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RESEARCH ARTICLE

Self-Efficacy Beliefs on Integrating Sustainability into Profession and Daily Life: in the Words of University Students

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Abstract

Integrating sustainable development into higher education is essential to reach a sustainable future; accompanied with level of knowledge, increasing level of motivation of university students is also crucial since motivation affects their ways of sustainable behaviour. Therefore, this study aimed to explore university students' reflections about their level of knowledge on sustainability and their ways of integrating sustainability principles into their profession and daily life. Thus, we attempted to investigate university students' level of self-efficacy beliefs on integrating sustainability into their profession and daily life after completing a sustainability course. However, since there is no specific instrument to evaluate university students' self-efficacy beliefs on this subject, we adapted the instrument (originally developed by Enochs & Riggs, 1990) to determine university students' self-efficacy beliefs on integrating sustainability into profession and daily life and used the instrument to explore our research questions. Besides, we used students' essays and self-reports in order to evaluate their conceptions on sustainability. The implementation was realised with 113 university students studying at a state university in Ankara, Turkey). According to the exploratory factor analysis results, two dimensions emerged as Daily Life Efficacy and Profession Efficacy to integrate sustainability. The results showed that university students who attended the sustainability course have relatively high personal self-efficacy beliefs towards integrating sustainability into their daily life. Nevertheless, although they reported that they have enough background knowledge on sustainability and have high self-efficacy, evaluations of the students' essays on the definition of sustainability showed that they do not hold a holistic understanding.

Keywords: Self-Efficacy, Sustainable Development, Higher Education, Mixed-Method.

Introduction

The development of the notion of sustainable development is a dynamic phenomenon (Egelston, 2006), and its description has been evolving over time. Although there are different approaches and definitions for sustainable development, the commonly used one is the definition declared in Brundtland Commission Report, Our Common Future (1987), "…development that meets the need of the present without compromising the ability of future generations to meet their own needs" (p.43). In order to elucidate the key elements of sustainable development, 18 principles were declared in the United Nations Conference on Environment and Development (UNCED), also known as Rio Declaration (UNCED, 1992). These principles explicated the components of sustainability as environmental, social and economic. However, the debate and

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interpretations about sustainable development continue expanding; in 2010, for example, UNESCO (2010) defined sustainable development through four dimensions which are environment, economy, society, and policy.

The perception of Education for Sustainable Development (ESD), on the other hand, has been integrated into sustainability agenda targeting to endorse education and public awareness since Stockholm Conference (1972) and through Agenda 21 (1992). It was emphasized that education is an indispensable tool to permit individuals to deal with the challenges of present and future generations and offer plausible solutions. Correspondingly, UNESCO defined four objectives of ESD as (UNESCO, 2005, p.7) "(1) improving access and retention in quality basic education; (2) reorienting existing educational programmes to address sustainability; (3) increasing public understanding and awareness of sustainability; and (4) providing training to all sectors of the workforce."

The idea of integrating sustainable development into higher education emerged with the Talloires Declaration of University Leaders for a Sustainable Future (1990), the official agreement of university administrators to infuse ESD in higher education. This integration mainly stemmed from the fact that universities have the capacity to raise future leaders so that they can engage in science, technology, economy and community, thus playing a critical role for a sustainable future (Moore, 2005b; Tuncer, 2008). Correspondingly, universities have been considered as one of the key contributors to the sustainable development (Haigh, 2005). In line with these, more than 400 colleges from 40 countries reached an agreement about the integration of sustainable development into university campus life as well as education systems (Cotton, Warren, Maiboroda & Bailey, 2007) so as to raise awareness about impacts of daily life activities on environmental degradation, economy and human life (Moore, 2005a).

As McKeown (2002) denoted, contributions of current disciplines, education programs and teachers are significant in order to proceed in incorporating sustainable development into education system. Moreover, increasing level of motivation of university students should also come into prominence since motivation affects the way individuals act and their attainment of goals (Pintrich & Schunk, 2002). Motivation refers to all courses of actions that are encouraged and maintained throughout the process (Pintrich & Schunk, 2002). Hence, one of the primary points of this research is that the context of an ESD course in higher education should be constructed concerning the relationships among learning, attainment and motivation, depending on the fact that learning and attainment are to motivation (Bandura, 1977).

