.9%) reduced the consumption of fast foods (*M=3.09 SD=1.15*) for the last year while the mean value of the item toward reduced the consumption of processed food

was calculated 2.90 out of 5 (*SD=1.16*). This means that students less frequently perform behavior toward reducing consumption of processed food such as junk food, salami, frozen pizza when comparing to other eating behaviors pertinent to sustainable diet. Furthermore, Considering GMO and organic food consumption related items, more than one third of the participants stated that they have usually (37.7%) avoided GMO foods (*M=3.09, SD=1.09*) and (35%) tried to consume organic foods (*M=3.02, SD=1.07*). On the other hand, considering purchasing related items, merely one fourth of the participants affirmed that they have frequently (26.3%) purchased foods from small local shops and bazaars (*M=2.73, SD=1.10*), and (25.4%) Considering all stages of food system, they have consumed foods which are environment, economy and society friendly (*M=2.87, SD=.95*). Specifically, regarding eating behaviors, students less usually perform behavior toward reducing consumption of processed food than other eating behaviors pertinent to sustainable diet. Furthermore, purchasing related behaviors such as purchasing from local shops and consuming food considering all stage of food system were at least frequently performed behaviors among all behaviors. Furthermore, when comparing to waste reduction behavior of teacher education students it can be seen that they performed less frequently favorable eating and food purchasing behaviors.

Table 4.4. *Distribution of Items of Behaviors related Purchasing and Eating Pattern*

	Percentages						
Item	**N**	**R**	**S**	**O**	**A**	**Mean**	**SD**
8. I have eaten high nutrition value foods (e.g. fiber, protein, vitamin – rich foods)	3.8	11.0	34.5	40.6	10.1	3.42	.94
9. I have eaten variety of foods sufficiently instead of consuming too much one or two kinds of food.	4.2	16.8	38.2	32.1	8.7	3.24	.96
7. I have eaten packaged foods after looking ingredients.	8.5	19.9	31.9	29.8	9.9	3.12	1.10
12. I have reduced the consumption of fast foods.	8.8	23.8	28.5	27.2	11.7	3.09	1.15
5. I have avoided to consume Genetically Modified Foods (GMOs)	8.3	20.8	33.2	28.1	9.6	3.09	1.09
4. I have tried to consume organic foods.	9.0	22.3	33.7	27.6	7.4	3.02	1.07
6. I have reduced consumption of processed food. (e.g. junk food, salami, sausage, frozen pizza)	13.9	24.4	26.9	27.4	7.4	2.90	1.16
11.Considering all stages of food system, I have consumed foods which are environment, economy and society friendly	8.1	25.5	41.0	22.0	3.4	2.87	.95
10. I have purchased foods from small local shops and bazaars.	13.3	32.6	27.7	20.4	5.9	2.73	1.10
Total						3.05	.75

4.2.2 Internal Locus of Control pertinent to Sustainable Diets of Teacher Education Students at METU

In this part of the study, the internal locus of control scale was used to examine teacher education students' internal locus of control pertinent to sustainable diets concerning eating, food related purchasing, and waste reduction patterns. Students were asked to state to what extent they agreed that their behaviors toward sustainable diet could contribute and affect sustainable development. The internal locus of control toward

sustainable diets scale was consisted of 15 items which reflected unidimensional structure. The mean score of the scale was calculated 4.21 out of 5 and standard deviation of the scale was.57. Results revealed that majority of participants agree with the idea which they can reduce the threats to meet the needs of future generations and today's people by actualizing given behaviors toward sustainable diets given in the scale. Figure 4.6 demonstrated percentages of students' internal locus of control pertinent to sustainable diets.

Regarding the results of the descriptive statistics (see Table 4.5), students mostly stated that they can reduce the threats to meet the needs of future generations and today's people via performed actions toward *waste reduction*. In other words, compared to eating and purchasing related items in the scale, participants primarily believe their individual waste reduction actions toward sustainable diets can be the solution to achieve sustainable development.

Specifically, majority of participants affirmed that they can reduce the threats to meet the needs of future generations and today's people via recycling food packaging waste (97%); reducing to waste the foods (91.7%); reducing food waste (90.8%); composting food waste (85.8%) respectively.

Concerning *eating pattern* related items while majority of the teacher education students affirmed that they can be able to reduce the threats to meet the needs of future generations and today's people by "using sustainable farming products" (89%); "eating adequate and balanced nutrition" (84.8%); avoiding GMO foods (85.5%); and preferring organic foods (83.3%) respectively. In addition, although less students agree with the statements related to convenience food and meat consumption such as "choosing traditional kitchens instead of fast foods" (81.6%), "avoiding eating processed foods" (78.7%) and "keeping balance diet instead of consume excessive red meat" (78%) comparing to other eating related locus of control items, majority of participants also stated that their individual eating actions related reducing to consume processes food, fast food and meat consumption toward sustainable diets can contribute sustainable development.

Table 4.5. *Distribution of Items of Internal Locus of Control Scale*

Item	Percentages					Mean	*SD*
	SD	**D**	**UD**	**A**	**SA**		
1. …recycle food packaging waste.	0.0	0.5	2.5	45.6	51.4	4.47	.57
8. … reduce to waste food.	0.5	1.3	6.5	39.7	52.0	4.41	.71
14. …reduce food waste.	0.5	1.1	7.6	38.5	52.3	4.40	.72
2. …compost food waste.	0.9	1.6	10.7	46.9	39.9	4.23	.77
4. …use sustainable farming products. (e.g. free-range chickens and eggs, foods produced sustainably, foods produced in farms using drip irrigation)	0.9	0.7	9.1	44.3	45.0	4.31	.73
12. …avoid Genetically Modified foods.	0.9	3.1	10.5	41.4	44.1	4.24	.82
10....eat adequate and balanced nutrition.	0.9	2.3	11.9	42.3	42.5	4.23	.81
11. …prefer organic foods.	1.3	3.4	11.9	41.0	42.3	4.19	.86
9. …avoid eating processed foods. (e.g. junk foods, salami, sausage, frozen pizza)	0.7	5.1	15.6	37.8	40.9	4.13	.90
6. … choose traditional kitchens instead of fast foods.	2.0	4.7	11.7	40.9	40.7	4.13	.93
15. …keep balanced diet instead of consuming excessive red meat.	1.8	6.1	14.0	40.6	37.4	4.05	.95
3.... use potable tap water.	1.6	5.5	18.2	40.4	34.4	4.00	.93
7. …buy seasonal fruits and vegetables.	0.2	1.6	10.8	41.5	45.9	4.31	.74
13. …purchase foods by taking into consideration fair trade.	0.5	4.5	16.2	38.7	40.0	4.13	.87
5. …purchase food from small local shops and bazaars..	0.7	5.0	24.0	41.8	28.5	3.92	.88
Total						4.21	.57

Considering purchasing related internal locus of control items, participant generally reported that “purchasing foods by taking into consideration fair trade.” (88.7%), and “buying seasonal fruits and vegetables” (86.9%) can reduce the threats to meet the needs of future generations and today's people while less participants agree the item “purchasing food from small local shops and bazaars.” (70.3%) which was calculated

as the lowest internal locus of control score item among the all items in the scale (M=3.92, SD=.88). The analysis results revealed that most of the teacher education students at METU believe that sustainable dietary actions as waste reduction, eating pattern and purchasing can reduce the threats to meet the needs of future generations and today's people respectively.

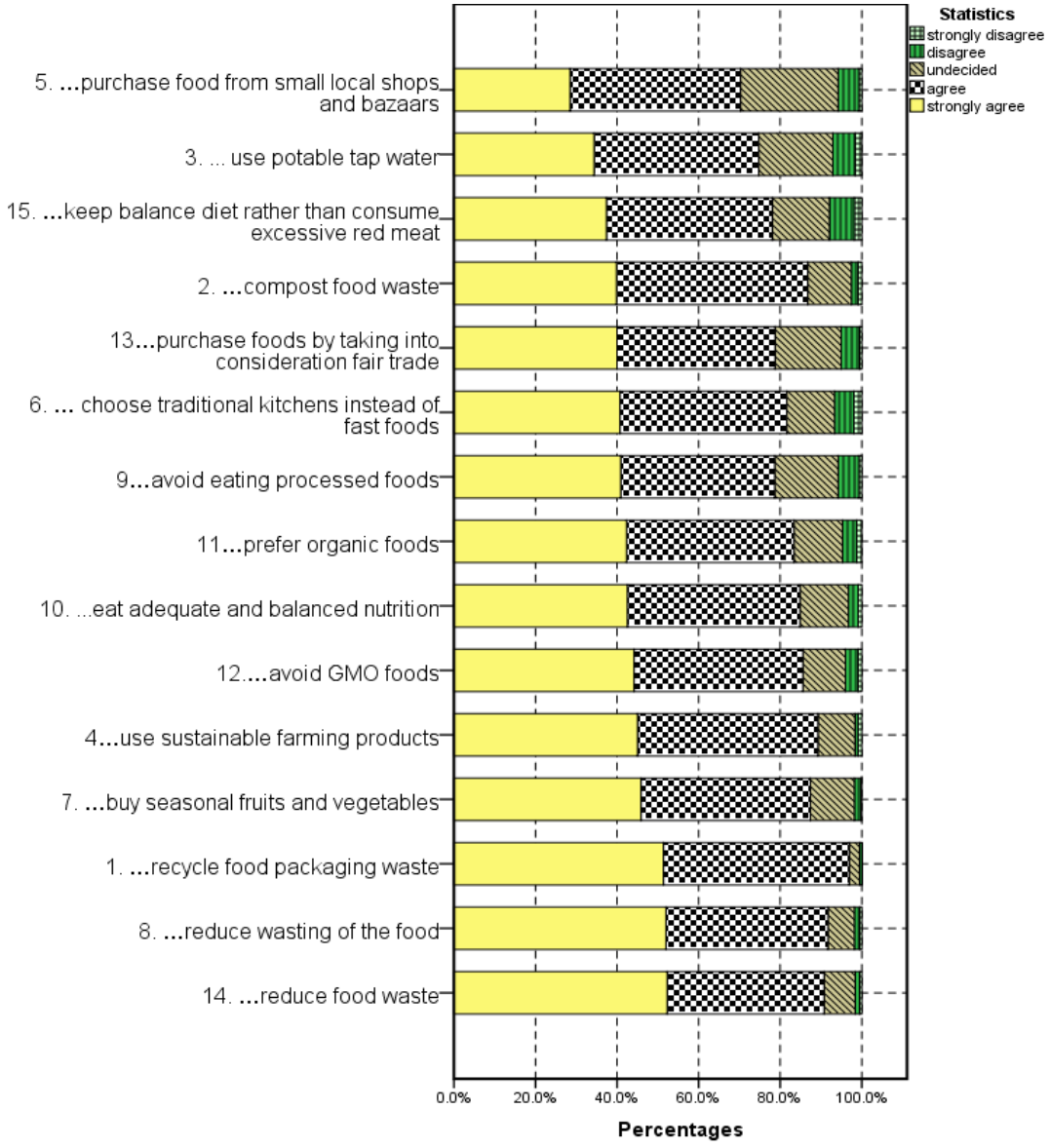

Figure 4.6. Percentages Internal Locus of Control Pertinent to Sustainable Diets

4.3 Inferential Statistics

In this part of the study, bivariate analysis results which explained association between behavior and internal locus of control toward sustainable diets were stated. In addition, statistical analysis results of gender difference, differences among teacher education programs, and interaction of gender and teacher education programs in these dependent variables were also examined.

4.3.1 Association between Behaviors and Internal Locus of Control towards Sustainable Diets

Bivariate correlation analysis was measured to test null hypothesis. The Pearson correlation coefficient was calculated by bivariate correlation analysis to show possible relationship between behaviors and internal locus of control towards sustainable diets. The five assumptions of the analysis as "independents of observation, normality, level of measurement, linearity and homoscedasticity" (Pallant, 2011, p. 125-126) were checked before conducting the analysis.

Independence of observation which was stated as" each observation or measurement must not be influenced by any other observation or measurement" (Pallant, 2011) was examined during applying measurement scale on students. The researcher observed that each participant filled the questionnaire own self during data collection procedure.

To check normality assumption, skewness and kurtosis values, and histograms of the dependent variables were examined. The histogram graphs were seem normally distributed (see Figure 4.7). In addition, skewness and kurtosis values were between -2 and +2 range as acceptable for normal distribution considered mean scores of dependent variables (Gravetter & Wallnau, 2014) as internal locus of control and behavior toward sustainable diets (see Table 4.6).

Table 4.6. *Skewness and kurtosis values internal locus of control and behavior toward sustainable diets*

Constructs	Skewness	Kurtosis
Internal locus of control	-.763	1.318
Behavior	-.302	.074

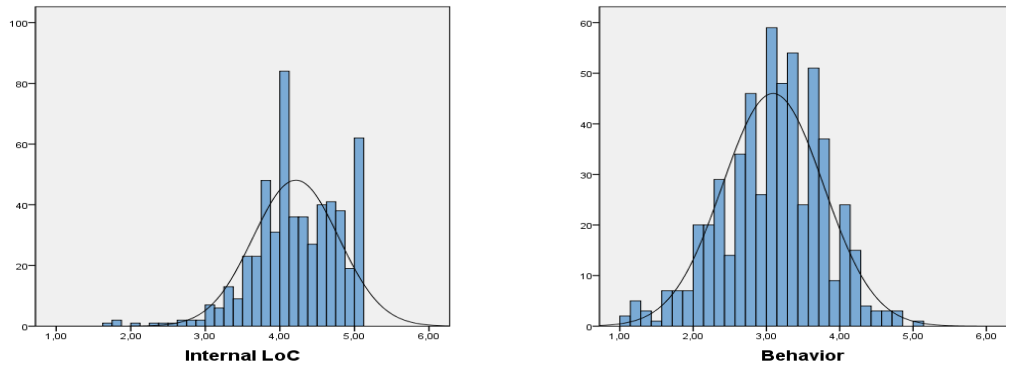

Figure 4.7. The histogram graphs of mean score of internal locus of control and behavior toward sustainable diets

According to Pallant (2011), relationship among two variables should be linear to perform bivariate correlation analysis. Then to examine the linearity assumption, scatterplots were examined for behavior and internal locus of control scores, which showed that there was no violation of the linearity assumption.

As a last assumption as homoscedasticity, the variance of the behavior scores should be the similar for all internal locus of control scores (Pallant, 2011). To examine this assumption, the scatterplot of dependent variables was examined in terms of showing cigar shape. The scatter plot analysis showed that there was no violation in the homoscedasticity assumption.

The analysis results demonstrated that there was a positive significant relationship between behaviors and internal locus of control towards sustainable diets ($r=.318$, $n=556$, $p<.01$). Then, it could be asserted that when internal locus of control toward

sustainable diets increases, behaviors on sustainable diets also increase. By taking into consideration of r value, according to Cohen (1988), if the Pearson r value is.01, relationship is small; if r value is.03, relationship is medium and if r is.05, relationship is large. (Cohen, 1988, p. 79–81). Then according to this criteria, correlation strength between these dependent variables was evaluated as medium. In addition, bivariate correlation analysis was conducted for locus of control toward sustainable diets scale and sub-dimensions of behavior scale, "waste reduction"; and "eating and purchasing pattern". The outcome of the analysis showed that there was significant relationship between internal locus of control scale with sub-dimensions of the behavior scale (see Table 4.7). To put it differently, participants with higher internal locus of control toward sustainable diets tend to engaged more favorable behaviors toward eating and food purchasing, and food waste reduction respectively.

Table 4.7. *Relationship between Internal Locus of Control Scale with Items of Behavior Scale*

	Internal LoC scale
Sub-dimensions of behavior scale	**Pearson correlation**
Waste reduction	.229*
Eating and purchasing pattern	.305*
Behavior scale on sustainable diets	.318*

**Correlation is significant at the 0.01 level (2-tailed).*

4.3.2 Gender and Teacher Education Program Differences in Behavior and Internal Locus of Control

To examine gender and teacher education program differences, firstly, mean and standard deviation for gender and teacher education programs with respect to behaviors and internal locus of control pertinent to sustainable diets in terms of teacher education programs and gender were demonstrated in Table 4.8. According to analysis

results, females had higher mean scores than males on behavior and internal locus of control pertinent to sustainable diets. Furthermore, students pursuing in Elementary Science Education and Early Childhood Education had slightly higher mean scores on behavior and internal locus of control pertinent to sustainable diets rather than students pursuing in other teacher education programs.

Table 4.8. *Descriptive Statistic of teacher education programs and gender on Internal Locus of Control and Behavior*

	Internal LoC					**Behavior**				
	Female		**Male**		**Total**	**Female**		**Male**		**Total**
Teacher education programs	**M**	**SD**	**M**	**SD**	**M**	**M**	**SD**	**M**	**SD**	**M**
ECE	4.22	.60	4.35	.57	4.30	3.12	.67	3.50	.96	3.13
ESE	4.33	.45	3.94	.43	4.29	3.27	.56	3.09	.53	3.25
EME	4.32	.58	3.73	1.01	4.23	3.05	.58	2.70	.94	2.99
SSME	4.33	.44	4.02	.64	4.23	3.10	.67	3.15	1.08	3.12
FLE	4.25	.59	3.91	.60	4.19	2.85	.71	2.69	.91	2.82
CEIT	4.10	.50	3.93	.55	4.01	3.17	.62	3.04	.74	3.10
Total	4.27	.55	3.93	.61	4.21	3.11	.65	2.97	.83	3.08

To analyze gender and teacher education program differences in behavior and internal locus of control toward sustainable diet and the interaction effect of these independent variables in the related dependent variables, two-way multivariate analysis was conducted in the present study. Assumptions of two-way multivariate analysis were reported as sample size, normality and outliers, linearity, homogeneity of variance-covariance matrices, homogeneity of regression, multicollinearity and singularity (Pallant, 2011, p. 287).

When multivariate analysis is conducted, there should be required to have more cases than the number of dependent variables because of increasing power of the analysis (Tabachnick & Fidell, 1996). There were total 24 cells (two levels for gender independent variable: females/males; six level for teacher education program: ECE/ESE/EME/CEIT/SSME/FLE; and two dependent variables for each). The least number of cases in all cells was Elementary Childhood male student of 4. Therefore, the number of cases in each cell were higher than the number of dependent variables of 2, which showed that there was not a violation for sample size assumption in the study.

Furthermore, normality was examined both univariate and multivariate normality for each dependent variable in each group. Considering univariate normality, the histogram graphs were seem normally distributed. Furthermore, skewness and kurtosis values for each dependent variable in each group were in acceptable level between -2 and +2. Therefore, there was no violation on univariate normality assumption.

Multivariate normality assumption was examined by evaluating Mahalanobis distance value which was computed as 23.40. The critical chi square value is 13.8 for *df* value 2 based on Chi-square table (Pallant, 2011). Therefore, the Mahalanobis distance value was larger than the critical value, which evidence for the multivariate normality assumption was met in the study.

Linearity assumption to conduct multivariate analysis was evaluated by examining straight-line relationship between each pair of the dependent variables in the study (Pallant, 2011). Then scatterplots were generated for each pairs (ECE males, ECE females, ESE males, ESE females, EME males, EME females, FLE males, FLE females, SSME males, SSME females, CEIT males, CEIT females). The analysis showed that the scatter plots did not demonstrate any obvious non linearity evidence, therefore, evidence for linearity assumption was met in the study.

Concerning multicollinarity assumption of MANOVA, moderately correlated dependent variables to conduct MANOVA was proposed. Multicollinearity is defined that “dependent variables are highly correlated” which is stated with correlations up around.8 or.9 (Pallant, 2011, p.151). The correlation between dependent variables was

evaluated.318 (see Table 4.9). Then it was in the acceptable level for multicollinarity assumption which were not violated in the study.

Table 4.9. *Correlation between the dependent variables*

	Pearson correlation
	Internal LoC
Behavior	.318*

**Correlation is significant at the 0.01 level (2-tailed).*

Homogeneity of covariance assumptions were checked by examining Box's Test of Equality of Covariance Matrices. Regarding homogeneity of covariance assumption, if Box's M Test of Equality of Covariance Matrices p value was significant ($p<.001$), the homogeneity of covariance and variance assumption of was violated (Tabachnick & Fidell, 1996). Analysis result showed that the p value of the test was.000 so the assumption was violated. Furthermore, concerning homogeneity variance assumption, Levene's Test of Equality of Error Variances was examined. As presented in Table 4.10, significance values for both dependent variables were less than 0.05. which demonstrated that the assumption of homogeneity of variance for both dependent variables were violated. According to Tabachnick & Fidell (1996), when there were violated assumptions in multivariate analysis, Pillai's Trace which is more robust then Wilks' Lambda, should be used in order to calculate multivariate significance. Therefore, as some assumption were not met in the present study Pillai's Trace was used instead of Wilks' Lambda.

Table 4.10. *Levene's Test of Equality of Error Variances*

Dependent Variables	***F***	***df1***	***df2***	**Sig. (*p*)**
Internal locus of control	2.376	11	544	.007*
Behavior	2.681	11	544	.002*

**Correlation is significant at the 0.05 level*

4.3.2.1 MANOVA Analysis

A two-way multivariate analysis of variance was conducted to investigate gender and teacher education program differences, and interaction effect of these independent variables in behavior and internal locus of control toward sustainable diet. Pillai's Trace value was used rather than value of Wilks' Lambda to examine multivariate significance because of the reason that there were assumptions which were not meet (Tabachnick & Fidell, 2007).

As presented in Table 4.11 there were significant difference between males and females on the combined dependent variables, Pillai's Trace=.023, F (2, 543) = 6.315, p=0.002. The multivariate partial eta squared value based on Pillai's Trace was 0.023 indicating that 2.3% of multivariate variance of the dependent variables by gender.

Furthermore, the results showed statistically significant difference of teacher education program on the combined dependent variables, Pillai's Trace=.038, F (10, 1088) = 2.114, p=0.021. The multivariate partial eta squared value based on Pillai's Trace was indicating that 3.8% of multivariate variance of the dependent variables by teacher education programs.

On the other hand, the multivariate analysis results revealed that there was not a statistically significant interaction effect between teacher education program and gender on the combined dependent variables ($p>.05$).

Significant differences were evaluated at.025 level of significance by using Bonferonni adjustment which is proposed dividing alpha level (.05) by dependent variables number in order to decrease Type 1 error - obtaining significant result but actually it is not significant- (.05/2=.025) (Tabachnick & Fidell 2007, p. 270). When the outcomes for the dependent variables were considered separately, concerning gender difference, using Bonferonni adjusted value.025, the merely statistically significant difference was internal locus of control, F (1, 430) = 8.34, p=.004, partial eta squared =.02 indicating 2% of the variance. The examining mean score showed that females reported higher internal locus of control pertinent to sustainable diets (M=

4.27, SD=.55) than males (*M=3.93, SD=.61*).Specifically, concerning internal locus of control, the null hypothesis was rejected proposing that there was a statistically significant difference between females and males to internal locus of control toward sustainable diets, however, concerning behaviors toward sustainable diet, the null hypothesis was failed to reject stated that there was not statistically significant difference between females and males to behavior toward sustainable diets.

When independent variables have more than two levels, it is required to conduct follow-up univariate analysis to define where the differences there are (Pallant, 2011). Considering teacher education programs, follow-up univariate analysis was conducted to examine on which dependent variables ECE, ESE, EME, CEIT, FLE, SSME teacher education programs significantly differed, which was explained at next part.

Table 4.11. *MANOVA results on combined dependent variables*

Source	**Pillai's Trace**	***F***	**Sig. (*p*)**	**Partial Eta Squared**
Gender	.023	6.315	.002*	.023
Teacher Education Program	.038	2.114	.021*	.019
Gender X Teacher Education Program	.014	.780	.649	.007

**Analysis was conducted with the significance level α=.05*

4.3.2.1.1 Follow up Analysis ANOVA for Teacher Education Program differences on Dependent Variables

As demonstrated in Table 4.12, there was a statistically significant teacher education program difference on behaviors, F (5, 550) = 5.142, p=.000, partial eta squared=.045 explaining that 4.5 % of variance of behaviors toward sustainable diets by teacher education programs. On the other hand, there was not a significant teacher education

program difference on internal locus of control pertinent to sustainable diets (p>.025). To put it differently, students' belief toward the idea which they can reduce the threats to meet the needs of future generations and today's people by actualizing given behaviors pertinent to sustainable diets did not differ with respect to teacher education programs.

According to post-hoc analysis results, the only significant differences on behavior pertinent to sustainable diets were examined in the teacher education programs among ESE and FLE; and ECE and FLE (p<.025). As far as the teacher education program differences in behavior pertinent to sustainable diets were concerned, ESE (*M=3.25, SD=.56*) and ECE (*M=3.13, SD=.68*) students had significantly higher behavior scores than FLE students (*M=2.82, SD=.75*). Therefore, the results of follow-up analysis indicated that students pursuing Early Childhood Education and Elementary Science Education programs performed significantly more frequently favorable behaviors pertinent to sustainable diets than students pursuing Foreign Language education performed.

Table 4.12. *Follow-up Analysis ANOVA differences of teacher education programs on Behavior Score*

Source	**Dependent Variable**	***df***	***F***	**Sig. (*p*)**	**Partial Eta Squared**
Teacher Education Program	Behaviors	5	5.142	.000*	.045
	Internal LoC	5	2.351	.040	.021
	Error	550			

*Analysis was conducted with the significance level α=.025

4.4 Chapter Summary

In conclusion**,** majority of METU teacher education students stated that they are familiar with "sustainability" and "sustainable development" terms in popular media and usage of these terms in their own academia. With respect to gender, majority of

female and male students stated themselves familiar with respect to popular media and academia. In addition, students pursuing in ESE and ECE students had higher level familiarity with sustainable development than students pursuing in FLE. Moreover, most of the students defined the sustainable development as "*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*". On the other hand, students' stated keywords viewed related sustainability were comprised mostly environment related keywords as "environmental aspect of sustainable development and sustainability" compare to the keywords concerning economic and social aspects of sustainable development. When food related keywords among which participants stated related sustainability were examined in the present study.

In terms of descriptive statistic results, teacher education students "sometimes" performed behaviors toward sustainable diets. Then, it can be stated that students moderately perform behaviors pertinent to sustainable diets. Furthermore, considering sub-dimensions of the behavior scale, participants more frequently performed favorable waste reduction behaviors than eating and purchasing pattern related behaviors. On the other hand, when internal locus of control toward sustainable diets scores was examined, students have high internal locus of control to reduce threats on meeting future generations and today's people needs by actualizing the items related sustainable diets.

In the results of inferential statistic in the study, considering correlational analysis, there were a significant relationship between internal locus of control and behaviors pertinent to sustainable diets. To put it differently, participants with higher internal locus of control toward sustainable diets tended to engaged more favorable behaviors toward sustainable diets. In addition, based on outcome of two way MANOVA, there were significant differences of teacher education programs and gender on combined dependent variable on the other hand, there was not found any significant interaction effect. When the outcomes for the dependent variables were considered separately differences of independent variables, there were statistical genders differences on locus of control scores on the other hand, not significant difference on behaviors. Specifically, females have higher locus of control scores than males.

Regarding teacher education program differences, follow up univariate analysis results examined that there was a statistically significant teacher education program difference on behaviors while there was not any significant difference the related independent variable on internal locus of control. Regarding the teacher education program differences in behavior pertinent to sustainable diets, students pursuing ESE and ECE teacher education programs performed more frequently behaviors toward sustainable diets than FLE students.

CHAPTER 5

CONCLUSION, DISCUSSION and IMPLICATION

In this chapter of the study, summary of the study, conclusions and discussion on the students' familiarity and understandings of sustainable development, behaviors and internal locus of control toward sustainable diets, relationship between these constructs, and differences on the students' behaviors and internal locus of control toward sustainable diets in terms of gender and teacher education programs were presented.