Social cognitive theory is one of the motivational science theories with the focal point of obtaining information, skills, beliefs, and strategies of individuals by means of interrelationships (Pintrich & Schunk, 2002). Self-efficacy beliefs, on the other hand, are one of the key elements in this theory which influence individuals' attainment of courses of action, performance and their endurance during the process (Bandura, 1977). Self-efficacy beliefs were described by Bandura (1977) as "the beliefs in one's capabilities to organize and execute the courses of action required producing given attainments" (p.3). These beliefs affect the selection of activities, the individual efforts, the level of persistence for impediments, the endurance and the level of achievement (Bandura, 1977). According to Bandura, high self-efficacious individuals tend to form more challenging goals, overcome difficulties and have higher level of motivation (Locke & Latham, 1990). On the other hand, low self-efficacious individuals may avoid executing the courses of action (Pintrich & Schunk, 2002). Moreover, higher self-efficacy beliefs help individuals encountering difficulties and determine how to overcome challenges (Bandura, 1977; Pajares, 1992). In line with this point of view, we hypothesize that individuals with high self-efficacy can challenge the difficulties during

the process of meeting sustainable development goals compared to low self-efficacious individuals. Furthermore, ESD provides excellent opportunities for the learners through which they can improve their knowledge, values and necessary skills to integrate sustainability concept into their daily lives and profession. Therefore, we believe that ESD programs in higher education are essential to develop self-efficacy to incorporate sustainability both into profession and daily life.

Self-efficacy literature, in general terms, supplies data related to individuals' motivation, academic achievement, approach and possible behaviours towards an issue (Tschannen- Moran & Woolfolk Hoy, 2007). In short, a review of broad and complex literature on self-efficacy indicated that the emerging issues were focused on K-12 students' and in-service teachers' self-efficacy beliefs (Allinder, 1994; Sungur & Gungoren, 2009; Sungur & Kahraman, 2011; Tschannen- Moran & Woolfolk Hoy, 2007) as well as pre-service teachers' from different disciplines self-efficacy beliefs (Aydin & Boz, 2010; Azar, 2010; Bahcivan, & Kapucu, 2014; Demirtas, Comert & Ozer, 2011; Gencer & Cakiroglu, 2007; Onder & Kocaeren, 2015; Trauth-Nare, 2015). Although there have been a lot of research studies on self-efficacy beliefs, there has been limited research conducted on self-efficacy beliefs and sustainable development targeting students in higher education (e.g. Effeney & Davis, 2013; Heeren et. al, 2016; Louisa, Sarah & Cliff, 2017; McCormick, Bielefeldt, Swan, & Peterson, 2015; Moseley, Reinke & Bookout, 2002;). For instance, McCormick et al. (2015) conducted a study to asses engineering students' self-efficacy beliefs, affect, and values toward sustainable engineering. A total of 515 engineering students from three universities participated into the study. The results indicated that participating in experiential learning activities had a positive relationship with students' self-efficacy beliefs, values and affect for sustainable engineering. Moreover, female students have higher affect and value towards sustainable engineering. Hence, the researchers recommended that specific courses fostering active learning may influence students' motivation toward sustainable engineering.

Nevertheless, there are studies about the perceptions, attitudes, and behaviours of the university students about sustainable development (Emanuel & Adams, 2011; Heeren et. al, 2016; Horhota, Asman, Stratton, & Halfacre; 2014; McCormick et al., 2015; Parrott, Mitchell, Emmel & Beamish, 2011; Sahin, Ertepinar & Teksoz, 2009; Tuncer, 2008). For instance, Tuncer (2008) examined university students' conceptions about sustainable development and their intensions of shifting life styles in a sustainable way. In this study, most of the university students admitted taking action to change their life styles, not to exploit natural resources and to save them for the future generations. Nevertheless, the author emphasized that the participants' conceptions should be improved by ESD courses in higher education in such a way that they promote integrating sustainability principles into their daily lives. Similarly, Sahin, Ertepinar and Teksoz (2009) aimed to explore university students' conceptions of 'sustainable development' and to determine their attitudes towards sustainable development, environmental values and their behaviours about sustainable life style. The responses of the students revealed that even though they were acquainted with the concept of sustainable development, they lacked a holistic conception of sustainability. Moreover, the researchers reported that university students had positive attitudes and intrinsic values towards sustainable development, but they did not engage in a sustainable life style. On the other hand, Parrott, Mitchell, Emmel and Beamish (2011) investigated the outcomes of a course in the US, the content of which fosters resource protection and increasing environmental quality. In this study, most of the students emphasized that more efforts (in terms of training and education) are needed to increase the motivation to achieve environmental sustainability. In another study, Emanuel and Adams (2011) compared the responses of college students in Alabama and Hawaii in terms of their level of concern about the present and the future,

their level of knowledge of sustainability and their level of perception about people who are responsible for sustainability. The researchers reported that students had enough background knowledge about campus sustainability; however, their level of commitment is not sufficient when compared to the level of their knowledge. As a result, the authors suggested investigating possible ways to promote student commitment.