5.1 Summary of the Study

The aims of the present study were stated as examining teacher education students' familiarity and understandings of sustainable development, identifying teacher education students' behaviors and internal locus of control on sustainable diets, assessing significant relationship between these students' behaviors and internal locus of control on sustainable diets, and investigating differences on behavior and internal locus of control pertinent to sustainable diets in terms of gender and teacher education programs.

The present study was designed as an associational research revealing relationship between behaviors and locus of control pertinent to sustainable diets as well as the differences on these constructs in terms of gender and teacher education programs. By using convenience sampling strategy, "Demographic information questionnaire", "Familiarities and Understandings towards Sustainable Development Scale", "Behaviors towards Sustainable Diets questionnaire", and "Internal Locus of Control

towards Sustainable Diets questionnaire" were administered to 565 students pursuing a degree program at the teacher education programs at a public campus university in the capital city of Turkey. The results of the present study showed that majority of METU teacher education students stated that they are familiar with "sustainability" and "sustainable development" terms in popular media and usage of these terms in their own academia. With respect to gender, majority of female and male students stated themselves familiar with respect to popular media and academia. In addition, students pursuing in Elementary Science Education and Early Childhood Education programs were higher level familiar with these terms with respect to academia and popular media than other programs while students pursuing in Foreign Language Education program were at least familiar these terms in terms of media and academia among other teacher education programs. However, teacher education students have lack of holistic understanding toward sustainable development. Moreover, the students did not demonstrate frequently behaviors toward sustainable diets while they had high levels of internal locus of control on sustainable diet. The results of this study also showed that there was a statistically significant association between the students' internal locus of control and behaviors pertinent to sustainable diets. Furthermore, regarding gender differences, while female students had significantly higher internal locus of control toward sustainable diets than males, there was not a statistically significant difference in behaviors pertinent to sustainable diets in terms of gender. In addition, with respect to differences in terms of teacher education programs, it was found out that the students pursuing Elementary Science Education and Early Childhood Education programs exhibited more usually sustainable behaviors toward sustainable diets than the students at the Foreign Language Education program. However, the present study showed that internal locus of control did not differ with respect to teacher education programs.

5.2 Conclusion and Discussion of the Study

5.2.1 Familiarity and Understanding Toward Sustainable Development, and Behaviors and Internal Locus of Control pertinent to Sustainable Diet of Teacher Education Students

The present study examined the teacher education students' familiarity and understandings of sustainable development. The present study showed that more than half of the teacher education students at METU were familiar with "sustainability" and "sustainable development" terms with their uses in popular media and academia. With respect to gender, majority of female and male students stated themselves familiar with respect to popular media and academia at about same level. In addition, students pursuing in Elementary Science Education and Early Childhood Education programs were higher level familiar with these terms with respect to academia and popular media than other programs while students pursuing in Foreign Language Education program were at least familiar these terms in terms of media and academia among other teacher education programs. Furthermore, more than a half of these students defined the sustainable development with the definition of "*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*" which is mostly affirmed Sustainable Development definition described by (World Commission on Environment and Development, 1987). On the other hand, one-fourth of the teacher education students viewed the term as environmental protection related definition as *"development that aims to preserve environment and our natural resources in order to overcome the "ecological crisis" that we face with*". Furthermore, most of the keywords which teacher education students were asked to write down related to sustainable development were linked to environmental issues such as environment, nature, renewable energy, recycling. On the other hand, the other aspects of sustainable development as economy and society related keywords were used far less than environmental aspects like other keyword categories such as long-term and future. Therefore, findings of this study revealed that teacher education students did not develop a comprehensive understanding toward sustainable development and sustainability. Although most of the students defined sustainable

development with the generally accepted definition of it, students' understanding on sustainable development were mainly related with environment, environmental protection and nature.

Sustainable development aroused and was acknowledged with a holistic approach as a solution to manage social, economic problems such as poverty, hunger, inequality, unemployment besides that environmental ones. To actualize that United Nations General Assembly accepted 17 Sustainable Development Goals with 169 related targets were handled in three dimensions of sustainable development: environment, social and economic in balanced. These three aspects of sustainable development were integrated well into the goals and targets in centered, which were comprise wide-ranging issues such as, gender equality, quality education, climate action, sustainable production and consumption, zero hunger (Agenda 30, 2015). In these respects, although it was crucial that developing holistic vision toward sustainable development in order to actualize all these goals and targets related SDGs, the present study showed that teacher education students as possible educators of future generations were lacked of the holistic approach of the sustainable development.

Previous research studies (e.g. Kagawa, 2007; Mageswary et al. 2013; Schmidt, & Eilks, 2013; Şahin, 2008; are consistent with the findings of the present study which students did not have deep and holistic understanding of sustainable development while they have better understanding of environmental issues. Mageswary, Zurida and Norita (2013) linked these results that government emphasize environmental concepts such as recycling, renewable resources through media effectively. In the present study, most of teacher education students stated that they are familiar with sustainable development in terms of media so these finding was also attributed to give wide publicity to environment in media such as public service advertisements, social media. Moreover, Şahin (2008) demonstrate that METU teacher education students understand sustainable development mostly as an environmental term rather than a holistic approach about ten years ago. However differently with finding of the studies Kagawa (2007) and Şahin (2008), in the present study, another sustainable development category as the name of “multidimensional aspect” which included a range of sustainable development issues such as climate change, genetically modified

food, organic food etc. was ascertained. On the other hand, inconsistently with current study finding, phenomenography research made by Kılınc and Aydın (2013) demonstrated that pre-service science teachers had a holistic understanding of sustainable development, which reflected they had a range of conceptions regarding sustainable development, which is attributed to informal experiences such as Turkish media rather than formal experiences like education.

According to USTESD (2013), understanding of sustainable development are necessary to address sustainability by means of ESD. Concerning that, ESD pedagogies as action-oriented, self-directed, and interdisciplinary should be support to improve understanding of students and teachers toward sustainable development (UNESCO, 2005; 2017). Concerning impacts of ESD on understanding of sustainable development a research (Dyments et al., 2014) showed that teacher education programs curriculums and pedagogies with respect to ESD should be improved in pre-in service teacher education programs because if sustainable development concepts were integrated in various subjects and courses, pre-service teachers as future applicator of ESD can be able to reflect their holistic understanding of sustainable development to students. In addition, teachers having lack of understanding of sustainable development aspects with a holistic approach also have less qualified teaching performance to implement ESD (Taylor et al., 2013). Therefore, regarding lack of adequate understandings of teacher education students as future educators with respect to sustainable development in the present study, their teaching performances may be not efficient to integrate ESD into the teaching process, which may affect adversely on their prospective students' understanding toward sustainable development.

Sustainable lifestyles comprising sustainable behaviors aroused as a holistic approach (Indo German Expert Group, 2015). It is important to understand what holistic approach is related lifestyle and how multiple issues require different lifestyle solutions. Therefore, without understanding holistic approach of sustainable development and sustainable living (UNESCO, 2017, UNEP, 2016), sustainable lifestyles may not be comprehended and lack of understanding can affect lifestyles as behaviors and actions to sustainable lifestyles. Moreover, familiarity to sustainable development via formal and informal experience as media can influence knowledge

and lifestyles. Sustainable lifestyles have wide media coverage such as public service advertisement, social media etc. so media can affect individuals' daily-choice, values, lifestyles (UNEP, 2016), and their internal locus of control as beliefs to change consequences by their sustainable actions. Furthermore, education as a formal experience has impact on individuals to create lifestyles. Specifically, ESD is stated one of the main contributor to fulfil SDGs which includes sustainable lifestyles. In fact, one of the objective of ESD is stated as "The learner understands how individual lifestyle choices influence social, economic and environmental development." (UNESCO, 2017, p. 34).

The current study purposed to examine teacher education students' behaviors pertinent to sustainable diets. The result of the study demonstrated that teacher education students had moderately favorable behaviors pertinent to sustainable diets. In addition, considering waste reduction behaviors, teacher education students have frequently reduced wasting their foods but they have not generally reduced the food waste and food packaging waste over the past year. Moreover, concerning eating behaviors, teacher education students stated that they least frequently performed behavior toward reducing of consumption of processed food among the items of eating related behaviors pertinent to sustainable diet. In addition, purchasing from local shops and consumption with considering all stage of food system were stated least frequently performed behaviors among all behavior items. The mean score of waste reduction sub-dimension were higher than eating and purchasing sub-scale.

Understanding of sustainable development with three dimensions as a holistic approach is important for actualizing sustainable lifestyles, behaviors and actions. (UNESCO, 2017, UNEP, 2016). In other words, how individuals comprehend the sustainable development can affect their understanding of sustainable development issues and so their performance on these issues like as sustainable lifestyle. In the present study, teacher education students have *lack of understanding* toward sustainable development with respect to holistic approach. Therefore, the finding of the study which they did not frequently perform sustainable dietary behaviors may be attributed their lack of understandings. In future studies, actual behaviors toward

sustainable diets can be measured more elaborately with respect to sustainable development and sustainable lifestyle understandings.

Regarding eating and purchasing behaviors pertinent to sustainable diets, previous research studies (e.g. Fischer et al., 2017; Niven et al., 2014, Tam et al., 2017) are consistent with the findings of the present study which consumers did not usually demonstrate sustainable purchasing and eating behaviors. Students consume high level processed food consumption such as snack foods which were attributed to availability of processed food and snacks (Niven et al., 2014) and food opportunities (Tam et al., 2017). Therefore, food availability and accessibility in city and campus may be a factor for dietary behaviors. In the present study, the cafeterias, markets and faculty canteens provide processed foods so this may these students consume processed food such as junk food, snacks, frozen foods etc.

Considering waste reduction behaviors pertinent to sustainable diets, one possible explanation of that majority of teacher education students have reduced wasting the food may be related with cultural and religious issues. Koroglu (2012) reported that religion was an influential factor in the formation of consumption behavior. In addition, spiritual people perform higher waste reduction actions because they see no wasting actions as ethical and moral actions (Karbalaei et al., 2014). Furthermore, no wasting of food was a very important and respected value in Turkish culture (Istanbul Chamber of Commerce, 2010). In addition, another possible explanation on this finding may be related with economic reasons. Specifically, teacher education students pay money to purchase their foods and they may not want to waste their money.

Ecological footprint was stated as an indicator to demonstrate the level of consumption regarding impacts of consumption on world resources (Castellani, & Sala, 2013). In this consideration, Keles and Aydogdu (2010) demonstrated that ecological footprints of pre-service teachers were higher than footprint of the World per-capita, and pre-service teachers' food consumptions contributed highest to ecological footprint of pre-service teachers. In the present study teacher education students did not perform frequently sustainable dietary behaviors which may also contributed ecological food print at huge level. It was important for not only for their impacts on world but also

impacts on future generations because they were potential teachers for future generations (Keles, & Aydogdu, 2010). In addition, sustainable diets had lower ecological footprint when comparing to current widespread western type of diets as over consumption of processed food, low nutrition value and unhealthy food including too much salt, sugar, saturated fat, and red meat (Almendoz et al., 2013). Therefore, food consumption and dietary choices of teacher education students should be altered to sustainable choices.

Present study examined teacher education students' internal locus of control pertinent to sustainable diets. In this study, it was found out that the teacher education students had high levels of internal locus of control pertinent to sustainable diets. In other words, these students as educators of the future generations believed that they as being consumers can reduce the threats to sustainable development by demonstrating some certain behaviors related to sustainable diets. Specifically looking the students' internal locus of control pertinent to sustainable diet, the result revealed that students had generally high level internal locus of control toward waste reduction actions, eating and purchasing actions respectively.

Sustainable lifestyles can be influenced by familiarity through media and education. Public service announcements and social media regarding daily-choices, sustainable life styles and consumer preferences can affect values, lifestyles (UNEP, 2016), and internal locus of control. Sustainable diets are including in sustainable lifestyles. The finding of high level internal locus of control toward sustainable diets may be attributed to students' familiarity with sustainable through media. Therefore, individuals may be influenced from publications based on sustainable development in media so their internal locus of control as belief to change events and consequences via their own actions were high. Furthermore, education has impact on individuals to create lifestyles. Specifically, ESD is stated one of the main contributor to actualize "holistic understanding of life" (p.38), sustainable lifestyles and to elucidate beliefs (UNESCO, 2017). In the present study, most of the students were stated that they were familiar with sustainable development usage in academia. In addition, there were some must course with respect to environment, sustainable development and nutrition education in Faculty of Education at METU. Therefore, a part of the students may take

these courses. Therefore, another possible explanation that students had high level of internal locus of control pertinent to sustainable diets may be familiarity with these terms through academia as school experiences and courses. Willis (1994) that environmental education based on protection of natural resources had significant effects on positively internal locus of control pertinent environment. Furthermore, pre-service teachers who believe that their behaviors toward environmental education as being teachers at future can contribute environmental wellness tend to learn and teach environmental education strategies (Chang, 1998). In conclude, media and academic familiarity based on school experience may have impacts on high level internal locus of control pertinent to sustainable diets.

Similar with the current study findings, Kim (2012) reported that university students who attended education courses had high internal locus of control to create a sustainable world. In addition, similar with the previous studies sampling pre-service teachers (Alper, 2014) and university students (Karbalae et al.,2014), claimed similar results in that university students have high internal locus of control to change current unsustainable situation of the world by mainly performing waste reduction actions. Parallel with the findings of the study Tabak, Piyal, Çelen, Karakoç and Ozen (2009) on Turkish adolescent students, the present study stated teacher education students had high internal locus of control to create sustainable development pertinent to eating healthy which is one of the important determinants of the sustainable diets (FCRN, 2016) such as eating high nutrition value food, adequate and balanced.

It was stated that media was used as a factor to change waste behaviors especially with respect to environment protection (Young et al., 2017). In other words, media such as social media, public service advertisements with respect to environment, can be effective on people in order to increase understanding toward environment and to decrease waste impact on environment. Considering the fact that most of the teacher education students were familiar with sustainable development term usage in media, one possible explanation for this finding teacher education students' internal locus of control may arise from their personal experiences by media. Teacher education students believe waste reduction actions to reduce threats toward sustainable

development highly because they may be affected from media based on environmental protection with respect to waste reduction.