Thus, we may infer in the light of literature review that ESD play a critical role in conceiving the idea of sustainability. Nevertheless, it is also obvious that high level of knowledge and positive attitudes are not enough to convince individuals to integrate sustainability principles into their profession and daily life. Therefore, we claim that further studies are needed to explore the interrelationship between university students' motivational state and behaviour in the context of integrating sustainability into their lives. Thus, as there is limited research in the context of self-efficacy beliefs and as the current literature does not provide an instrument to assess individuals' self-efficacy beliefs in terms of integrating sustainability into their daily life and/or professional life; we aimed with the present study to develop an instrument to do so. Through the instrument, we attempted to explore university students' level of self-efficacy beliefs on integrating sustainability (SEBIS) into their profession and daily lives. We believe that developing such an instrument which promises valid and reliable data may encourage researchers to produce further research so as to enrich self-efficacy literature in terms of sustainability context in higher education. Moreover, the results of the current study may inspire researchers concerning the effect of sustainability courses on developing self-efficacy beliefs of university students on sustainability. Besides, offering SEBIS instrument may be meaningful especially for the developing countries, like Turkey, where there are several attempts to integrate sustainability into higher education so as to bring up future leaders with higher self-efficacy to integrate sustainability into their professional and daily lives and reorient programs accordingly. Last, but not least, since organizing and executing the courses of action is one of the key elements of self-efficacy (Bandura, 1977), determining university students' self-efficacy on sustainability integration and focusing on increasing their efficacy beliefs may help them live sustainably and integrate this context into their daily life and profession. Based on the above mentioned significances, the research questions of this study are as:

a) Is Self-Efficacy Beliefs on Integrating Sustainability (SEBIS) Scale a valid and reliable tool to assess university student's self-efficacy beliefs on integrating sustainability into their profession and daily life?
b) What is sustainability in the words of university students?
c) What are the university students' self-efficacy levels regarding integrating sustainability concept into their profession?
d) What are the university students' self-efficacy levels regarding integrating sustainability concept into their daily life?

Methodology

Research Design

A mixed method-explanatory design was used to analyse data. Self-efficacy beliefs instrument which was previously developed by Enochs and Riggs (1990) and translated by Tekkaya, Cakiroglu and Ozkan (2004) was adopted by the researchers. A total of 113 university students' levels of self-efficacy were explored quantitatively via descriptive statistics. On the other hand, students' understandings of sustainability and their ways of integrating the concept into daily and professional lives were explored qualitatively through essay writing. The topic given to the students for the essay was "What is your definition of sustainability?" Of the participants, 30 of them were

randomly selected to examine their understanding of sustainability via content analysis.

Procedure

Turkey, as a developing country, has been trying to start some initiatives about policies on sustainable development in line with the global mainstream. Although some regulations and need assessments took place in national development plans (Egeli, 1996; Okumus, 2002), one of the most comprehensive reports was prepared in 2012 as “Turkey's Sustainable Development Report: Claiming the Future 2012” within the notions of the UN Conference on Sustainable Development (Rio+20). This national report was assembled by Ministry of National Development (MoND) with the contributions of 55 institutions and organizations. In this report, ESD was emphasized in a way that there is a strong correlation between sustainable development and education. It was highlighted that the integration of sustainable development into all levels of education has become an inevitable step to be taken in order to raise awareness of future generations about the interaction between the environment and sustainable consumption. It was also claimed that with the inclusion of the ESD courses into educational programs and curricula, it will be possible to encourage future decision-makers and citizens to embrace sustainable production and consumption patterns.

Compatible with these recommendations in the report (MoND, 2012), an elective course is offered at a public university in Turkey for the purpose of increasing awareness on sustainability among higher education students. The objectives of the 12-week elective course can be outlined as to (1) help individuals to understand how daily life and work can be adopted to help achieve sustainable development; (2) acquire social values, strong feelings of concern for the environment and motivation for active participants in its protection; (3) acquire a personal view of general and global environmental issues; (4) acquire a personal view of general and global environmental issues and sustainable use of natural resources; and (5) ensure that students understand that they are part of the natural circle. The lectures were given based on real stories both in global and national context and examples from daily life. The brief content of the course was given in Table 1.

Table 1.

Content of the Course

Week	***Content***
Week 1	Welcome – Introduction: What Is Sustainability?
Week 2	Sustainability Milestones: The History and The Need for Sustainability
Week 3	Man and Environment
Week 4	Carrying Capacity of the Earth
Week 5	Water 1: How Much Water Do We Have?
Week 6	Water 2: How Do We Use Water?
Week 7	Unsustainable Consumption of Natural Resources
Week 8	Sustainable Use of Natural Resources
Week 9	Sustainable Use of Natural Resources
Week 10	Sustainable Use of Natural Resources
Week 11	Global Problems: Reasons, Results and Our Responsibility
Week 12	What Is Sustainability?