ESD based food education provides opportunities to learn food sustainability issues by experiences on making school garden, visiting local farms, exploring food production systems. In addition, teachers and students can question their current dietary patterns with respect to sustainable food system by the help of food education based on ESD. However, previous study stated that teachers found food sustainability issues complex to be comprehended and to integrate into teaching practices (Weitkamp, 2013). Teacher education students as future implementer of ESD have high level internal locus of control pertinent sustainable diet, which may be indicator for effective teaching performance based on ESD. However, these performances may be limited because teacher education students had moderately behaviors pertinent to sustainable diets and they have lack of understandings holistic sustainable development, which affects teaching performance.

In conclusion, teacher education students at METU were familiar with sustainable development with their uses in media and academia while teacher education students did not develop a comprehensive understanding toward sustainable development and sustainability. In addition, although teacher education students had high levels of internal locus of control pertinent to sustainable diets, they did not frequently perform sustainable dietary behaviors. Their high level familiarities of sustainable development through media such as social media, public service advertisements, and academia can influence that students had high level of internal locus of control pertinent to sustainable diets. On the other hand, teachers having lack of understanding of sustainable development may affect their behaviors toward sustainable diets. Further experimental studies can be conduct to explain these possible reasons elaborately.

5.2.2 Association between Behaviors and Internal Locus of Control pertinent to Sustainable Diets

In the literature, a number of study stated that internal locus of control influences behaviors, actions and choice (e.g. Busseri, Lefcort, Kerton, 1998; Rosina, 2001). Therefore, the association between internal locus of control and behaviors pertinent to sustainable diets were examined. The relevant results revealed that there was a significant relationship between the behavior and internal locus of control pertinent to sustainable diets of teacher education students. In other words, as being consumer, teacher education students, who have higher beliefs about reducing the threats to sustainable development by demonstrating some certain behaviors related to sustainable diets, have higher level internal locus of control pertinent to sustainable diets exhibit higher favorable behaviors toward sustainable diets. Furthermore, considering sub-dimensions of behavior pertinent to sustainable diets, results showed that there was a significant relationship between internal locus of control on sustainable diets and both sub-dimensions as eating and food purchasing and waste reduction respectively. That is to say, internal locus of control on sustainable diets contributed teacher education students' behaviors regarding sustainable diets as waste reduction, and eating and food purchasing behaviors.

Sustainable diets were ascertained a dietary pattern also to reduce environmental impacts of current dietary patterns. In this perspective, the study result was parallel with previous research studies conducted with respect to association between internal locus of control and behavior with respect to pro-environment (e.g. Hines et al., 1987; Bamber, 2007, Alper, 2014). On the other hand, current study findings inconsistent with the study by Kim (2012), there was not a significant relationship between these dependent variables. However, the researcher also stated that students with internal locus of control, as belief to build sustainable World, rather than external locus of control perform more favorable behaviors toward sustainable development.

Considering sub-dimensions of the behavior scale as waste reduction and, eating and purchasing separately, consistent with the findings of research regarding waste

reduction and this result was linked to possible anxiety on the effects of environmental degradation on humans and environment (Karbalae et al. 2013; 2014). Therefore, considering teacher education students' understanding of sustainable development mainly as an environmental aspect, this finding can be linked also to environment related anxiety which were affect human being and nature.

Considering eating actions, healthy and nutritious diets were essentially placed in many SDGs such as zero hunger, healthy lives and sustainable consumption etc. (Agenda 2030, 2015; UN Standing Committee for Nutrition, 2015) in the context of sustainable diets. In this perspective, whereas inconsistent Steptoe and Wardle (2001) inconsistent the findings, the similar studies (Clark et al., 2013; 2014; Tabak et al., 2009) with the findings of the current study with respect to eating actions were in the literature. For instance, Clark, Kassenboehmera and Schurerbet (2014) stated internal locus of control toward having healthy eating pattern and living a healthy life was significantly related with performing favorable behaviors toward eating healthier food and this result was attributed to individual's future health benefits and future orientations with respect to health values. In this respect, addition to the health benefits of sustainable diets, the present research findings may be attributed to future orientations and benefits with respect to benefits of society, environment and economy regarding sustainable development because they may consider their own actions may be advantages on construction of sustainable World at future.

To sum up, there was a significant relationship between the internal locus of control and behaviors pertinent to sustainable diets of teacher education students, and sub-dimensions of behaviors as *waste reduction*, and *eating and food purchasing behaviors.* Beliefs toward future orientations and benefits with respect to advantages for environment (Clark et al., 2014), society, and economy regarding sustainable development can be linked to this finding because students who may consider their own actions may be advantages on construction of sustainable World at future perform frequently these behaviors.

5.2.3 Differences of gender and teacher education program in terms of Behavior and Internal Locus of Control on Sustainable Diets

Another focus of the current study was examining gender and teacher education program differences, and interaction effect of these independent variables in behavior and internal locus of control toward sustainable diet. The present study findings show that, considering gender difference, there were significant gender differences detected in internal locus of control pertinent sustainable diets of males and females with 2% explained variance. Then, despite the small size effect, female teacher education students have higher level internal locus of control pertinent to sustainable diets than male teacher education students. However, there were no significant gender differences found in males' and females' behaviors toward sustainable diets. In other words, while female teacher education students believe that they can reduce the threats to sustainable development by demonstrating some certain actions related to sustainable diets than males, they do not usually perform behavior towards sustainable diets than males significantly. Regarding interaction effect of gender and teacher education programs, no interaction effect of gender by teacher education programs (and vice versa) was found on internal locus of control and behavior pertinent to sustainable diets.

Consistent with the present study findings, previous studies sampling adolescent students (e.g. Tabak et al., 2009), girls had more internally locus of controlled than boys with respect to healthy eating pattern. However, incongruent with findings of present study, there were some studies showed that females performed more frequently health eating behaviors than males, which was linked to females having higher weight control (Boek et al., 2012, Wardle, 2004). These attributions may be sense in healthy food consumption but not for sustainable dietary behaviors because sustainable dietary behaviors included not only health related dietary actions but also various actions such as waste reduction or purchasing actions. Moreover, present study finding was similar with research by Kısoglu, Yıldrım, Salman, and Sulun (2016) explaining that pre-service teachers' pro-environmental behaviors did not change with respect to gender.

However, incongruent with findings of present study, Fielding and Head (2011) stated that there were gender differences in pro-environmental behaviors.

Holistic understanding of sustainable development is important for sustainable lifestyles, behaviors and actions (UNESCO, 2017, UNEP, 2016). In the present study, both females and males have lack of understanding toward sustainable development with respect to holistic approach. Therefore, their understanding may affect both females' and males' behaviors toward sustainable diets so both they did not perform frequently and differently perform sustainable dietary behaviors. On the other hand, females have higher internal locus of control pertinent to sustainable diets. Further studies can examine the reasons of this difference with respect to internal locus of control pertinent to sustainable diets among females and males.

With regarding differences in teacher education program, there was a statistically significant teacher education program difference on behaviors (4.5% of variance). The significant differences on behavior pertinent to sustainable diets were detected in the teacher education programs among Early Childhood Education and Foreign Language Education, and Elementary Science Education and Foreign Language Education. Specifically, students pursuing Early Childhood Education and Elementary Science Education programs performed significantly more favorable behaviors pertinent to sustainable diets than students pursuing Foreign Language Education performed. On the other hand, there was not a significant teacher education program difference on internal locus of control pertinent to sustainable diets. To put it differently, students' belief toward the idea which they can reduce the threats to meet the needs of future generations and today's people by actualizing given behaviors pertinent to sustainable diets did not differ with respect to teacher education programs while students pursuing in ECE and ESE programs performed more favorable behaviors than students pursuing in FLE exhibit behaviors toward sustainable diets.

Media mentioning sustainable lifestyles can affect individuals' daily-choice and lifestyles (UNEP, 2016). In the current study, students pursuing in Elementary Science Education and Early Childhood Education programs were higher *familiar* with sustainable development terms with respect to *popular media* than Foreign Language

Education program students. In this respect, one possible explanation of this finding may be linked to media.

Another possible explanation of this finding may be connected to familiarities with respect to academia. Students pursuing in Elementary Science Education and Early Childhood Education programs were higher level *familiar* with these terms with respect to *academia* than students pursuing in Foreign Language Education program. Moreover, both Elementary Science Education and Early Childhood Education curriculums include *must courses* related with environment, sustainable development and nutrition education which comprises food issues with respect to sustainable development. For instance, ECE students should take must-course related nutrition education to be graduate namely as "Maternal and Child Nutrition" which includes some objectives toward sustainable development and sustainable diets in METU. Therefore, the nutrition courses may affect their behaviors pertinent to sustainable diets. In this regard, Unusan (2007) examined positive effects of nutrition course on pre-service teachers' food related nutrition behaviors, and nutrition education contributes to differentiate food choice between unhealthy and healthy and to change unfavorable eating behaviors to healthy (Robertson, & Zalles, 2005). In addition, the researcher stated that the nutrition courses develop healthy eating behaviors of pre-service teachers. Besides, ESD is effective element to alter behaviors through sustainable lifestyles and create sustainable societies not only today but also futures (Taylor, Quinn, & Eames, 2015; UNESCO, 2017). In ESE teacher education curriculum, there is *must course* named as "Environmental Science" which comprises sustainable development issues based on ESD. Therefore, the familiarity regarding academia of Elementary Science Education and Early Childhood Education students may be affected by these ESD and nutrition education related must courses which include content related food issues with respect to sustainable development. Therefore, ESE and ECE students performed more frequently behaviors toward sustainable diets than FLE students because of the contribution of these must courses on familiarity and behaviors.

Briefly, while female students had significantly higher internal locus of control toward sustainable diets than males, there was not a statistically significant difference in

behaviors pertinent to sustainable diets in terms of gender. Moreover, both female and male teacher education students have lack of understanding toward sustainable development. Considering gender differences, behaviors of both female and male teacher education students may be influence by lacking of understanding of sustainable development so both they did not perform frequently and differently perform sustainable dietary behaviors. Furthermore, the reason of difference with respect to internal locus of control pertinent to sustainable diets among females and males can be explained in future studies. Besides, with respect to differences in terms of teacher education programs, it was found out that the students pursuing Elementary Science Education and Early Childhood Education programs exhibited more usually sustainable behaviors toward sustainable diets than the students at the Foreign Language Education while teacher education students' internal locus of control did not differ with respect to teacher education programs. Furthermore, students pursuing in Elementary Science Education and Early Childhood Education programs were higher level familiar with these terms with respect to academia and popular media than other programs while students pursuing in Foreign Language Education program were at least familiar these terms in terms of media and academia among other teacher education programs. Therefore, possible explanations of this finding may be linked to media and academia. Regarding familiarity through academia, Elementary Science Education and Early Childhood Education students may be affected by environmental education based on ESD and nutrition education related *must courses* including in respectively ESE and ECE teacher education curriculums which comprised content related food issues with respect to sustainable development.

5.4 Implications

In the light of the results of this study results and discussions, some implications were proposed to administers, teachers and curriculum developers:

- The study results showed that teacher education students have lack of holistic understanding toward sustainable development. To handle that, pre/in- service

teacher education programs, campaigns and projects based on ESD should be regulated and focus on enhancing students' understanding toward all aspects equal.

- To increase behaviors pertinent to sustainable diets, sustainable food system issues, especially dietary patterns, should be inserted into ESD and nutrition courses more.

- Sustainable diet issues can be also adapted into other courses of EME, CEIT, SSME and, FLE teacher education programs to create sustainable food choice.

- Nutrition education courses and ESD courses should be proceeded to maintain students' internal locus of control toward sustainable diets.

- It is stated as main aims of ESD that altering behaviors toward creating sustainable lives and creating sustainable societies not only for today, but also for the future (Chung, 2013; Taylor, Quinn & Eames, 2015; UNESCO, 2017). To change students' behaviors toward more sustainable dietary patterns, purchasing, eating and waste management, and also growing foods, campus facilities and resources should be regulated toward sustainable diet.

- With respect to holistic and system thinking approaches, "outdoor learning" (Karaarslan, &Teksöz, 2016) and "conceptualization of a holistic environment" as ESD pedagogies should also be integrated to teacher education programs (Mokuku, & Jobo 2016) to change behaviors to sustainable actions more.

- To create sustainable lifestyles including behaviors "Traditional practices, old technologies, and communities living fulfilling lives without being heavily consumptive" (UNEP, 2016, p.38) as good educatory examples can be inserted ESD with respect to sustainable diets

- Curriculum developers should pay more attention to place more sustainable diet objectives into nutrition education and ESD courses to enhance constructing sustainable food preference and dietary patterns.

- Various stakeholders such as university managers, academicians, community based organization groups should work together and cooperatively to build sustainable food system in higher education institutes and campuses (Rosing, & Block, 2017) that enhance ecological environment, create local food economy and increase opportunities to access sustainable food.

5.3 Recommendations

In this study, some recommendations were made toward future researches, which can be stated as following:

- Another research, that is similar with this study, can be applied with using *random sampling method* in different countries and at private universities with teacher education students to increase generalizability.
- Future studies, that are examining strategies to increase understanding of sustainable development and food issues in sustainability as a holistic way, can be conducted.
- Studies can be conducted to examine strategies to change dietary behaviors of faculty of education.
- Future researches can be handled to enhance ESD strategies toward sustainable diets to create sustainable lifestyles.
- Because of self-reported data collection procedure usage in this study, in future studies actual behaviors on sustainable diets can be measured.
- Qualitative studies examining opinions toward ESD and nutrition education related courses, and assessing the contribution of these courses to sustainable behaviors and internal locus of control pertinent to sustainable diets can be made in future.

- In the further studies, participants can be asked where they eat and purchase their foods such as cafeterias, supermarkets, bazaar, small local shops, canteens etc. Moreover, whether they prepare their own foods or not can be examined.

- Future researches can be used social desirability scale to prevent or detect the social desirability bias, which may affect the result of the survey research.

- There is strong need to conduct more studies related internal locus of control based on sustainability issues and sustainable diets.

- Future studies can examine behaviors and internal locus of control pertinent to stages of sustainable food system such as production, processing and distribution stages.

- Other studies can include examining teacher education students, teachers and pre-service teachers on belief, value and attitude toward sustainable diets.

- To examine effects of internal locus of control on behaviors toward sustainable diets, experimental researches can be conducted in future researches.

- To provide deeper knowledge on internal locus of control and behaviors toward sustainable diets, qualitative researches can be conducted in the future.

- Socio-demographics, that are different from gender and teacher education programs, such as ethnicity, socio-economic level, grade level can be included in other future researches to demonstrate differences on locus of control and behaviors on sustainable diets.

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APPENDICES

APPENDIX-A

SÜRDÜRÜLEBİLİR BESLENMEYE YÖNELİK DAVRANIŞ ve KİŞİSEL KONTROL ODAĞI ANKETİ

A. KİŞİSEL BİLGİLER

1. Cinsiyetiniz:

- Kadın
- Erkek

2. Yaşınız:

3. Bölüm:

- Okul Öncesi Öğretmenliği
- İlköğretim Fen Bilgisi Öğretmenliği
- Diğer ……

4. Sınıf Düzeyiniz:

- 1
- 2
- 3
- 4
- Yüksek lisans
- Doktora

5. Ailenizin aylık gelir miktarı;

- 1,000 TL 'den az
- 1,001-3,000 TL
- 3,001-5,000 TL
- 5,001-10,000 TL
- 10,001 TL ' den fazla

5. Aileniz sebze ve/veya meyve yetiştirir mi?

- Hayır
- Evet

Cevabınız "Hayır" ise, 2. sayfadaki B. bölümüne geçebilirsiniz.

6. Hangi amaçla yetiştiriyor? (Birden fazla seçenek işaretleyebilirsiniz.)

- o Kendi ihtiyaçlarımızı karşılamak için
- o Maddi kazanç sağlamak için
- o Boş zamanlarını değerlendirmek

B. Sürdürülebilirlik ile ilgili Altyapınız

1. 'Sürdürülebilirlik' ya da 'Sürdürülebilir Kalkınma' terimi size ne kadar tanıdık geliyor?	**Hiç**	**Biraz**	**Orta**	**Oldukça**	**Çok**
a. popüler medyada karşılaştığınız şekliyle	1	2	3	4	5
b. akademik alanınızda kullanılan şekliyle	1	2	3	4	5

1a. ve 1b. sorularının her ikisi için de cevaplarınız 'Hiç' ise lütfen 'C' Bölümüne geçiniz.

2. Aşağıdaki ifadelerden hangisi 'Sürdürülebilir Kalkınma' ile ilgili kendi anlayışınıza en yakındır?

a) Çevre korumasının ihmal edilmesi pahasına toplumun kısa ve uzun vadede gerekli olan ihtiyaçlarının karşılanmasına yönelik bir kalkınma şekli
b) Bireylerin kendi kaliteli yaşam anlayışlarına göre yaşayabilmelerini destekleyen bir kalkınma şekli
c) Gelecek nesillerin ihtiyaçlarının karşılanması olanaklarını tehlikeye sokmadan günümüzün ihtiyaçlarını karşılayan bir kalkınma şekli
d) Mal ve hizmet üretiminin ve bu ürünlerin kalitesindeki artışın uzun vadede sürdürüldüğü bir kalkınma şekli
e) Karşı karşıya olduğumuz ekolojik krizden kurtulabilmek için doğanın ve doğal kaynaklarımızın korunmasını hedefleyen bir kalkınma şekli

3. 'Sürdürülebilirlik' ya da 'Sürdürülebilir Kalkınma' ile ilgili kişisel anlayışınızı yansıtan anahtar kelimeler ya da sözcük öbekleri yazınız. (Lütfen yukarıda B.2 sorusunda yer alan kelimeleri kullanmayınız.)

C. SÜRDÜRÜLEBİLİR BESLENME ve GIDA TÜKETİMİNE YÖNELİK DAVRANIŞ ve KİŞİSEL KONTROL ODAĞI

1. Aşağıda verilen gıda temelli davranışları son 1 yıl içinde ne sıklıkla yaptığınızı lütfen verilen ölçüte göre [Hiçbir zaman (1) – Her zaman (5)] belirtiniz. (Lütfen her madde için tek kutucuğu işaretleyiniz.)]

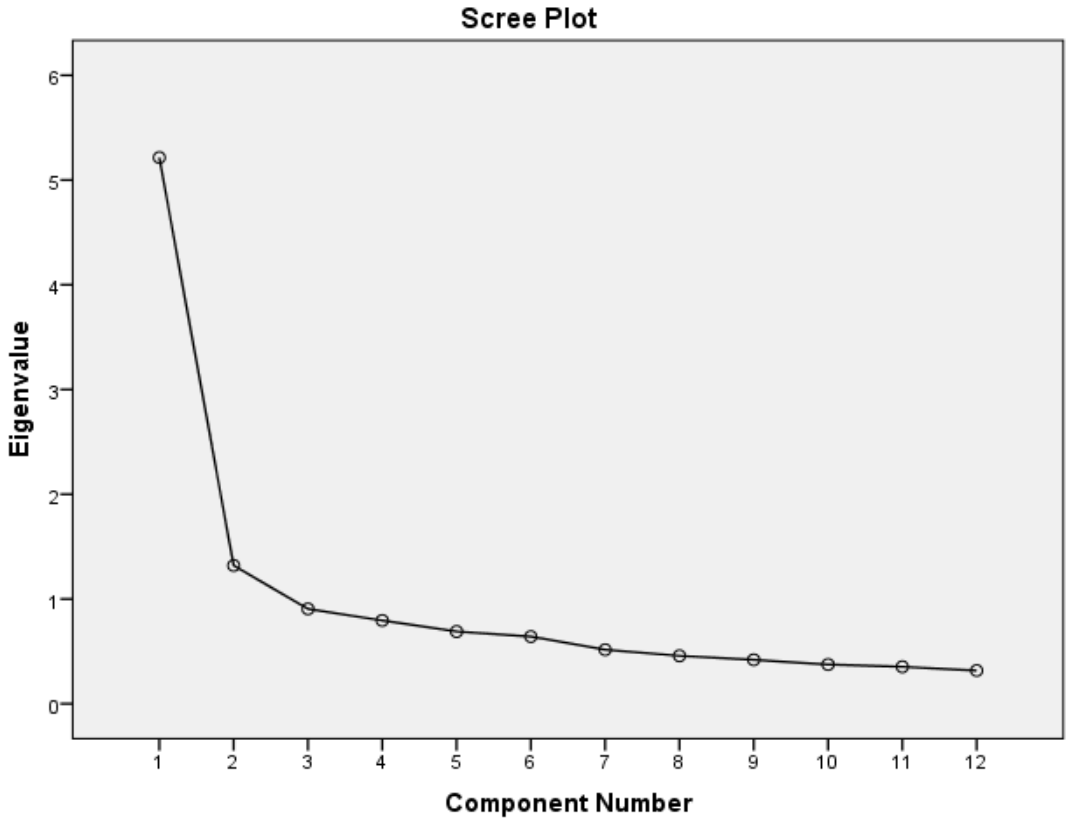
	Hiçbir zaman	**Nadiren**	**Bazen**	**Sık sık**	**Her zaman**
1. Gıda atıklarımı **azalttım.**	1	2	3	4	5
2. Gıda **ambalajı** atıklarımı **azalttım.** (örneğin; cam şişe, kavanoz, konserve kutuları, hazır gıda ambalajları gibi)	1	2	3	4	5
3. Gıda israfını **azalttım.**	1	2	3	4	5
4. Organik gıdalar tüketmeye özen gösterdim.	1	2	3	4	5
5. Genetiği değiştirilmiş gıdalardan (GDO) **kaçındım.**	1	2	3	4	5
6. İşlenmiş gıdaların tüketimini **azalttım. (**örneğin; abur cubur, salam sosis, dondurulmuş pizza gibi)	1	2	3	4	5
7. Paketlenmiş gıdaların içeriklerine dikkat ederek tüketmeye özen gösterdim.	1	2	3	4	5
8. Besin değerleri yüksek gıdalar tükettim. (örneğin; lif, protein, vitamin değerleri gibi)	1	2	3	4	5
9. Bir iki besin türünden çok fazla yemek yerine, değişik tür besinlerden yeterli miktarlarda tükettim.	1	2	3	4	5
10. Gıda alışverişlerimi küçük ölçekli esnaf ve yerel pazarlardan yaptım.	1	2	3	4	5
11. Gıdanın geçtiği -tüm- aşamaları göz önünde bulundurarak doğa, toplum ve ekonomi dostu gıdalar tükettim.	1	2	3	4	5
12. Fastfood tüketimini azalttım.	1	2	3	4	5

2. Aşağıda verilen cümleleri "..... gelecek nesillerin ve günümüz insanının ihtiyaçlarının karşılanmasına yönelik tehditleri azaltmış olurum." ifadesi ile tamamlayarak oluşan görüşe ne derece [Kesinlikle Katılmıyorum (1) – Kesinlikle Katılıyorum (5)] katıldığınızı lütfen belirtiniz. (Lütfen her madde için tek kutucuğu işaretleyiniz.)

"..... gelecek nesillerin ve günümüz insanının ihtiyaçlarının karşılanmasına yönelik tehditleri azaltmış olurum."	**Kesinlikle Katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle Katılıyorum**
1. Gıda ambalajı atıklarını geri dönüşüme atarak (kâğıt ambalajlar, cam kavanoz vb.)	1	2	3	4	5
2. Gıda atıklarından kompost yaparak	1	2	3	4	5
3. İçilebilir musluk suyunu kullanarak	1	2	3	4	5
4. Sürdürülebilir tarım ürünlerini (*serbest dolaşan tavuklar ve yumurtaları, damla sulama sistemi kullanan üreticilerin ürünleri vb.)* kullanarak	1	2	3	4	5
5. Gıda alışverişlerimi küçük ölçekli esnaf ve yerel pazarlardan yaparak	1	2	3	4	5
6. "Fastfood" tipi beslenme yerine geleneksel mutfakları tercih ederek	1	2	3	4	5
7. Mevsiminde yetişmiş sebze ve meyveleri satın alarak	1	2	3	4	5
8. Gıda israfımı **azaltarak**	1	2	3	4	5
9. İşlenmiş gıdalardan uzak durarak (örneğin; abur cubur, salam sosis, dondurulmuş pizza gibi)	1	2	3	4	5
10. Yeterli ve dengeli beslenerek	1	2	3	4	5
11. Organik gıdaları tercih ederek	1	2	3	4	5
12. GDO'lu gıdalardan **kaçınarak**	1	2	3	4	5
13. Gıda alışverişlerimde 'adil ticaret' (*insan haklarını gözeterek üretilen)* uygulamalarını takip ederek	1	2	3	4	5
14. Gıda atıklarını azaltarak	1	2	3	4	5
15. Aşırı et ağırlıklı beslenmek yerine dengeli beslenerek	1	2	3	4	5

APPENDIX-B

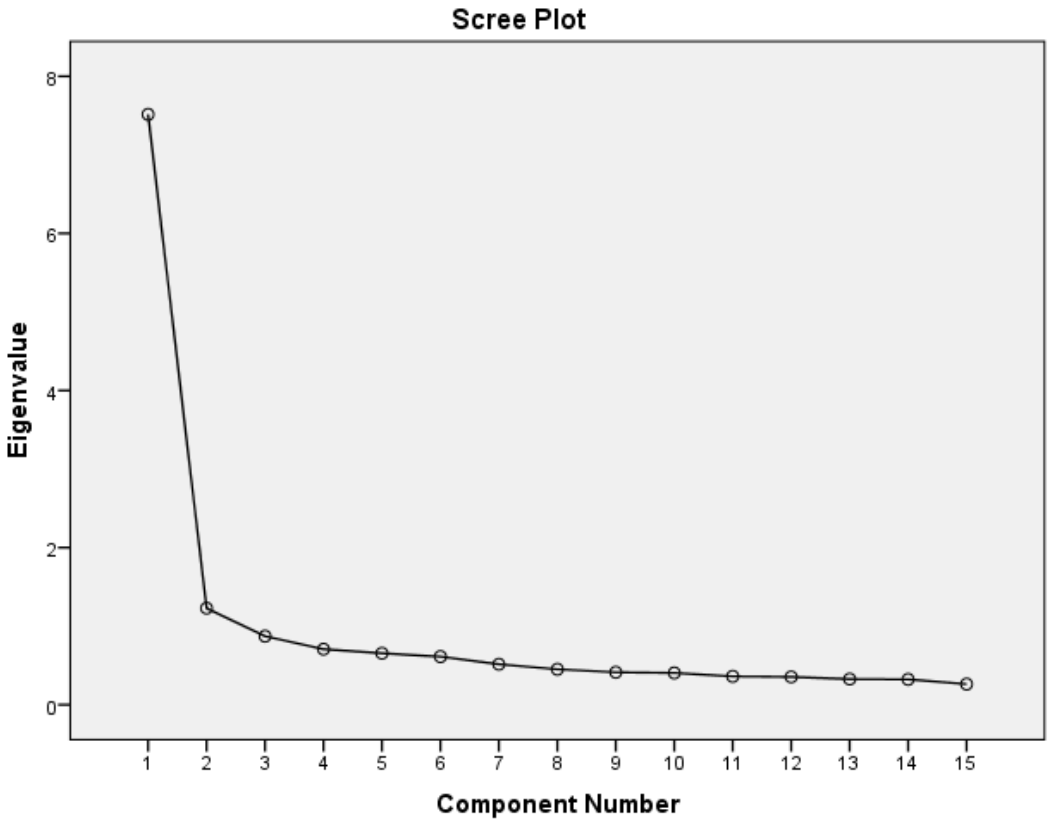
SCREE PLOT and ROTATED COMPONANT RESULTS BEHAVİOR of FACULTY of EDUCATION STUDENT



Rotated Component Matrix[a]