The data of this study was collected from the students of this elective course. Pre-test was not administered at the beginning of the course since the perspectives on sustainability are relatively new issue in higher education agenda. Although it may seem as a limitation for the study, we assumed that the students who enrolled the course did not have any background on sustainable development and might not develop a sense of self-efficacy on integrating sustainability into their profession and daily life. Instead, we included several self-reported items in the test related to students' background on the concept of sustainable development, and we have reported the results in the results section. Moreover, we examined the essays written by the students as a response to the homework related to their own definitions of sustainable development. Thus, this was how we attempted to support our findings through the results we obtained from implementing SEBIS in exploring the research questions, how students define sustainability and how they integrate sustainability into their profession and daily life.

Participants

The target population was university students who attended the course titled "Education and Awareness of Sustainability" at a public university in Ankara, Turkey in 2014. The accessible population was the students who enrolled in the sustainability course. The instrument was administered to 113 university students from different majors by using convenience sampling technique. Demographic information of the sample is given in Table 2.

Table 2.

The Sample

Variable	***Sample***	
	f	*%*
Gender		
Female	54	47.8
Male	59	52.2
Grade Level		
Sophomore	2	1.8
Junior	39	39.5
Senior	72	63.7
Faculty		
Faculty of Architecture	2	1.8
Faculty of Arts and Sciences	18	15.9
Faculty of Economic and Administrative Sciences	14	12.4
Faculty of Education	32	28.3
Faculty of Engineering	47	41.6

As displayed in Table 2, 54 (47.8%) of the participants were female and 59 (52.2%) were male. The mean of age of the participants was 22.9 years. Distribution of the grade level in Table 2 revealed that 2 (1.8%) of the participants were sophomore, 39 (39.5%) were junior, and 72 (63.7%) were senior students. Moreover, the participants enrolled in the course were from 30 different majors. 14.2% was from the Department of Mechanical Engineering, 10.6% was from Foreign Language Education and 8.0% was from Elementary Mathematics Education.

Instrumentation

The related literature was examined, and the instrument items were rewritten by the researchers based on the previously developed instrument STEBI-B (Enochs &Riggs, 1990) and translated by Tekkaya, Cakiroglu and Ozkan (2004) on science teaching efficacy beliefs. For the current study, one of the dimensions of the STEBI-B "Personal Science Teaching Efficacy" was used to construct the instrument. The items of this dimension were tailored to sustainability context and constructed to form three dimensions named as Profession Efficacy for Sustainability, Daily Life Efficacy for Sustainability, and Effective Communication Efficacy on Sustainability. Edwards' Criteria (Edwards, 1994) were considered while constructing the items. As a result, 17 Likert-type items measured on a 5-point scale (strongly disagree [1], disagree [2], undecided [3], agree [4], strongly agree [5]) formed the draft version of the instrument. Moreover, the items were written in Turkish.

As STEBI-B were translated into Turkish in previous studies (e.g Akbas & Celikkaleli, 2006; Hazir-Bikmaz, 2004; Onen, & Oztuna, 2006; Tekkaya, Cakiroglu & Ozkan, 2004), no additional translation process was conducted. Instead, in order to provide content validity evidence, expert opinion was taken. The draft items in the item pool and two additional hand-outs (checklist for comparing the original items of STEBI-B and adapted items, and item list within the related dimensions) were sent to two experts who are specialized in motivation in order to guide them while assessing the instrument. Some of the items were rewritten in the light of their suggestions. After the revision process, 17 items were decided to construct the instrument.

Quantitative Data Collection

The instrument including 17 items was administered to 113 participants at a public university in Ankara, Turkey. The data was collected at the end of the semester during the last lecture of the course titled as Education and Awareness for Sustainability. Exploratory Factor Analysis (EFA) was conducted with responses of the participants in order to determine the dimensions of the instrument. The details of the results of EFA and reliability analyses are given in the result section.

Qualitative Data Collection

In order to explore the participants' understanding of sustainability and their ability to integrate this conception into profession and daily life, students were asked to write an assay. The assay question was prepared in order to clarify students' own definition of sustainability and to enable participants to provide examples. The question was "What is your definition of sustainability?" Among the essays, 30 of them were randomly selected for the analysis.

Data Analysis

Quantitative Data Analysis

The answer for the 1st research question of this study was analyzed by means of EFA analysis. On the other hand, in order to answer the second and third research questions, descriptive statistics were performed. The self-efficacy levels of the students were described through descriptive data.