	Component	
	1	2
SMEAN (C_2_8_davranıs)	,760	,142
SMEAN (C_2_9_davranıs)	,738	,143
SMEAN (C_2_11_davranıs)	,691	,195
SMEAN (C_2_10_davranıs)	,689	,183
SMEAN (C_2_7_davranıs)	,679	,232
SMEAN (C_2_14_davranıs)	,673	,127
SMEAN (C_2_6_davranıs)	,668	,163
SMEAN (C_2_13_davranıs)	,653	,330
SMEAN (C_2_12_davranıs)	,578	,231
SMEAN (C_2_1_davranıs)	,182	,855
SMEAN (C_2_2_davranıs)	,180	,823
SMEAN (C_2_3_davranıs)	,242	,660

SCREE PLOT and COMPONANT RESULTS of INTERNAL LOCUS of CONTROLS of FACULTY of EDUCATION STUDENT



Component Matrix[a]

	Component
	1
SMEAN (C_4_12_locusofcontrol)	,803
SMEAN (C_4_11_locusofcontrol)	,803
SMEAN (C_4_7_locusofcontrol)	,776
SMEAN (C_4_9_locusofcontrol)	,773
SMEAN (C_4_10_locusofcontrol)	,767
SMEAN (C_4_8_locusofcontrol)	,763
SMEAN (C_4_4_locusofcontrol)	,718
SMEAN (C_4_13_locusofcontrol)	,712
SMEAN (C_4_14_locusofcontrol)	,698
SMEAN (C_4_5_locusofcontrol)	,690
SMEAN (C_4_6_locusofcontrol)	,647
SMEAN (C_4_2_locusofcontrol)	,624
SMEAN (C_4_15_locusofcontrol)	,612
SMEAN (C_4_1_locusofcontrol)	,606
SMEAN (C_4_3_locusofcontrol)	,564

APPENDIX-C

METU HUMAN ETHIC CENTRE DOCUMENT

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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05 NİSAN 2017

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç. Dr. Elvan ŞAHİN ;

Danışmanlığını yaptığınız yüksek lisans öğrencisi Ayşe DOĞRUBAK ***"Öğretmen Adaylarının Sürdürülebilir Beslenme Düzenine İlişkin İnanç ve Davranışlarının İncelenmesi"*** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2017-EGT-054** protokol numarası ile **10.04.2017 – 31.07.2017** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN
Başkan V

Prof. Dr. Ayhan SOL
Üye

Prof. Dr. Ayhan Gürbüz DEMİR
Üye

Doç. Dr. Yaşar KONDAKÇI
Üye

Doç. Dr. Zana ÇITAK
Üye

Yrd. Doç. Dr. Pınar KAYGAN
Üye

Yrd. Doç. Dr. Emre SELÇUK
Üye

APPENDIX-D

TURKISH SUMMARY/ TÜRKÇE ÖZET

ÖĞRETMEN EĞİTİMİ ÖĞRENCİLERİNİN SÜRDÜRÜLEBİLİR BESLENMEYE İLİŞKİN İÇSEL KONTROL ODAĞI VE DAVRANIŞLARININ DEĞERLENDİRİLMESİ

Giriş

20. yüzyılda insan faaliyetlerinden kaynaklanan sosyal, ekonomik ve çevresel problemlerle mücadele etmek için, Sürdürülebilir kalkınma, Ortak Geleceğimiz başlıklı raporda ortaya çıkmıştır. (1987 Dünya Komisyonu Çevre ve Kalkınma Komisyonu). Bu bağlamda, 2015 yılında, Sürdürülebilir Kalkınma Hedefleri (SKH) günümüz sosyal, ekonomik ve çevresel problemlerine karşı sürdürülebilir kalkınmayı gerçekleştirmek için kabul Birleşmiş Milletler tarafından kabul edilmiştir (Gündem 2030, 2015). Bu güncel sorunlar arasında açlık, beslenme ile ilgili hastalıklar (örn. yetersiz beslenme, obezite), gıda güvencesizliği, doğal kaynakların azalması ve tarımın bozulması gibi önemli ölçüde çözülmesi gereken kritik sorunlar da bulunmaktadır. Dolayısıyla, SKH' leri bu gibi gıda ile ilgili sorunları çözmeyi hedefleyen Açlığa son, Sorumlu Tüketim ve Üretim, İklim Eylemi, Sağlıklı Bireyler gibi hedefleri içermektedir (Agenda 2030, 2015, HLTF, 2015). Sürdürülebilir bir Dünya umudu için, gıda ile ilişkili sürdürülebilir kalkınma hedefleri ile sürdürülebilir gıda sistemleri yaratmak önemli bir amaç olarak belirtilmiştir (FAO, 2012; 2015). Sürdürülebilir bir gıda sistemi inşa etmek için, mevcut gıda sistemi sağlıklı, çevre dostu, topluma duyarlı ve ekonomik bir gıda sistemine dönüştürülmelidir. Böyle bir gıda sistemi oluşturmak için, günümüz sağlıksız, yüksek atık oluşturan, ekonomik

olarak adaletsizlikler barındıran, çevreye duyarsız beslenme alışkanlıklarının değiştirilmesi en önemli hedeflerden biridir (FAO& BIODIVERSITY, 2010).

Sürdürülebilir beslenme, "mevcut ve gelecek kuşaklar için gıda ve beslenme güvenliğine ve sağlıklı yaşama katkıda bulunan düşük çevresel etkilere sahip; biyoçeşitlilik ve ekosistemlere karşı koruyucu ve saygılı, kültürel açıdan kabul edilebilir, ulaşılabilir, ekonomik açıdan adil ve ekonomik beslenme açısından yeterli, güvenli ve sağlıklı; doğal kaynakları optimize eden diyetler" (s.7) olarak tanımlanmıştır (FAO, 2010). Sürdürülebilir beslenme, tüketicilerin gıda sistemindeki önemi göz önünde bulundurulduğunda, besin zincirinden salınan sera gazı emisyonlarının azaltılmasına, obezite ve malnutrisyon gibi beslenme ile ilgili hastalıkların azaltılmasına, gıda kültürü ve mirasın korunmasına ve sağlıklı ve ekonomik gıdaya erişimin kolaylaşmasına katkıda bulunan beslenme alışkanlıkları olarak belirtilmiştir (WWF, 214). Gündem 2030'a (Birleşmiş Milletler, 2015) göre Sürdürülebilir Kalkınma için Eğitim (SKE), sürdürülemez sistemlerin sonuçlarının ortadan kaldırması için herkes için sağlanmalıdır. Ayrıca, eğitim, bireylerin atık azaltma, yiyecek satın alma ve yemek yeme dahil olmak üzere sürdürülebilir beslenme alışkanlıklarını benimsemeleri için önemli bir araç olarak görülmektedir (Çevre, Gıda ve Köy İşleri Bakanlığı, 2012; WWF, 2014). Bununla beraber, Sürdürülebilir yaşamlar yaratmaya yönelik davranışların değiştirilmesi SKE'nin ana hedeflerinden biridir (Arbuthnott, 2009; Chung, 2013; UNESCO, 2017). Öğretmenlerin Sürdürülebilir Dünya kurmaları için öğretmenlerin önemini göz önüne alarak, SKE'i öğretmen eğitim programlarına uyarlamak, davranışları değiştirmek için önemli bir unsur olarak görülmektedir (UNESCO, 2014; UNESCO, 2017; USTESD, 2013; Venkataraman, 2009).

Sürdürülebilir kalkınma ve SKH'leri, sürdürülebilir kalkınmanın birçok perspektifinin olduğunu kabul etmek ve dünya problemlerini anlamak için çokyönlü ilişkilerin belirtildiği bütüncül bir yaklaşımla ortaya çıkmıştır. Bu nedenle, sürdürülebilir kalkınma ve sürdürülebilir yaşam biçimlerini anlamak için sürdürülebilir kalkınmanın çevre, toplum ve ekonomi boyutları birlikte ele alınması önemlidir (UNESCO, 2014; UNESCO, 2017; UNEP, 2016). Sürdürülebilir kalkınmayı kavramak ve sürdürülebilir yaşam biçimleri geliştirmek için bilgi ve beceriler gerekli görülmektedir (UNESCO, 2017; UNEP, 2016). Bu nedenle, sürdürülebilir davranışlar da dahil olmak üzere

sürdürülebilir yaşam biçimleri bütünsel bir yaklaşım olarak ele alınmalıdır (Hint Almancası Uzman Grubu, 2015), çünkü davranışları anlamak ve etkilemek için sürdürülebiilir kalkınmanın bütüncül bir yaklaşımle anlaşılması önemldir (UNESCO, 2017). Buna ek olarak, sürdürülebilir kalkınmaya yönelik aşinalık göz önüne alındığında, bilgi ve beceriler, eğitim ve medya sırasıyla formal ve informal deneyimlerden etkilenebilir (UNESCO, 2017; UNEP, 2016).

Davranışlar, sürdürülebilir yaşam tarzları oluşturmak için önemli bir belirleyici etken olarak görülmektedir (UNEP, 2016). OECD'ye (2008) göre, sürdürülebilir yaşam tarzları oluşturmak için tüketici davranışlarına yönelik farkındalığın arttırılması esastır. Bu bağlamda, sürdürülebilir beslenmeye yönelik satın alma, yemek yeme ve gıda atığını azaltma gibi sürdürülebilir davranışlar, sağlıklı, çevre, toplum ve ekonomi dostu beslenme düzeni oluşturmak için önemlidir (WWF, 2014). Ayrıca, içsel kontrol odağı, insanların "kendi tutum, eylem ve çaba" vasıtasıyla hayatlarındaki olumlu veya olumsuz durumları değiştirebileceklerine olan inançlar olarak tanımlanmaktadır. (Grinnel, 2016). Buna ek olarak, davranışlar ve içsel kontrol odağı arasındaki ilişki, ilgili literatürdeki birçok çalışmada (Ahn ve diğerleri, 2014; Bamberg & Möser, 2007; Boubonari ve ark., 2013; Cleveland ve ark., 2005) belirtilmiştir. Ayrıca, cinsiyet etkeni, sürdürülebilir gıda sistemi, beslenme ve gıda güvenliği gibi konularda (FAO, 2013, WWF, 2013) belirleyici etkenlerden biri olarak görülmektedir.

Bu çalışmanın amaçları; Öğretmen eğitimi öğrencilerinin "sürdürülebilir kalkınma" terimiyle ilgili aşinalık ve anlayışlarını incelemek, sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağını tanımlamak, öğrencilerin sürdürülebilir beslenmeye yönelik içsel kontrol odağı ve davranışları arasındaki potansiyel ilişkiyi incelemek, cinsiyet ve öğretmen eğitim programları açısından sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağındaki farklılıklarını araştırmaktır.

Bu çalışmadaki araştırma soruları;

1. Öğretmen eğitimi öğrencileri "sürdürülebilir kalkınma" terimine olan aşinalıkları nedir?

2. Öğretmen eğitimi öğrencilerinin "sürdürülebilir kalkınma" terimine yönelik anlayışları nelerdir?

3. Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye yönelik davranışları nelerdir?

4. Öğretmen eğitimi öğrencilerinin, sürdürülebilir beslemeye yönelik içsel kontrol odakları nedir?

5. Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenme ye yönelik içsel control odağı ve davranışları arasındaki ilişkiler nelerdir?

6. Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenme davranış ve içsel kontrol odağı bakımından kadın ve erkekler arasında anlamlı bir fark var mıdır?

7. Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye ilişkin davranış ve içsel kontrol odağı açısından öğretmen eğitim programları arasında anlamlı farklılıklar var mıdır?

8. Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye ilişkin davranış ve içsel kontrol odağı açısından cinsiyet ve öğretmen eğitim programları arasında anlamlı bir etkileşim etkisi var mıdır.

SKE, SKH' lerini gerçekleştirmek ve sürdürülebilir bir gelecek inşa etmek için önemli bir araç olarak görülmektedir. Bu bağlamda eğitimciler, SKE' nin uygulanması ve entegrasyonu yoluyla SKH' lerini gerçekleştirmek için önemli derecede sorumlu olarak görülmektedirler (UNESCO, 2017). Dahası, SKE'nin okul öncesi eğitiminden yüksek öğrenime kadar her seviyede eğitime entegre edilmesi gerekmektedir (UNESCO, 2012). Bu aşama, eğitimciler sürdürülebilir yaşam tarzları oluşturmada önemli paydaşlar olarak görülmektedir (UNESCO, 2017) Bu bağlamda mevcut sürdürülemez yaşam biçimlerini göz önünde bulundurusak, davranış değişikliği, mevcut Dünyadaki çevresel, sosyal ve ekonomik sorunlar için çözüm üzerinde kritik bir role sahiptir (Reisch, Eberie, & Lorek, 2013; Vinnari & Tapio, 2012). Bu nedenle,

davranışları değiştirmek için öncelikle davranışları belirlemek esastır. Dahası, içsel kontrol odağı "sürdürülebilir kalkınmayı konularını ele almak için önemli bir yol" olarak belirtilmekte ve sürdürülebilirlikle ilgili konularda daha fazla çalışmada ele alınması önerilmektedir (Kim, & Reid 2016).

Cinsiyet, gıda sistemindeki eşitsizlikleri ortaya çıkarmak için incelenmesi gereken sürdürülebilir gıda sisteminin gelişimi açısında temel faktörlerden biri olarak görülmektedir. Dolayısıyla, sürdürülebilir kalkınma konularında cinsiyet farklılığını değerlendiren çalışmalar önemli görülmektedir (EAT, SDSN ve CGIAR Konsorsiyumu, 2015). Buna ek olarak, farklı öğretmen yetiştirme programlarında öğrenim gören öğrencilerin davranışlarını tanımlama ve karşılaştırma çalışmalarının yapılması (Timur, Timur ve Yılmaz, 2012) davranışların farklılıklarına ışık tutabilir ve bu farklılıklara ilişkin olumlu davranışlar geliştirmesine yardımcı olabilir.

Bu yönüyle, Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağının belirlenmesi ve ilgili değişkenle arasındaki ilişkiyi incelemek ve cinsiyet ve öğretmen eğitimi programları arasındaki farkları araştırmak sürdürülebilir beslenme açısından öğretmen eğitim programının mevcut durumuna ışık tutabilir. Ayrıca bu araştırma SKE kapsamında öğretmen eğitiminin iyileştirilmesine katkıda bulunabilir.

Yöntem

Bu çalışmada anket, korelasyon ve nedensel- karşılaştırma araştırma yöntemleri kullanılmıştır. Mevcut araştırmada, hedef popülasyon, Ankara'daki devlet üniversitelerindeki Eğitim Fakültesi lisans ve lisansüstü programlarına kayıtlı tüm öğretmen eğitimi öğrencileri olarak tanımlanmıştır. Bununla beraber, erişilebilir nüfus, Orta Doğu Teknik Üniversitesinde lisans ve lisansüstü programlarında öğrenim gören Öğretmen eğitimi öğrencileri olarak belirlenmiştir. Çalışmada kolay ulaşılabilir durum örneklemesi kullanılmıştır. Ayrıca, bu çalışmada İlköğretim Fen Bilgisi Öğretmenliği, Okul Öncesi Öğretmenli, İlköğretim Matematik Öğretmenliği, Bilgisayar Eğitimi ve

Öğretim Teknolojileri Eğitimi, İngilizce Öğretmenliği, Kimya Öğretmenliği ve Fizik Öğretmenliği disiplinlerinde öğrenim gören lisans ve lisansüstü programları öğretmenlik eğitimi öğrencileriyle çalışılmıştır.

Bu çalışmanın ulaşılabilir popülasyonu 2016-2017 bahar dönemi ODTÜ Eğitim Fakültesinde öğrenim gören toplam 1686 öğretmen eğitimi öğrencisinden oluşmaktadır. Bununla beraber, ana çalışmadaki örneklem sayısı 556 öğretmen eğitimi öğrencisinden oluşur. Çalışmanın katılımcılarının çoğu kadın (N = 462, %83.1) iken, erkek katılımcıların yüzdeleri % 16.9 (N = 94) olarak belirlenmiştir. Katılımcıların yaş ortalaması 22.51 olarak hesaplanmıştır. Katılımcıların çoğu sırasıyla Okul Öncesi Öğretmenli, (%29) ve İlköğretim Fen Bilgisi Öğretmenliği (%24.6) programlarından olup, en düşük katılımcı sayısı Kimya ve Fizik öğretmenliği öğrencileri (%5.9) olarak belirlemiştir. Katılımcılar, birinci sınıf (%13,3), ikinci (%29) sınıf, üçüncü sınıf (%21,9), dördüncü sınıf (%25,4) ve yüksek lisans/doktora 58'i (%10,4) düzeyindeki öğrencilerden oluşmaktadır. Katılımcıların çoğu ailelerinin aylık gelirinin 1001 ila 3000 TL arasında (%40.6) olduğunu bildirirken, katılımcıların yalnızca %1.4 aile gelirlerini 10000 TL'nin üstünde olduğunu belirtmiştir. Ayrıca, çalışmada ODTÜ Eğitim Fakültesi'nde öğretmen eğitimi öğrencilerine yönelik verilen SKE ve beslenme eğitimine dayalı bazı zorunlu ve seçmeli dersler gösterilmiştir.

Çalışmanın bağımlı ve bağımsız değişkenleri düşünüldüğünde, sürdürülebilir beslenmeye yönelik davranışlar ve sürdürülebilir beslenmeye yönelik içsel kontrol odağı, çalışmanın bağımlı değişkenleridir. Ayrıca, cinsiyet ve öğretmenlik eğitimi programları çalışmanın bağımsız değişkenleridir.

Bu araştırmada kullanılan ölçüm araçları "Demografik Bilgi Anketi", "Sürdürülebilirlik ve Sürdürülebilir Kalkınmaya Yönelik Anlayış ve Aşinalık Anketi" ve "Sürdürülebilir Beslenmeye Yönelik Davranışlar Anketi" ve " Sürdürülebilir Beslenmeye Yönelik İçsel Kontrol Odağı Anketi" olmak üzere dört ana ölçekten oluşmaktadır (bakınız tablo 1).

Tablo 1. S*eçme ve Geliştirme Prosedürü ve Ölçüm Ölçeklerinin Amacı*

Ölçekler	**Seçme ve Geliştirme Prosedürü**	**Amaç**
Demografik Bilgi Anketi	- Demografik Bilgi ölçeğinde 6 madde bulunmaktadır. –Madde-5 ve madde-6, meyve ve sebze yetiştiriciliği ile ilişkili olup Lea ve Worsley (2008) tarafından geliştirilmiş ve bu çalışmada Türkçe 'ye uyarlanmıştır.	--Öğrencilerin cinsiyeti, yaşı, öğretmen eğitimi programları ve sınıf düzeyi, aile gelirleri ve ailelerinin meyve veya sebze yetiştirip büyütmediği ve sebze yetiştirme sebepleri ile ilgili veriler toplamak.
Sürdürülebilirlik ve Sürdürülebilir Kalkınmaya Yönelik Anlayış ve Aşinalık Anketi	-Madde 1 ve 3, sırasıyla Kagawa (2007) tarafından 5 puanlık likert tipi soru ve anahtar kelime sorusu olarak geliştirildi ve Şahin tarafından (2008) Türkçe' ye uyarlandı. -Madde 2, Şahin (2008) tarafından çoktan seçmeli bir soru olarak geliştirildi.	-Madde 1, medya ve akademik alanlarda SK terimine yönelik aşinalığı keşfetmek için kullanılmıştır. -Madde 2, SK' ya yönelik anlayışları keşfetmeyi amaçlar. -Madde 3, SK' ya yönelik anlayışları daha derin anlamaları ile keşfetmek için kullanılmıştır.
Sürdürülebilir Beslenmeye Yönelik Davranışlar Anketi	Bu çalışmada davranış ölçeği 12 maddelik likert tipi ölçek olarak hazırlanmıştır.	Tüketici olarak sürdürülebilir beslenmeye yönelik gıda ile ilişkili satın alma, yemek yeme ve atık azaltma gibi üç ana temaya dayanan seçim ve eylemlerin son bir yıl boyunca ne sıklıkla yapıldığını keşfetmek.
Sürdürülebilir Beslenmeye Yönelik İçsel Kontrol Odağı Anketi	Bu çalışmada içsel kontrol odağı ölçeği 15 maddelik likert tipi ölçek olarak hazırlanmıştır.	İçsel kontrol odağı, bireylerin sürdürülebilir beslenmeye yönelik satın alma, yemek yeme ve atık azaltma gibi belirli gıda ile ilgili eylemleri gerçekleştirerek sürdürülebilir kalkınma tehditlerini azaltılabileceğine olan inançlarını belirlemek için kullanılmıştır.

Tablo 2 davranış ve içsel kontrol odağı anketlerine uygulanan faktör analizi ve güvenilirlik analiz sonuçlarını göstermektedir.

Tablo 2. *Güvenilirlik ve Açıklanan Toplam Varyans*

Ölçekler	**Madde Sayısı**	**Açıklanan Toplam Varyans (%)**	**Cronbach alfa değeri**
Sürdürülebilir Beslenmeye Yönelik Davranışlar Anketi (iki boyutlu)	12	54.4	.879
- Atık Azaltma Alt Boyutu	3	10.9	.739
-Yeme ve Satın Alma Alt Boyutu	9	43.4	.875
Sürdürülebilir Beslenmeye Yönelik İçsel Kontrol Odağı Anketi (tek boyutlu)	15	50.1	.925

Bu çalışmada, öğretmenlik eğitimi öğrencilerinin sürdürülebilirlik ve sürdürülebilir kalkınmaya yönelik anlayışları; davranışları ve sürdürülebilir diyetlere yönelik iç kontrol odağı incelendi. Ayrıca cinsiyet farklılığı, öğretmen eğitimi programları arasındaki davranış ve içsel kontrol odağı farklılıkları incelenmiştir. Buna ek olarak, sürdürülebilir beslenmeye yönelik davranışlar ile içsel kontrol odağı arasındaki istatistiksel ilişki araştırılmıştır. Çalışmanın başlangıcı, sürdürülebilir kalkınma, SKE, sürdürülebilir beslenme, davranış ve içsel kontrol odağına yönelik literatürdeki çalışmalar gözden geçirilmiştir. İlgili literatür (FAO, 2015, SDSN ve CGIAR, 2015, UNEP, 2012; UNSCN, 2014; WWF, 2014) dikkate alınarak sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağı ölçekleri hazırlanmıştır.

Pilot çalışma 149 Okul öncesi ve İlköğretim Fen Bilgisi Öğretmenliği ODTÜ lisans ve yüksek lisans öğrencileriyle Ocak-2017' de gerçekleştirilmiştir. Gerekli etik onayları alındıktan sonra, ana çalışma Mayıs- Haziran-2017'de gerçekleştirilmiştir. Çalışma verisi öğretmenlik eğitimi öğrencilerinden doğrudan sınıf ortamında gönüllülük esasına dayanarak toplanmıştır. Öğrenciler çalışmanın amacı hakkında bilgilendirilmiştir ve çalışma verileri araştırmacı tarafından doğrudan toplanmıştır. Ayrıca, araştırma verileri betimleyici ve çıkarımsal istatistik yöntemleriyle SPPS IBM 22 programı kullanılarak analiz edilmiştir.

Bu çalışmada, katılımcıların ölçek maddelerini içtenlikle yanıtladıkları ve araştırma anketinin normal koşullar altında yürütüldüğü varsayılmıştır. Ayrıca bu çalışmanın sınırlılıklarından biri kendi bildirim anket kullanılmasıdır ve bundan dolayı bu, nesnelliği tamamen yansıtamayabilir. Ayrıca, kolay ulaşılabilir örneklem uygulanmasının kullanılması ve yalnızca bir devlet üniversitesinde uygulanması olarak belirlenmiştir, bundan dolayı Ankara'daki tüm öğretmen eğitimi öğrencileri için sonuçlar genellendirilememektedir.

Bulgular ve Tartışma

Çalışmanın bu bölümünde, Öğretmen eğitimi öğrencilerinin Sürdürülebilirlik ve Sürdürülebilir Kalkınma konusundaki aşinalık ve anlayışlarına yönelik bulgular verilmiştir. Ayrıca, sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağı; sürdürülebilir beslenmeye yönelik davranış ve içsel kontrol odağı arasındaki ilişki; cinsiyet ve öğretmen yetiştirme programlarının öğrencilerinin sürdürülebilir beslenmeye yönelik davranışları ve içsel kontrol odağı üzerindeki farklılıkları verilmiştir.

Araştırma sonuçları göstermiştir ki, ODTÜ Öğretmen eğitimi öğrencilerinin çoğunluğu kendilerinin popüler medyada (%62,95) ve akademik alanda (%62,95) "sürdürülebilirlik" ve "sürdürülebilir kalkınma" terimlerine aşina olduklarını belirtmişlerdir. Cinsiyete göre aşinalıklara bakıldığında, kadın ve erkek öğrencilerin çoğunluğu popüler medya ve akademik alanda bu terimlere benzer oranlarda tanıdık oldukları bulunmuştur. Ek olarak, bu terimlere en aşina olan öğretmen eğitimi programları İlköğretim Fen Bilgisi ve Okul öncesi öğretmenliği iken İngilizce öğretmenliğinde eğitim gören öğrencilerin çoğunluğu bu terimlere aşina olmadıklarını belirtmiştir. İlköğretim Fen Bilgisi (%76,57) ve Okul öncesi (%86,45) öğretmenliklerinde öğrenim gören öğrenciler, sürdürülebilir kalkınmaya akademik kullanımda İngilizce Öğretmenliğine (%24,95) devam eden öğrencilere göre daha aşinalardır. İlköğretim Fen Bilgisi (%71,06) ve Okul öncesi (69,54%), öğretmenliklerinde öğrenim gören öğrenciler, sürdürülebilir kalkınmaya popüler

medyada kullanımda da İngilizce Öğretmenliğinde (%24,95) öğrenim gören öğrencilerden daha aşinalardır. Ayrıca, öğrencilerin çoğu (%60,6) "gelecek nesillerin ihtiyaçlarını karşılama imkânlarını tehlikeye atmadan, bugünkü neslin kendi ihtiyaçlarını karşılayabilmesi" olarak sürdürülebilir kalkınma olarak tanımladılar. Öte yandan sürdürülebilirlikle ilgili yazılan kelimeler (N = 812) incelendiğinde, sürdürülebilir kalkınmanın ekonomik (%8,9) ve sosyal (%8,9) boyutları ile ilgili anahtar kelimeler, çevre ile ilişkili anahtar kelimelerden (%47,7) büyük oranda daha az belirtilmiştir.

Betimleyici istatistiksel sonuçları göz önünde bulundurulduğunda, Öğretmen eğitimi öğrencileri sürdürülebilir beslenmeye yönelik davranışları "bazen" sergilemektedirler (M= 3.08, SD=.68). Başka bir deyişle, öğrencilerin sürdürülebilir beslenmeyle ilgili davranışları kısmen gerçekleştirdikleri söylenebilir. Ayrıca, sürdürülebilir beslenme davranış ölçeğinin alt boyutlarını göz önünde bulundurulduğunda katılımcılar, *sürdürülebilir gıda alışverişi ve yemek yeme* (M=3.05 SD=.75) (bakınız Tablo 4) davranışlarından daha sık oranda *atık azaltma (*M=3.18, SD=.81) davranışları gerçekleştirmiştir (bakınız Tablo 3).