IBM SPSS 20 Statistical Software Program was utilized to analyse the data of the present study. The responses of the items which ranged from strongly disagree to strongly agree were coded from 1 to 5 respectively. Gender is valued with 1 and 2; departments coded from 1 to 30, and grade levels were also coded with the numbers ranging from 2 to 4. In addition, "excluded cases pairwise" is selected to deal with missing data.

Qualitative Data Analysis

Content analysis was used to examine the students' understanding of sustainability. As there are no classification schemes in the accessible literature, the researchers constructed it congruent with the research questions and the context of the study. Merriam (2009) recommended following steps to analyze data: (1) construct categories by coding from data; (2) combine the coding to meaningful categories; (3) order the categories and the data; and (4) name the categories.

Results

University Students' Self-Reports on Their Level of Knowledge of Sustainable Development

Participants were asked if they took another course(s) which contain the concept of sustainable development before enrolling in this elective course. Based on their answers, only 13.3% of them enrolled in a course related to sustainable development. On the other hand, it was also asked if they heard about the term before attending the course and approximately 78% of them stated that they heard about sustainable development from their families, friends, internet, and TV.

Participants were also asked to evaluate their background knowledge of sustainability after they enrolled in the course. As the results presented in Table 3 indicate, almost 86% of the participants reported that they have heard about the concept and know the meaning.

Table 3.

Self-evaluation of the participants related to their level of knowledge of sustainability

	Frequency	*Percent*
	f	*%*
I have heard the concept "sustainability" and I know the meaning.	97	85.8
I have heard the concept "sustainability", but I don't know the meaning.	2	1.8
I have my own definition of sustainability, but I am not sure if it is true.	9	8.0
I have memorized the definition of "sustainability", but I do not know its content.	1	.9
I know the concept, but I do not know how to apply it.	2	1.8
Others	2	1.8

University students' understanding of sustainability

Essays written by the students on their understanding of sustainability were analysed by content analysis. Students' definitions of sustainability were coded to construct categories as presented in Table 4.

Table 4.

University students 'definition of sustainability: categories

Category	*Frequency*	*Percent*
	f	*%*
Human-nature interaction	7	23.3
Conventional Definition (Brundtland Report)	5	16.7
Consumption	5	16.7
Longevity	3	10.0
Survival	3	10.0
Other	1	3.3
More than one category	6	20.0
Total	30	100

As presented in Table 4, approximately one-fourth of the students construct their definitions for sustainability through the notion of human-nature interaction as in the case of P4: *"Sustainability is the collaboration of the human being and the nature"*. Almost 17 % of the students, however, defined the concept through the conventional definition as given in the Brundtland Report as in the case of P19: *"Sustainability makes it possible to hand over the world to the next generations with the least damage."* Other 17% of the participants defined sustainability through natural resource consumption: *"I think sustainability is more related to usage of natural resources"* (P23). Other categories for students' understanding of sustainability were decided as longevity; *"The word sustainability gives us clues about how to maintain our survival." (*P13) and *"…means ability to being permanently…"* (P15*).* Moreover, 20% of the participants' definitions were comprised of more than one category; for example, some of the participants' definitions involved both human-nature interaction and conventional definition: *"Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony that permits fulfilling the social, economic and other requirements of present and future generations."* (P28).

Students' definitions were also analyzed related to their explanation of their way of integrating sustainability in daily life and profession. As a result, it was found that 21 of 30 students have integrated sustainability into their daily lives through changing their consumption patterns. For example: *"I decided to start from myself at least and do something individually for sustainability. For example, I reduced the amount of water I use during bath. I don't waste rough papers anymore and so on."* (P7). On the other hand, only 3 participants (out of 30) mentioned integrating sustainability into profession while making the definition of the term: "*The Bank of America proved that it's possible to make profit and preserve the resources at the same time."* (P17). Besides, only one participant mentioned integration of sustainability both into daily life and profession: "*I try to make sustainable choices when I go shopping. What inspired me for such a choice is the project I have participated during my internship at Metro Cash & Carry.*

Thanks to such projects that make customers and people be aware of sustainable choices (P9).

Dimensionality of the instrument (SEBIS)

Exploratory factor analysis was administered in order to examine the construct-related validity evidence of the instrument. The percentage of missing values for each variable was lower than 10 %; therefore, all missing values were replaced with mean scores (Pallant, 2007). Before conducting EFA, Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were tested to provide assumptions for factorability. Bartlett's test of sphericity produced a value (*p=.00)* indicating a normality assumption. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy index was found to be 0.86 which is sufficient to perform EFA.

In order to decide the number of components, principle component analysis (PCA) with unrotated solution was conducted in the initial phase. In the second phase, factors were rotated with the oblimin rotation method to make meaningful interpretations for the dimensions.

At the first trial, PCA yielded 4 components with eigenvalues that are greater than 1.0 as displayed in Table 5. Pallant (2007) denoted that scree plots produce better results for conditions in which many components were extracted based on eigenvalues (Figure 1). Accordingly, scree plot for this study revealed two factors, which explained 53.6 % of the variance with respect to eigenvalues. Overall, two dimensions were represented by the instrument items suggest that factor loadings are higher than 0.30 (Pallant, 2007). Pattern matrix of the pilot instrument is given in Appendix 1.

Table 5.

Initial eigenvalues of the dimensions of the self-efficacy beliefs on integrating sustainability instrument

Component	*Initial Eigenvalues*		
	Total	*% of variance*	*Cumulative%*
1	7.288	42.869	42.869
2	1.828	10.750	53.619
3	1.264	7.435	61.054
4	1.078	6.339	67.394

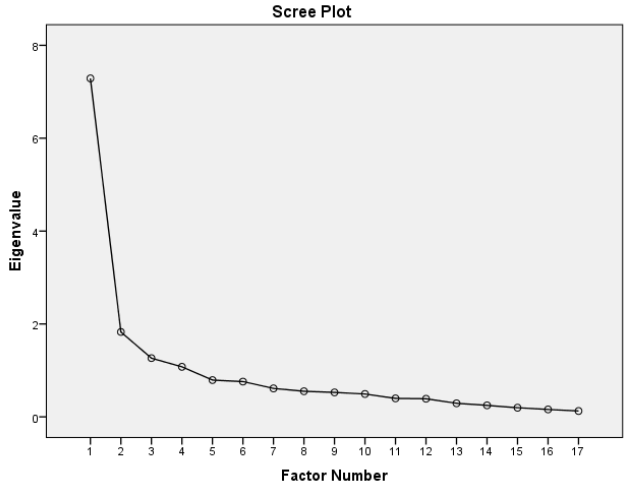

Figure 1. Scree Plot

A total of 11 items loaded in the first dimension were related to self-efficacy beliefs on integration of sustainability into daily life. Based on the similar characteristics of items, the dimension was defined as *Daily Life Efficacy for Sustainability*. On the other hand, the other six items were about self-efficacy beliefs on integration of sustainability context in profession. Hence, this dimension is defined as *Profession Efficacy for Sustainability.* As a result, although we began with proposing three dimensions, EFA results revealed two dimensions. Moreover, Cronbach's alpha values were calculated. Besides, reliability analyses were replicated by selecting items from the same dimension. Item-total statistics is given in Appendix 2. The dimensions and Cronbach's Alpha Values were given in Table 6.

Table 6.

Dimensions of the self-efficacy beliefs on integrating sustainability instrument

Dimensions	*Items**	*Cronbach Alpha*
Daily Life Efficacy for Sustainability	2,5,6,8,9,10,11,13,15,16	.88
Profession Efficacy for Sustainability	1,3, 4,7,12,14,17	.89

** Please see the items in Table 8 & Table 9.*

University Students' Self-efficacy beliefs related to integrating Sustainability into daily life and profession

Self-efficacy belief scores on integration of sustainability into profession and daily lives were estimated through descriptive statistics. The means and standard deviations were reported for each dimension of the instrument in Table 7.

Table 7.

Results of Descriptive Statistics

Dimension	Mean	Standard Deviation
Daily Life Efficacy for Sustainability	3.81	0.54
Profession Efficacy for Sustainability	3.76	0.73

Looking at the first dimension, the mean score of 3.81 over 5 (s = 0.54) displayed in Table 8 indicated these participants have high self-efficacy beliefs on integrating sustainability context into their daily lives. As presented in Table 8, more than 80 % of the university students believe that they will always find better ways to incorporate sustainability into their daily lives (item 5). With a similar percentage, they reported that they know what to do while integrating sustainability into their daily lives (item 13). On the other hand, more than one fourth of the respondents are undecided about their level of knowledge and skills on sustainability (28.5%); finding better methods to explain sustainability to other people (24.8%); explaining to people why sustainable life style is better (26.6%), and answering questions of people (23.9%) about sustainability. Therefore, according to the results presented in Tables 7 and 8, we can infer that

although participants of this study have high self-efficacy beliefs about integrating sustainability into their daily life style, they are “undecided” about the reason why sustainable life style is better (item 16); how to explain sustainability (items 15, 11, and 6) and how to integrate sustainability into daily life (items 10 & 2).

Table 8.

University students’ self-efficacy for integrating sustainability into daily life: results of descriptive analysis

Translation of the Items	Frequency (%)		
	Disagree	*Undecided*	*Agree*
16. I find it difficult to explain to people why sustainable life style is better.	63.7	26.6	9.7
15. I can always find better ways to explain sustainability to other people.	5.3	24.8	69.9
13. I do not know what to do about integrating sustainability principles into my daily life.	82.3	12.4	5.3
11. I have skills and knowledge that would allow me to explain sustainability concepts to people.	6.3	28.5	65.2
10. I have skills and knowledge that would allow me to aggregate sustainability context into my daily life.	6.2	23.0	70.8
9. Even when I try very hard, I won't be able to explain sustainability to other people.	75.0	17.0	8.0
8. I am not very effective in including sustainability principles in my daily life.	75.0	16.1	8.9
6. I am typically able to answer people's sustainability questions.	5.3	23.9	70.8
5. I can always find better ways to integrate sustainability in my daily life.	3.5	15.1	81.4
4. Even when I try very hard, I won't be able to include sustainability into my daily life.	91.8	4.5	3.6
2. I don't know what to do to persuade people to have a sustainable life style.	55.0	27.9	17.1

Looking at the second dimension, the mean score of 3.76 over 5 (s = 0.73) displayed in Table 9 indicated these participants have also relatively high self-efficacy beliefs on incorporating sustainability into their profession. Table 10 represents the frequencies of the responses for the items of the second dimension. The findings revealed that more than 70% of the university students believe that they will always find better ways to incorporate sustainability context into their profession (item 17). With a similar percentage, they hold the beliefs that they have necessary knowledge and skills (item 12). Furthermore, nearly 65% of the university students reflected that they know what to do to integrate sustainability into their profession (item 1). On the other hand, more than one third of the respondents’ are “undecided” about their level of understanding of sustainability context to their profession (item 7). Hence, according to the answers presented in Tables 7 and 9, we can infer that even though participants have high self-efficacy beliefs on integrating sustainability into profession, they remained “undecided”

about their level of understanding that enables them to integrate sustainability context into their profession.

Table 9.

University students' self-efficacy for integrating sustainability into profession: results of descriptive analysis

Translation of the Items	Frequency (%)		
	Disagree	*Undecided*	*Agree*
17. I can always find better ways to integrate sustainability into my profession.	10.6	16.8	72.6
14. Even when I try very hard, I won't be able to include sustainability to enrich my career as effectively as I do with most subjects.	75.9	15.2	8.9
12. I wonder if I have the necessary skills to integrate sustainability context into my profession.	8.0	17.9	74.1
7. I understand sustainability concepts well enough to be effective in integrating them into my profession.	15.7	31.5	52.8
3. I cannot include sustainability context in my business life because it needs to be done by specially trained people.	77.0	13.3	9.7
1. I know the necessary steps to include the sustainability context into my profession effectively.	14.2	21.2	64.6

Discussion and Conclusion

Dimensionality of the SEBIS Instrument

According to Gravetter and Wallnau (2009), EFA was used to examine the dimensions of instruments. Accordingly, EFA was used in the current study by the use of the statistical software, Statistical Package for the Social Sciences (SPSS) version 20 in order to analyse the instrument's dimensionality. According to EFA results, 2 dimensions emerged as *Daily Life Efficacy for Sustainability* and *Profession Efficacy for Sustainability.* The total variance explained by these dimensions was found as 53.4% that may be considered as the power of the dimension configuration of the instrument (Cokluk, Sekercioglu, & Buyukozturk, 2012). Furthermore, all rotated factor loading values of the items were found as higher than 0.3 revealing a strong relationship among the items and the dimensions (Stevens, 2002). Moreover, loading

of the all items in one dimension can be interpreted as construct-validity evidences for the present study. Since evaluating EFA results alone is not enough to confirm the dimension configuration of the instrument, it was necessary to run confirmatory factor analysis (CFA) through the sample with similar characteristics. Therefore, further studies are needed to have more validity and reliability evidences for the instrument. After confirming dimension structure, this instrument can be used for further research to identify the level of self-efficacy of individuals towards incorporating sustainability context into their life. Moreover, this instrument could serve well as a pre-test and post-test to determine the change in self-efficacy belief levels by enrolling in sustainability lectures. Besides, this instrument may be used in any higher education program including sustainability context.

University students' understanding of sustainability and their self-efficacy levels on integrating the concept into their profession and daily life

Literature examining level of knowledge of the students on ESD generally suggested that they have enough background knowledge (Emanuel & Adams, 2011), but lack holistic interpretations of the concepts (Sahin, Ertepinar & Teksoz, 2009). Moreover, several studies clearly addressed that most of the students describe ESD based on the interaction with the environment, and they were not be able to consider the other aspects of the sustainability (Tuncer, 2008). When the results of this study were compared with the literature, 85% of the university students who participated in our study reported that they had heard the concept "sustainability", and they knew the meaning of it at the end of the course. On the other hand, their responses about the definition of sustainability revealed that there is still a dominance of the aspect of environment in their description of sustainability. Nevertheless, if the essays of the students are explored in depth, they mention the economic and social aspects implicitly such as daily consumption habits and their effects on the domestic economy and quality of their life correspondingly. Yet, they need to proceed to the next stage which requires holistic approach to sustainability issues. Hence, it can be concluded that these results are moderately compatible with the literature and pave the way for further studies which could focus on exemplification of the students while describing their sustainability conception.

As described in the introduction section, self-efficacy beliefs affect individuals' accomplishment of courses of action, performance, and their persistence throughout the process (Bandura, 1977). People who have high self-efficacy beliefs have a tendency to take on more challenging goals, to overcome possible problems, to determine how to overcome these challenges (Bandura, 1977; Pajares, 1992) and to have higher level of motivation (Locke & Latham, 1990). In this study, we aimed to explore the level of self-efficacy beliefs of university students after completing the sustainability course at a public university. Based on the results (please see Table 8), university students who participated in this study (42% engineers; 28% education; 16% arts and science; 12% economics and administrative sciences) think that they have the necessary knowledge and skills to integrate sustainability context into daily life, they can answer people's questions on sustainability, and they can find better ways to explain sustainability context to other people. However, they remained undecided about having necessary skills and knowledge to convince other people to integrate sustainability into daily life.

When the essays were examined, the number of participants who integrated sustainability concept into daily life was about 21 out of 30. These results were in line with the course content: The lectures were based mainly on real cases on sustainability or unsustainability. Therefore, lectures related to the experiences of people from different countries of the world might have inspired the students to set their own point of view. For example, they exemplified how sustainable lifestyle is possible

through regulating daily consumptions such as (1) reducing the amount of water they use, (2) eliminating the usage of plastic bags while shopping, (3) reducing electricity consumption, and (4) not buying the products they do not need. This is not a surprising result since these concepts were addressed during the course that they attended. For example, one of the topics in the course was related to sustainable consumption patterns (food consumption, water consumption, energy consumption etc.) and 5 of the students among 30 explained sustainability through changing consumption patterns. Hence, we can infer that the course content inspired students about how to integrate sustainability into their daily lives.

On the other hand, despite relatively high self-efficacy level for integrating the sustainability into their profession, most of the students failed to explain the ways of integration. Even though they declared that they can integrate the sustainability context into their profession, they did not exemplify how to do it in their essays. The reason for failing to explain how to make the integration may be that there is no attempt in their major departments to integrate the concept into their profession. Hence, they have no related inspiration or visualization. Besides, 85% of the students declared that they know the meaning of sustainability. However, as the results displayed, one third of them have doubts about integrating it into profession and convincing other people to live sustainably. At this point, we recommend that major specific courses given in all faculties shall include sustainability concept as well as good examples about integrating the concept into profession.

As a result, one can infer that students' understanding for integrating sustainability into practice may be shaped by course content and may give a clue on how course contents may be revised accordingly. Thus, these results may provide feedback for lecturers about how to use the power of courses to improve students' understandings of integrating sustainability into their lives. Nevertheless, the situation arose from this research is that in spite of having high self-efficacy to integrate sustainability into daily life and profession, the reason for the university students being undecided about how to explain the concept to the other people and how to integrate into their profession requires to be studied further.

Although there is no specific study for the self-efficacy beliefs on the integration of sustainability both into profession and daily life, there are examples in the literature the results of which may support our results. For instance, these studies reported that university students have positive attitudes towards having a sustainable life style (Sahin, Ertepinar & Teksoz, 2008), that they have admitted to take action (Tuncer, 2008), and that they have enough background knowledge (Emanuel & Adams, 2011), but do not have holistic conceptions of sustainability (Tuncer, 2008; Sahin, Ertepinar, & Teksoz, 2008). Nevertheless, they are reluctant to engage in sustainable life style (Sahin, Ertepinar & Teksoz, 2008; Emanuel & Adams, 2011), thus more courses and/or improvements in the current ones are needed (McCormick et al., 2015; Tuncer, 2008; Sahin, Ertepinar & Teksoz, 2008; Parrot et al. 2010). Besides, all of these studies reached a conclusion that further studies should explore some other variables that may affect students' self-efficacy beliefs.

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