Tablo 3. *Atık Azaltma Davranış Maddelerinin Dağılımı*

	Yüzde						
Atık azaltmayla ilgili maddeler	**Hiçbir zaman**	**Nadiren**	**Bazen**	**Sıksık**	**Her zaman**	**M**	**SD**
3. Gıda israfını azalttım.	3.6	8.9	27.8	42.0	17.7	3.61	.99
1. Gıda atıklarımı azalttım.	7.1	21.5	43.4	21.3	6.7	2.99	.98
2. Gıda ambalajı atıklarımı azalttım.	9.4	20.9	40.1	23.1	6.5	2.96	1.03
Toplam						3.18	.81

Tablo 4. *Gıda alışverişi ve yemek yeme Davranış Maddelerinin Dağılımı*

	Yüzde						
Gıda alışverişi ve yemek yeme ile ilgili maddeler	**Hiçbir zaman**	**Nadiren**	**Bazen**	**Sıksık**	**Her zaman**	**M**	**SD**
8. Besin değerleri yüksek gıdalar tükettim.	3.8	11.0	34.5	40.6	10.1	3.42	.94
9. Bir iki besin türünden çok fazla yemek yerine, değişik tür besinlerden yeterli miktarlarda tükettim	4.2	16.8	38.2	32.1	8.7	3.24	.96
7. Paketlenmiş gıdaların içeriklerine dikkat ederek tüketmeye özen gösterdim	8.5	19.9	31.9	29.8	9.9	3.12	1.10
12. Fastfood tüketimini azalttım	8.8	23.8	28.5	27.2	11.7	3.09	1.15
5. Genetiği değiştirilmiş gıdalardan (GDO) kaçındım	8.3	20.8	33.2	28.1	9.6	3.09	1.09
4. Organik gıdalar tüketmeye özen gösterdim.	9.0	22.3	33.7	27.6	7.4	3.02	1.07
6. İşlenmiş gıdaların tüketimini azalttım.	13.9	24.4	26.9	27.4	7.4	2.90	1.16
11. Gıdanın geçtiği -tüm- aşamaları göz önünde bulundurarak doğa, toplum ve ekonomi dostu gıdalar tükettim.	8.1	25.5	41.0	22.0	3.4	2.87	.95
10. Gıda alışverişlerimi küçük ölçekli esnaf ve yerel pazarlardan yaptım.	13.3	32.6	27.7	20.4	5.9	2.73	1.10
Toplam						3.05	.75

Öte yandan, sürdürülebilir beslenmeye yönelik içsel kontrol odağı sonuçları incelendiğinde, öğrencilerin sürdürülebilir beslenmeye yönelik yüksek içsel kontrol odağına (M=, 4.21, SD=.57) sahip oldukları bulunmuştur. Başka bir deyişle, öğrencilerin sürdürülebilir beslenmeye yönelik gerçekleştirebilecekleri bireysel eylemlerin "gelecek nesiller ve günümüz insan ihtiyaçlarını karşılamak için tehditleri azaltmak" için yüksek inançlara sahip olduğu bulunmuştur (bakınız Tablo 5)

Tablo 5. İç Kontrol Odağı Maddelerinin Dağılımı

İçsel Kontrol Odağı Maddeleri	Yüzde					M	SD
	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum		
1. Gıda ambalajı atıklarını geri dönüşüme atarak	0.0	0.5	2.5	45.6	51.4	4.47	.57
8. Gıda israfımı azaltarak	0.5	1.3	6.5	39.7	52.0	4.41	.71
14. Gıda atıklarını azaltarak	0.5	1.1	7.6	38.5	52.3	4.40	.72
2. Gıda atıklarından kompost yaparak	0.9	1.6	10.7	46.9	39.9	4.23	.77
4. Sürdürülebilir tarım ürünlerini (serbest dolaşan tavuklar ve yumurtaları, damla sulama sistemi kullanan üreticilerin ürünleri vb.) kullanarak	0.9	0.7	9.1	44.3	45.0	4.31	.73
12. GDO' lu gıdalardan kaçınarak	0.9	3.1	10.5	41.4	44.1	4.24	.82
10. Yeterli ve dengeli beslenerek	0.9	2.3	11.9	42.3	42.5	4.23	.81
11. Organik gıdaları tercih ederek	1.3	3.4	11.9	41.0	42.3	4.19	.86
9. İşlenmiş gıdalardan uzak durarak (örneğin; abur cubur, salam sosis, dondurulmuş pizza gibi)	0.7	5.1	15.6	37.8	40.9	4.13	.90
6. Fastfood" tipi beslenme yerine geleneksel mutfakları tercih ederek	2.0	4.7	11.7	40.9	40.7	4.13	.93
15. Aşırı et ağırlıklı beslenmek yerine dengeli beslenerek	1.8	6.1	14.0	40.6	37.4	4.05	.95
3. İçilebilir musluk suyunu kullanarak	1.6	5.5	18.2	40.4	34.4	4.00	.93
7. Mevsiminde yetişmiş sebze ve meyveleri satın alarak	0.2	1.6	10.8	41.5	45.9	4.31	.74
13. Gıda alışverişlerimde 'adil ticaret' (insan haklarını gözeterek üretilen) uygulamalarını takip ederek	0.5	4.5	16.2	38.7	40.0	4.13	.87
5. Gıda alışverişlerimi küçük ölçekli esnaf ve yerel pazarlardan yaparak	0.7	5.0	24.0	41.8	28.5	3.92	.88
Toplam						4.21	.57

Çıkarımsal istatistik sonuçlarına göre, korelasyon analizi sonuçları göstermektedir ki sürdürülebilir beslenmeye yönelik davranışlar ve içsel kontrol odağı arasında anlamlı bir ilişki bulunmuştur (*r=.318, n=556, p<.01*). Farklı bir ifadeyle, sürdürülebilir beslenmeye yönelik daha yüksek içsel kontrol odağı olan katılımcılar, sürdürülebilir beslenmeye daha elverişli davranışlar sergileme eğilimindedirler. Buna ek olarak, iki Yönlü MANOVA analizinin sonucuna göre, birleşik bağımlı değişkenler üzerinde öğretmen eğitim programları (Pillai's Trace=.038, *F* (10, 1088) = 2.114, *p*=0.021., %3.8) ve cinsiyet farklılıkları (Pillai's Trace=.023, *F* (2, 543) = 6.315, *p*=0.002, %2.3) bulunmuştur ancak birleşik bağımlı değişkenler üzerinde anlamlı bir etkileşim etkisi bulunamamıştır (*p>.05*). Bağımlı değişkenlern bağımsız değişkeler üzerindeki farklılıkları ayrıca bakılmıştır. Buna göre, cinsiyet farklılıkları açısından, kadın öğrencilerin (M= 4.27, SD=.55) sürdürülebilir beslenmeye yönelik içsel kontrol odağının erkeklerden (M=3.93, SD=.61) anlamlı derecede yüksektir (F (1, 430) = 8.34, p=.004, partial eta squared =.02, %2). Ancak, sürdürülebilir beslenmeyle ilişkili davranışlarda cinsiyet açısından istatistiksel olarak anlamlı fark bulunmamıştır (p>.025, Bonferonni varsayımı). Ayrıca, öğretmen yetiştirme programları arasındaki farklılıklar açısından, İlköğretim Fen Bilgisi öğretmenliği (M=3.25, SD=.56 ve Okul Öncesi öğretmenliği (M=3.13, SD=.68) öğrencilerinin sürdürülebilir beslenmeye yönelik olarak, İngilizce öğretmenliği programındaki (M=2.82, SD=.75) öğrencilere göre daha sık sürdürülebilir beslenme davranışları sergilediği bulunmuştur *(F* (5, 550) = 5.142, *p*=.000, partial eta squared=.045, %4.5). Bununla birlikte, bu çalışma, sürdürülebilir beslenme içsel kontrol odağının öğretmen eğitimi programlarına göre farklılık göstermediğini göstermiştir (p>.025).

ODTÜ'deki öğretmen eğtimi öğrencileri, medyada ve akademik kullanılmalarıyla sürdürülebilir kalkınmaya aşina olsalar da, sürdürülebilir kalkınmaya yönelik kapsamlı ve bütüncül bir anlayışa sahip değillerdir. Sürdürülebilir davranışları kapsayan sürdürülebilir yaşam biçimleri bütüncül bir sürüdüelebilir kalkınma anlayışıyla ortaya çıkmıştır. (Indo German Expert Group, 2015). Bu nedenle, sürdürülebilir kalkınmayı bütüncül bir yaklaşımla anlamaksızın (UNESCO, 2017, UNEP, 2016), sürdürülebilir yaşam biçimleri kavranamayabilir ve bu anlayış eksikliği sürdürülebilir davranışları ve eylemleri etkileyebilir. Dahası, sürdürülebilir kalkınmaya aşinalıkları, anlayış, bilgi düzeyi ve yaşam biçimlerini etkileyebilir. Medya bireylerin günlük tercihlerini,

değerlerini, yaşam biçimlerini (UNEP, 2016) ve kendi içsel kontrol odağını etkileyebilir. Dahası, eğitim, bireylerin sürdürülebilir yaşam biçimleri yaratmak için önemli bir etken olarak görülmektedir. Özellikle, SKE, sürdürülebilir yaşam tarzlarını da içeren SKH'lerinin yerine getirilmesinde katkıda bulunan araçlardan biri olarak belirtilmiştir. Özellikle, SKE'in hedeflerinden biri olarak "Öğrencilerin bireysel yaşam tarzı seçimlerinin toplumsal, ekonomik ve çevresel gelişmeyi nasıl etkilediğini anlaması" (UNESCO, 2017, s.34) olarak ifade edilmiştir. Buna ek olarak, öğretmen eğitimi öğrencileri, sürdürülebilir beslenmeyle alakalı olarak yüksek düzeyde içsel kontrol odağına sahip olmalarına rağmen, sürdürülebilir beslenme davranışlarını sıklıkla gerçekleştirmemektediler. Sürdürülebilir kalkınmaya yönelik sosyal medya, kamu spotları gibi medya ve dahi akademik aşinalıkları, öğrencilerin sürdürülebilir beslenmeye yönelik içsel kontrol odaklarına katkıda bulunmuş olabilir. Öte yandan, bütüncül bir sürdürülebilir kalkınma anlayışına sahip olmamaları sürdürülebilir beslenme davranışlarını olumsuz yönde etkileyemiş olabilir. Bu muhtemel nedenleri detaylı bir şekilde açıklamak için ileride deneysel çalışmalar yapılabilir.

Öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye ilişkin içsel kontrol odağı ve davranışları arasında ile anlamlı bir ilişki bulunmuştur. Ayrıca sürdürülebilir beslenmeye ilişkin içsel kontrol odağı ve gıda atık azaltımı ve yemek yeme ve gıda alışverişi davranışları alt boyutları arasında da anlamlı bir ilişki bulunmuştur. Gelecekteki çevre (Clark ve diğerleri, 2014), toplum, ekonomi ve sürdürülebilir kalkınmaya beklenti ve avantajlara yönelik inançlar bu bulguyla bağlantılı olabilir. Başka bir deyişle, kendi eylemlerinin gelecekte Sürdürülebilir Dünya'nın inşasında katkı sağlayabileceğini düşünen öğrenciler, bu davranışları sık sık yerine getirebilirler.

Kadın öğretmen eğitimi öğrencilerinin sürdürülebilir beslenmeye yönelik içsel kontrol odağı erkeklerden daha yüksek iken, sürdürülebilir beslenme davranışlarında cinsiyet açısından istatistiksel olarak anlamlı bir fark bulunmamıştır. Üstelik hem kadın hem de erkek öğretmen eğitimi öğrencileri, sürdürülebilir kalkınmaya yönelik bütüncül bir anlayış geliştirmemiştir. Cinsiyet farklılıkları göz önüne alındığında, hem kadın hem de erkek öğretmen eğitimi öğrencilerinin davranışları, bütüncül olmayan sürdürülebilir kalkınma anlayışlarından etkilenmiş olabilir. Bu nedenle hem kadın hem erkek öğretmen eğitimi öğrencileri bu davranışları benzer şekilde sıkça gerçekleştirmiyor

olabilir. Ayrıca, gelecekteki çalışmalarda kadınlar ve erkeklerin farklı seviyede sürdürülebilir beslenmeye ilişkin içsel kontrol odağına sahip olmalarının nedeni açıklanabilir.

Öğretmen yetiştirme programları açısından farklılıklara göre, İlköğretim Fen Bilgisi ve Okul Öncesi Öğretmenliği programlarına devam eden öğrencilerin, İngilizce Öğretmenliği öğrencilere göre daha sık sürdürülebilir beslenmeye yönelik davranışlar sergilediği, ancak öğretmen eğitimi öğrencilerinin içsel kontrol odağının öğretmen eğitim programlarına göre farklılık göstermediği bulunmuştur. Ayrıca, İlköğretim Fen Bilgisi Öğretmenliği ve Okul Öncesi Öğretmenliği programlarında okuyan öğrenciler, sürdürülebilir kalkınmaya akademik ve popüler medyaya kullanımlarına göre diğer öğretmen eğitimi programlarındaki öğrencilere göre göre daha çok aşina oldukları bulunmuştur. Buna karşın, İngilizce Öğretmenliği programına devam eden öğrenciler ise diğer öğretmen eğitim programlarıyla karşılaştırıldığında, sürdürülebilir kalkınma terimini medya ve akademik kullanım açısından en az seviyede aşinalığa sahiptir. Dolayısıyla, bu bulgunun muhtemel açıklaması medya ve akademik aşinalıklarıyla bağlantılı olabilir. Buna ek olarak, İlköğretim Fen Bilgisi ve Okul Öncesi Öğretmenliği programlarındaki öğrencilerin akademik alandaki aşinalıkları SKE' ye dayalı çevre eğitimi ve beslenme eğitimi gibi bu iki bölüm ders programlarında bulunan zorunlu derslerle ilişkilendirilebilir ve bu bulgunun olası bir nedeni olarak bu zorunlu derslerin sürdürülebilir beslenme davranışlarına katkı sağladığı söylenebilir.

APPENDIX-E

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı: Doğrubak
Adı: Ayşe
Bölümü: İlköğretim Fen ve Matematik Alanları Eğitimi

TEZİN ADI (İngilizce): ASSESSING TEACHER EDUCATION STUDENTS' BEHAVIORS AND INTERNAL LOCUS OF CONTROL PERTINENT TO SUSTAINABLE DIETS

TEZİN TÜRÜ: Yüksek Lisans [X] Doktora [ ]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: