

## Adaptation of an entrepreneurship education self-assessment scale at the tertiary level into Turkish

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**Abstract:** The university environment provides a good context for entrepreneurship education. With the vigorous development of entrepreneurship education, educators and scholars have shown increasing interest in the significant role entrepreneurship education plays in higher education. As a result, the effectiveness of entrepreneurship education has quickly become a popular topic. However, it is often not easy to evaluate entrepreneurship education programs, which are designed for medium- and long-term outcomes. It is essential to develop alternative assessment tools that do not traditionally assess only knowledge. The study aims to adapt the multidimensional measurement tool for assessing university students' entrepreneurial skills, knowledge, attitudes, and mindsets. While the scale was translated into Turkish, face and content validity were proved. The data was gathered from 572 university students. Confirmatory factor analyses were employed to assess the construct validity of the measure. The Turkish Entrepreneurship Education Self-Efficiency Scale was obtained with three main dimensions and 38 items. Its Cronbach's alpha, Spearman-Brown correlation, and composite reliability coefficients are 0.95, 0.86, and 0.98, respectively. Furthermore, the study found that the entrepreneurship education scores of the participants were significantly related to their gender, field of education, volunteering, work experience, experience of starting or running their own business, and entrepreneurship education. The effect size of these variables differs, and the experience with self-employment has the greatest influence on entrepreneurship education.

## 1. INTRODUCTION

Given the current economic challenges and the recession in the global economy with the COVID-19 pandemic facing countries worldwide, creating more widespread and effective entrepreneurial activities has become an important goal. The economy, labour markets, societies, and social structures are increasingly undergoing continuous change as an effect of globalization. As lifelong learning has become necessary for all citizens, we need to develop throughout our lives not only for personal development but also our ability to shape the society we live in and our skills to succeed in an ever-changing world (European Council, 2018). This environment of rapid change created by Industry 4.0 and globalization means that anyone should have specific knowledge and skills related to their work and entrepreneurial competence

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that will enable them to adapt to uncertainty. To cope with this constant change, it has become an important goal for all countries to make individuals competent to function as entrepreneurs. To achieve this goal, it is essential that the education systems focus on developing entrepreneurial skills and capabilities from primary to higher education. It is now well-recognized that education and training opportunities play a key role in developing future entrepreneurs (Henry et al., 2005). In this sense, entrepreneurship education promotes the entrepreneurial mindset by providing students with skill sets, knowledge, and behavioral patterns that enable them to become entrepreneurs in their own lives (Moberg et al., 2009). However, because entrepreneurial skills are seen as synonymous with starting a business, and entrepreneurship education policies vary from country to country, there are many ways of evaluating entrepreneurship, especially in higher education institutions. The highly complex relationship between the concepts of entrepreneurship and education leads to problems in evaluating the impact of entrepreneurship education at the tertiary level, especially in the Republic of Turkey, using traditional methods. This article examines the current and valid definition of entrepreneurship education based on literature. Then it aims to adapt a scale developed in multiple languages by EU countries, which can assess the impact of entrepreneurship education at the tertiary level in a multidimensional way into Turkish.

### **1.1. A Quick Overview of Entrepreneurship**

The term entrepreneurship comes from the French word entrepreneur, rooted in the word enterprise, meaning someone who undertakes a business. The word entrepreneur is also often used to mean “someone who takes on the risks and management of a business”. This concept, which originated earlier, became popularized with the First Industrial Revolution in the 19th century and has been associated with business establishment and business activities since then. However, most business and finance-oriented definitions of entrepreneurship shaped by this trend are about starting a business or assuming the risks associated with running a business. Therefore, these definitions emphasize entrepreneurship’s ability to transform any industry and scale solutions faster than other economic approaches (Shamsrizi et al., 2021), with entrepreneurship being an important economic growth driver providing national advantage (Porter, 1990).

Entrepreneurship defines a broader process beyond starting a company in the Shane and Venkataraman (2000) model of entrepreneurship. In defining entrepreneurship, Venkataraman (1997) emphasizes the processes of discovering, evaluating, and exploiting opportunities to create value. Entrepreneurship is therefore, strongly associated with the ability to recognize and exploit opportunities in the environment (Gibb, 2005). Different studies in the field of entrepreneurship describe in detail how entrepreneurial skills are applied in various processes of entrepreneurship, such as identifying opportunities, resolving conflicts, and dealing with uncertainty (Malywanga et al., 2020). These skills are deployed at specific stages of entrepreneurship, which should be understood and studied as a cognitive and evolving process rather than a one-time decision (Arkko-Saukkonen, 2017).

In their study on the entrepreneurial process, van der Veen and Wakkee (2016) argued that focusing only on the characteristics of the entrepreneur does not reflect the realities of the entrepreneurial process. Entrepreneurship is not about entrepreneurs’ psychology and character traits, but about their actions, behaviours, and related concepts (Drucker, 1985a, 1985b). According to O’Hara (2011)’s study on the relationship between entrepreneurial skills and entrepreneurial processes, 4 key behaviours are prominent in entrepreneurship (as cited in Cooney, 2012):

- The ability to identify and exploit a business opportunity.
- The human creative endeavour of developing a business or building something of value.

- Willingness to take risks.
- The ability to organize the resources necessary to respond to the opportunity.

These behaviours embody that entrepreneurship is more important than taking high risks; it is about being able to manage the business process. The effort to explain entrepreneurship by emphasizing its inherent behaviours, i.e., the process, rather than a genetic inheritance or a result of personality traits, is vital in showing that entrepreneurship can be learned through education like any other discipline (Alum, 1986; Chimucheka, 2014; Drucker, 1982, p. 143). As a result of this effort, there has recently been a growing awareness worldwide, especially in the European Union, that people's entrepreneurial competencies can be developed through learning. The European Commission first identified 'a sense of initiative and entrepreneurship' as one of the eight core competences required for all members of a knowledge-based society (European Commission, 2007). After a decade, the European Commission (2019) has developed a lifelong learning competences framework that aims to create a common understanding covering a wide range of learning environments from primary school to university.

## 1.2. Entrepreneurship Education

Education has played a crucial part in developing entrepreneurial competencies in individuals and shaping their inclination towards exhibiting entrepreneurial behaviors. While education alone may not be adequate to enhance the tendency towards entrepreneurial endeavors (Balaban & Özdemir, 2008), it does hold significant significance in fostering the development and continuity of an entrepreneurial culture within society (European Commission, 2012; Genç, 2019). Entrepreneurship education has been found to have positive social effects, as evidenced by research conducted by the European Commission (2012) and Fayolle et al. (2006). This form of education has been shown to foster individuals' aspirations to become entrepreneurs promoting their ambition and engagement in extracurricular activities that contribute to their personal growth. Moreover, entrepreneurship education has been found to enhance individuals' awareness of innovation, bolster their communication skills, and heighten their motivation towards entrepreneurship, as indicated by studies conducted by Cevher (2016), Nasr and Boujelbene (2014), and Uygun et al. (2018). At the economic level, entrepreneurship education has been shown to increase the number of business start-ups, create new jobs and raise taxable income (Elert et al., 2015; Martin et al., 2013).

The main goals of entrepreneurship education encompass equipping young individuals with specific knowledge, skills, and attitudes to cultivate an entrepreneurial mindset, thereby fostering entrepreneurial behavior in their personal lives (Moberg et al., 2009). Additionally, this form of education aims to enhance their creativity and self-assurance in their endeavors and contributions to society and the economy (European Commission, 2012). A recent study highlights the importance of incorporating entrepreneurship education into the curriculum, starting from early schooling, and continuing through higher education. Early entrepreneurship education is seen as a means to cultivate persons with entrepreneurial skills who are equipped to navigate the intricate difficulties of the 21st century (European Council, 2013). Universities, specifically, have a significant responsibility to fulfill in augmenting these endeavors for the youth.

Today, universities are institutions that determine the types and fields of their activities according to the needs and expectations of global society and the resources allocated to them (Yelkikalan et al., 2010). Increasing economic integration, global competition, and the development of new information and communication technologies have led universities to assume a role that will directly contribute to economic and social development (Sakinç & Bursalıoğlu, 2012). With the addition of contribution to economic and social development to education and research activities, universities must have an entrepreneurial organizational

structure that supports change-oriented activities to provide individuals with opportunities to adapt to an ever-changing society. In an entrepreneurial university, norms, values, and expectations support entrepreneurship, and people engage in entrepreneurial activities (Sherkat & Chenari, 2020). However, another factor as crucial as the entrepreneurial structure of universities is the role, they play in developing the entrepreneurial competencies of individuals through the dissemination of entrepreneurship education (Yelkikalan et al., 2010).

From the view of structuration theory, competencies are developed over time (Morris et al., 2013), and university education can play an important role in this process by providing real-world opportunities. According to Schulte (2007), developing students' entrepreneurial spirit in all areas is among the main tasks of an entrepreneurial university. The ability of a university to educate its graduates not only as job seekers but also as entrepreneurs who can create jobs is one of the most critical drivers of entrepreneurship. Empirical research has shown that entrepreneurship education at universities positively promotes entrepreneurial attitudes and develops young graduates' human capital (Aboobaker & Renjini, 2020; Johannisson, 2006; Roman & Maxim, 2017; Varela & Jimenez, 2001). Therefore, to develop the entrepreneurial university potential, having a holistic approach that will create synergy between the university's entrepreneurship activities and entrepreneurship education is valuable. According to Gibb (2012), entrepreneurship education is one of the 5 key areas that provide this potential and synergy of universities.

According to a study among graduates of higher education institutions in Europe, the entrepreneurship education young people receive at university has a positive impact on their entrepreneurial mindset, their entrepreneurship intentions, their degree of taking the initiative, their employability, and ultimately their role in society and the economy (European Commission, 2012). Therefore, entrepreneurship education is expected to improve not only the role of the individual in the economy but also his/her social and personal life in society. Entrepreneurship education influences students' future intentions, and becoming an entrepreneur is among the common career plans of university students after graduation (Rasmussen & Sørheim, 2006). Many universities want to expand entrepreneurship courses to contribute positively to this tendency of students (Galloway & Brown, 2002; Henderson & Robertson, 1999).

In Turkey, compulsory or elective entrepreneurship courses taught directly in public and foundation universities and entrepreneurship trainings led by the Small and Medium Enterprises Development Organization of Turkey are examples of this effort (Genç, 2019). However, there are also general trainings in which entrepreneurship culture is embedded in higher education through courses, research, consultancies, and all other activities at the institutional level in other countries (McMullan & Gillin, 1998; Rasmussen & Sørheim, 2006). In Turkey, only a small number of universities have such trainings. As in many European universities, entrepreneurship trainings offered through specific courses under the economics and business administration departments are more common in Turkey. In addition, European Union (EU) countries are developing national strategies and action plans for entrepreneurship education, structuring curricula, and developing practices to support teachers in line with the decisions of the "European Reference Framework for Key Competences in Lifelong Learning" (European Commission, 2007; European Council, 2006), key competences framework for lifelong learning (European Commission, 2016; European Council, 2018), and the "2020 Entrepreneurship Action Plan" (European Council, 2013). Unlike EU countries, Turkey has several outworn strategies related to entrepreneurship education, the most relevant of which is the 'Ministry of National Education Strategic Plan 2010-2014'. These strategies do not include any monitoring and evaluation plan (European Commission/EACEA/Eurydice, 2016).

Just as important as having entrepreneurship education strategies in higher education institutions is monitoring, measuring, and evaluating practices to determine whether these strategies achieve their objectives. Even EU member states, which have made significant progress in entrepreneurship education to date, are still considering how to measure the impact of the national entrepreneurship education strategies they have implemented at the policy level (European Commission, 2012). The European Commission report 2001 clearly stated that one of the biggest problems with entrepreneurship education is the inadequacies in evaluating entrepreneurship education (Andrijevskaia & Mets, 2008). Therefore, assessment and evaluation practices as an element of entrepreneurship education program design are seen as an obstacle that needs to be overcome to embed entrepreneurship education in tertiary level curricula effectively (European Commission/EACEA/Eurydice, 2016; Fayolle et al., 2006).

### ***1.2.1. Problems in assessing entrepreneurship education at tertiary level***

As the interest of educators and scholars in the role of entrepreneurship education in higher education has increased, a wide variety of definitions, objectives, content, and pedagogical methods have arisen (Fayolle, 2008; Liu et al., 2021). Given this lack of standardization, assessment becomes fundamental in improving the effectiveness and efficiency of entrepreneurship education (Bécharde & Grégoire, 2005), and accurately assessing entrepreneurship education has quickly become a popular topic. Although assessing the impact of entrepreneurship education may seem complicated because it must include many types, purposes, and methods of assessment, it is beneficial because it provides an opportunity for program improvement (Fayolle & Gailly, 2015; Galvão et al., 2019; McMullan & Gillin, 1998). However, the academic challenges in evaluating entrepreneurship education programs (Fayolle et al., 2006); the neglect of real outcomes that entrepreneurs need when evaluating the effectiveness of entrepreneurship education in previous research (Scott et al., 2016); and the need to evaluate programs (Garavan & O’Cinneide, 1994; Honig, 2004; Pittaway & Edwards, 2012) call for more research on this topic.

Liu et al. (2021) explained this deficiency in the literature by addressing it in two dimensions. The first dimension is the lack of general validity arising from using many different indicators separately in evaluating the effectiveness of entrepreneurship education. Although changes in the selected indicators seem to reflect the impact of entrepreneurship education, the validity of the evaluation with a single indicator is relatively low. Secondly, there is a lack of a unified measurement model under a standard framework. A framework of multiple indicators is needed to reduce the limitations of unidimensional instruments and scales in comparative cross-regional, cross-cultural, and cross-institutional entrepreneurship education studies. However, the existing literature also lacks studies that explore the logical relationships between multiple indicators. This is because it is often not easy to evaluate entrepreneurship education programs, which by their very nature are designed for medium and long-term outcomes (McMullan & Gillin, 1998).

Pittaway et al. (2009) reviewed the literature and observed that although most entrepreneurship education research focuses on program design and implementation, there is a significant gap in evaluation practices. Fayolle et al. (2006) assessed the social, cultural, and economic impacts of entrepreneurship education from a new perspective using an evaluation approach based on the theory of planned behaviour to overcome the uncertainties in the selection of criteria identified in the literature. Jones and Penaluna (2013) found that being overly prescriptive in assessment strategies limited students’ achievement of the targeted entrepreneurial competencies; therefore, they argued that assessment practices should be more flexible, more accepting of ambiguity, and formative in nature. Sherkat and Chenari (2020) used a model previously proposed by Fayolle and Gailly (2008) to assess different components of entrepreneurship education. Liu et al. (2021), who wanted to eliminate the problems of single

indicator-based measurements, stated that they were able to comprehensively measure the impact of entrepreneurship education for university students by using a model consisting of the dimensions of entrepreneurial competencies, perception of entrepreneurial barriers, and entrepreneurial intentions.

The fact that entrepreneurship education programs in higher education institutions are offered in different types, integrated into the core curriculum or stand-alone, with more comprehensive levels, including courses, multiple courses, or institution-wide experiential learning, highlights the complexity associated with the assessment of entrepreneurship education. This complexity is further compounded by the fact that assessment is also driven by the need to support students' progress (formative assessment) and determine student performance (summative assessment) to meet the requirements for certified accreditation. In this context, it is necessary to develop feasible assessment practices within educational processes to monitor the impact of entrepreneurship education in higher education (Pittaway & Edwards, 2012). Identifying validated instruments that could measure the scope of entrepreneurship education outcomes is a major challenge (Duval-Couetil et al., 2010).

### ***1.2.2. Assessing entrepreneurship education with a multi-dimensional scale***

Developing instruments to measure different psychological constructs, such as entrepreneurial self-efficacy (ESE), entrepreneurial orientation, and entrepreneurial intention is a hot topic in business, management, and education. Some studies assessed students' perceptions of business skills and knowledge, self-efficacy, attitude towards entrepreneurship, entrepreneurial intent (Huang-Saad et al., 2016), and students' level of interest in entrepreneurial education (Shinnar et al., 2009) with different scales. In another study, competencies defined specific to the entrepreneurship discipline to develop scales to measure the effectiveness of entrepreneurship education (Morris et al., 2013). Due to its relevance with business, the competency-based approach has thus far established a standard paradigm for this kind of research (Mitchelmore & Rowley, 2010). Most studies, however, are theoretical works, and those that do offer empirical data instead identify entrepreneurship abilities without providing a strong theoretical foundation (Silveyra et al., 2021). Thus, these studies are not entirely applicable to assessing entrepreneurship education offered in different disciplines at the higher education level.

There are a few studies to develop various assessment tools published in the literature to assess university students' entrepreneurship education through multi-dimensional outputs (Bamiatzi et al., 2015; Duval-Couetil et al., 2010; Silveyra et al., 2021). In several studies, the effectiveness of entrepreneurship education has been assessed by focusing solely on a specific entrepreneurial behaviour. Saeed et al. (2014), for instance, used multiple scales to create a questionnaire and introduced a multi-level perspective of the factors that influence entrepreneurial intention. It has been observed that scales from different disciplines or questionnaire-based surveys are utilized in other research with a similar goal of evaluating entrepreneurship education, and in some cases, these scales have even undergone revisions following the research questions (Ahmed et al., 2017; Hasan et al., 2017; Mitchelmore & Rowley, 2013; Vanevenhoven & Liguori, 2013). However, most of these studies seem to be designed for research and scholarly study at a particular point in time, rather than for ongoing course or program evaluation (Duval-Couetil, 2013).

In a recent review of key studies conducted in the field over the last 15 years, Rideout (2012) noted that while progress has been made, scientific knowledge on the evaluation of entrepreneurship programs remains at an early stage of development and has a long way to go before the field can confidently answer the questions of whether and how entrepreneurship education works. Given that few of the studies conducted and evaluation tools developed have been validated through replication or used in multiple contexts or populations, it is clear that to overcome the difficulties of assessment in entrepreneurship education, universities need

practical and accessible measurement tools that can assess the impact of education in terms of entrepreneurship.

Given that entrepreneurship education is meant to equip people with the knowledge, skills, and attitudes to act entrepreneurially throughout their lives to determine the extent to which this goal is being achieved throughout the educational life of students in higher education institutions, it is essential to develop measurement tools that reflect the fact that entrepreneurship is a crucial competence for life and has importance far beyond simply aiming to start a business. On the other hand, there is also a need to organize and validate conventional indicators to ensure consistency and comparability of results after assessing entrepreneurial knowledge, skills, and attitudes together. In addition, since self-assessment and peer assessment are not used as often as expected in entrepreneurship education evaluation practices, assessment studies are regrettably limited to traditional methods (Pittaway & Edwards, 2012).

Entrepreneurship education ranks high on European policy agendas, but little research is available to assess its impact (von Graevenitz et al., 2010). Entrepreneurship education is typically offered as an elective course at Turkish institutions. Even though these courses are in great demand, students frequently enroll in them with the expectation of succeeding (Marangoz & Taçyu Dolu, 2022). Due to this circumstance, research in Turkey has a high tendency to evaluate the immediate effects of specific educational activities using a wide range of scales (Pazarcık, 2016). As a result, there is very little chance of comparing different study outcomes.

It will be meaningful to use valid and reliable scales that (1) define entrepreneurship as a multidimensional competence consisting of knowledge, skills, attitudes, and behaviours, (2) view entrepreneurship education as processes designed to develop this competence, (3) are applicable and valuable in all disciplines and lines of education, (4) are suitable for self-assessment in the form of pre and post-test to reveal the effect of education, (5) can offer comprehensive suggestions for university management and policy makers to develop entrepreneurship from a multidimensional perspective and to determine the effect of entrepreneurship education, which is given as a whole course or education program in universities in Turkey. One of the studies to validate and develop a measurement tool at higher education to help close this gap was carried out by Moberg et al. (2009) in an EU project called “Assessment Tools and Indicators for Entrepreneurship Education (ASTEED).”

The project started because of the need to measure the influence of entrepreneurship education at all levels of education among pupils and students (primary, secondary, tertiary) to improve and promote the dissemination of entrepreneurship education by providing educational institutions in Europe with access to these tools going forward (The ENTREDU, n.d.). Therefore, a project consortium of EU Member States (Ireland, France, Portugal, Germany, Croatia, Belgium, and Denmark) was established to develop a common indicator framework and measurement tool that could be used across EU countries. It was stated that these countries were selected because they represent the EU very well with different levels of maturity of entrepreneurship education practices at all levels of education systems (Moberg et al., 2009). In the project coordinated by the Danish Foundation for Entrepreneurship - Young Enterprise, in addition to the partners, Sweden, the United Kingdom, Austria, Italy, Romania, and Spain were also involved in the development and testing processes to increase the applicability of the measurement tools across Europe (Moberg et al., 2009; OECD/European Union, 2018). Thus, differences in education systems in the EU, cultural differences, and views on entrepreneurship education were aimed to be reflected in the scale as much as possible.

The tertiary level scale developed in the ASTEED project can be used as a self-assessment tool to determine the level of entrepreneurial competencies of university students participating in entrepreneurship courses, entrepreneurship education embedded in a specific subject, course, or discipline, or general education by age group. It can also be used by teachers, educators,

policymakers, and researchers before and after training to measure how students' entrepreneurial competences are improved through educational content and methods (ASTEE User Guide, n.d.).

In recent years, there has been a growing interest among researchers in Turkey regarding the concept of entrepreneurship. Consequently, there has been a noticeable increase in studies focusing on entrepreneurship education within universities (Balaban & Özdemir, 2008; Bulut & Aslan, 2014; Bozkurt & Alparslan, 2013; Çolakoğlu & Çolakoğlu, 2016; Özdemir, 2016; Uygun & Güner, 2016). When analyzing the research conducted on entrepreneurship education, it is evident that surveys are commonly employed as the primary method for data collecting (Balaban & Özdemir, 2008; Çolakoğlu & Çolakoğlu, 2016; Uygun & Güner, 2016). Nevertheless, despite the absence of a competency-based standardized measurement tool assessing the impact of entrepreneurship education in the domestic literature, Yılmaz and Sünbül (2009) have devised a scale to evaluate the entrepreneurship levels of university students. The one-dimensional scale, including 36 items, was subjected to a study of its validity and reliability among students enrolled in a university faculty. In addition, Sart (2020) established a scale to measure individual entrepreneurial tendencies at the university level, including five sub-dimensions and a total of 30 questions. In a similar vein, Ercan and Yıldırım (2021) undertook adapting the individual entrepreneurial tendency scale for university students into the Turkish language. The scale is composed of three dimensions and encompasses ten items. In this situation, it could be argued that using a multidimensional measurement tool from Turkey that measures the effect of entrepreneurship education while considering its impact on making people more entrepreneurial would be a great way to find and implement effective educational procedures.

In light of the above information, considering the developments and needs in assessment and evaluation studies on entrepreneurship education, it is thought that a valid and reliable measurement tool adapted to the Turkish language and the cultural structure of the country will contribute to an essential need in the field of higher education. This study aimed to adapt the tertiary level scale developed in the ASTEE project for EU member states into the Turkish language to be used in Turkey, one of the EU candidate countries. Thus, it will contribute to create effective, comprehensive, and generalizable measurement processes in studies aiming to measure and evaluate the impact of entrepreneurship education in higher education in Turkey and to increase the comparability of the results obtained with international literature, especially with EU countries. In this context, validity and reliability analyses of the scale translated into the Turkish language will be carried out, and a valid and reliable measurement tool that can evaluate the impact of entrepreneurship education that students receive in the context of university education will be presented to the use of policy makers, administrators, lecturers, and field experts. Moreover, many individual variables can affect entrepreneurship competency at different levels in different cultures. In this research, it is also aimed to reveal the effects of these variables on entrepreneurship education in Turkish culture.

## **2. METHOD**

### **2.1. Participants**

The study was conducted with 582 undergraduate students studying in public and foundation universities in Turkey in the 2018-2019 and 2020-2021 academic years. The data of 10 individuals with excessive and missing values were excluded, and the validity and reliability analyses of the study were completed with the data obtained from 572 participants. The demographic information of the participants is given in [Table 1](#).



**Table 1.** Demographic information of participants.

	Group	n	%
Gender	Female	364	63.6%
	Male	208	36.4%
University	State	562	98.3%
	Foundation	10	1.7%
Duration of study in higher education	1 year	65	11.4%
	2 years	39	6.8%
	3 years	195	34.1%
	4 years	186	32.5%
	5 years	67	11.7%
	6 years	9	1.6%
	Over 6 years	11	1.9%
Entrepreneurship Education Experience	Yes	202	35.3%
	No	370	64.7%
Experience of starting/running own business	Yes	191	33.4%
	No	381	66.6%

The study group consisted of 63.6% (n=364) female and 36.4% (n=208) male undergraduate students. Of the participants, 98.3% (n=562) were studying at state universities and 1.7% (n=10) at foundation universities in Turkey. While data were collected from a total of 25 universities, 21 of these universities were public universities, and 4 were private universities. According to the demographic data on higher education experience, 34.1% (n=195) of the students had 3 years of experience; 32.5% (n=186) had 4 years of experience; 11.7% (n=67) had 5 years of experience; 11.4% (n=65) had 1 year of experience; 6.8% (n=39) had 2 years of experience; 1.9% (n=11) had more than 6 years of experience; and 1.6% (n=9) had 6 years of experience. Since the scale focuses on skills and competencies for entrepreneurship education, participants asked about experience in entrepreneurship education and starting/running their own business. According to this data, 64.7% (n=370) of the participants were not taking or had not taken an entrepreneurship course out of school or at school, while 35.3% (n=202) were currently taking a course or had taken one in the past. At the same time, 33.4% (n=191) of the participants have experience starting/running their own business, while 66.6% (n=381) do not.

## 2.2. Measurement Tool

Entrepreneurship education assessment tool for the tertiary level developed in English by the ASTEE project partners was adapted into Turkish in this study. The Turkish version is called “Entrepreneurship Education Self-Assessment Scale (EESS).” The original scale, which aims to develop measurement tools to assess the entrepreneurship skills, knowledge, attitudes, and mindsets of higher education students, was developed between December 2012 and June 2014 for students over the age of 20. The scale consists of 57 items, including 18 open and closed-ended questions on demographic information and 39 Likert-type questions on entrepreneurial competencies. The items related to entrepreneurial competence, which are collected in 3 main dimensions and 11 sub-dimensions under the titles of “*mindset*”, “*skills - entrepreneurial self-efficacy (ESE)*”, and “*career ambitions*” are scored between 1-7.

The “Mindset” dimension of the scale includes 11 items in 3 sub-dimensions: the “entrepreneurial mindset” with 3 items, the “core self-evaluation” sub-dimension with 5 items, and the “entrepreneurial attitudes” sub-dimension with 3 items. The “Entrepreneurial skills”

dimension consists of 22 items in a total of 6 sub-dimensions: the “creativity” sub-dimension with 4 items, the “planning” sub-dimension with 4 items, the “financial literacy” sub-dimension with 3 items, the “marshalling resources” sub-dimension with 4 items, the “managing uncertainty” sub-dimension with 4 items, and the “entrepreneurial knowledge” sub-dimension with 3 items. The “Career Ambitions” dimension consists of 6 items in 2 dimensions: the “innovative employee” sub-dimension with 3 items and the “entrepreneurial intentions” sub-dimension with 3 items (Moberg et al., 2009). The distribution of all dimensions of the scale and the number of items, and some of the items are presented in Table 2.

**Table 2.** Original ASTEE tertiary level measurement tool factors and items.

Factors	Sub-factors	Number of Items	Examples of Items	Reliability
Mindset	Entrepreneurial mindset	3	I am often the first one to suggest a solution to a problem	.73
	Core self-evaluation	5	When I try, I generally succeed	.88
	Entrepreneurial attitudes	3	<i>In general, starting a business is...</i> Negative / positive	.87
ESE (Skills)	Creativity	4	<i>I am able to...</i> Identify opportunities for new ways to conduct activities	.84
	Planning	4	<i>I am able to....</i> Network (i.e., make contacts with and exchange information with others)	.86
	Financial literacy	3	<i>I am able to...</i> Control costs for projects	.80
	Marshalling of resources	4	<i>I am able to...</i> Put together the right group/team in order to solve a problem	.85
	Managing ambiguity	4	<i>I am able to...</i> Manage uncertainty in projects and processes	.80
	Entrepreneurial Knowledge	3	That some business ideas work, and others don't	.85
	Career Ambitions	Innovative employee	3	<i>I would like to have a job that allows me to...</i> Solve problems in new ways
Entrepreneurial intentions		3	I have business ideas I am going to implement	.91
Total		39		

As a result of confirmatory factor analysis in the original (English) scale, chi-square/*df* was calculated as 3.5; RMSEA .051, CFI .994, TLI .933. The coefficients of reliability were .73 for “Entrepreneurial Mindset”, .88 for “Core-self Evaluation”, and .87 for “Entrepreneurial Attitudes” in the “Mindset” factor; .84 for “Creativity”, .86 for “Planning”, .80 for “Financial Literacy”; .85 for “Marshalling of Resources”, .80 for “Managing ambiguity” and .85 for “Entrepreneurial knowledge” in “ESE Skills” factor; .91 for “Entrepreneurial intentions” and .85 for “Innovative employee” in “Career Ambitions” factor.

### 2.3. Translation Process

In this study, the evidence for different types of validity were collected during the adaptation process of the scale into Turkish. Before starting, the researchers obtained permission from the

project managers to use the scale. Then a total of fifty-seven items, including demographic questions, were translated into Turkish by the researchers. According to Seçer (2018), rather than translating the items into Turkish one-to-one, the items should be examined by Turkish and foreign language experts to adapt the scale culturally and making the necessary adjustments contributes to validity and reliability. In this direction, the translated scale was sent to 5 entrepreneurship education experts and 3 English language experts, and they were asked to evaluate the translations together with the original scale. Necessary corrections were made in line with the suggestions received from the experts, and the experts were asked to check the scale for the second time.

Review of the literature and expert comments were used to gather evidence of the scale's content validity. According to the expert reviews, the measurement tool serves its goal because it deals with entrepreneurial competencies and entrepreneurial behaviours that should be focused on at the university level. Furthermore, a review of the entrepreneurship education literature reveals that debates centered on individual characteristics have given way to research centered on the learning elements of entrepreneurial behaviour. Interestingly, recent research has given particular attention to how people develop their competence for creativity, opportunity recognition, resource management, and initiative. Kyrö (2006) drew attention to this link between individual and career and then underlined the need to consider both the development of an individual's potential and entrepreneurial behaviours while defining the elements of entrepreneurship education. Heinonen and Poikkijoki (2006) asserted that entrepreneurship education entails the development of an individual's knowledge, abilities, and attitudes. As a result of the competence attained from these elements, the individual can use entrepreneurship in her career and personal life. These elements are characterized by three interrelated dimensions in the EntreComp conceptual framework: ideas, resources, and activities. (Bacigalupo et al., 2016). In another study, learning elements of entrepreneurship were classified into five dimensions with a taxonomy approach: know-why, know-how, know-who, know-when, and know-what (Johannisson, 1991). Consistent with these studies, the scale developers have underlined the need to include not only individual but also social and work-related behaviours in the measurement of university-level entrepreneurship education. Consequently, the authors identified entrepreneurial intention and attitude toward innovation as an employee as key indicators for entrepreneurship education at this level, in addition to skills and knowledge (Moberg et al., 2019).

As can be seen, there are multiple dimensions that entrepreneurship education should focus on to educate entrepreneurial individuals. Therefore, to assess an individual's entrepreneurship education, it is necessary to employ a multidimensional theoretical framework that considers both the knowledge, skills, and attitudes of the individual and behaviours during the entrepreneurial process. Given its multidimensional theoretical content and structure, it is believed that this scale, which was adapted to Turkish, is well-suited to the scope of a typical university-level entrepreneurship education and content validated.

In order to gather evidence supporting the scale's face validity, five sophomores were requested to review the final version of the translation. They addressed the points they didn't understand on paper and online. After that, 3 Turkish language experts were asked to evaluate the articulacy and readability of the scale for the target audience. Finally, the content validity of the scale was theoretically guaranteed by the literature and experts, while face validity was provided by the opinions of both professionals and students.

#### **2.4. Data Collection**

Researchers collected their research data from universities in Turkey that were easily accessible. After receiving approval from a university's ethics committee, researchers began data collection. However, they encountered difficulties during the COVID-19 pandemic, and

university shutdowns hampered their data collection efforts. As a result, researchers were able to collect 78% of the necessary data ( $n = 348$ ) before the outbreak in Turkey during the academic year 2018–2019. As a result of analyzing these data, it was determined that the lack of entrepreneurship education experience among the vast majority of participants would negatively impact the validity and reliability of the scale. Therefore, a second round of data collection was performed after the pandemic's effects had subsided. By conducting this second round of data collection, researchers ensured the number of participants was increased by reaching students who have received or are receiving entrepreneurship education at the university through the purposive sampling method. Thus, it was aimed to balance the participants in the data set as much as possible in terms of their entrepreneurship education experience.

## **2.5. Data Analysis**

Since scale adaptation studies involve the adaptation of a tested and adapted model to another language, it is recommended to examine the adaptation of this structure to the Turkish language and the relevant culture with confirmatory factor analysis instead of redetermining the existing structure in the original language with exploratory factor analysis (Seçer, 2018). Confirmatory Factor Analysis (CFA) aims to confirm the structure formed by the relationships predicted theoretically or because of previous analyses (DeVellis, 2003). In this direction, after the process related to the content and face validity of the scale was completed, CFA was conducted with the Amos 24 software, and model fit (construct validity) was examined.

Various methods were used to verify the reliability of the scale. Cronbach's alpha coefficient was calculated, and reliability was measured by Spearman-Brown Brown coefficient using split-half method. Cronbach alpha is a useful measure of reliability for multi-item scales and evaluates internal consistency, indicating reliability (Cohen et al., 2007). Split-half method is another way of examining the consistency of responses. For a measurement tool to be reliable, users' scores should be consistent across items (Creswell, 2012). SPSS 23 software was used for these analyses. Besides composite reliability (construct reliability), a test of internal consistency or internal structure/stability in structural equation modelling (Netemeyer et al., 2003) was calculated.

The analysis process in the study includes a second phase in which group analysis was conducted by some variables. In the literature, there are studies examining the effects of variables such as gender (Vodă & Florea 2019; Tessema Gerba, 2012; Petridou et al., 2009; Wilson et al., 2007; Marques et al., 2018), educational background (Marques et al., 2018), family background on entrepreneurship (Lee et al., 2021; Duval-Couetil et al., 2014; Shinnar et al., 2009; Tessema Gerba, 2012; Peterman & Kennedy, 2003), work experience (Shinnar et al., 2009; Peterman & Kennedy, 2003), entrepreneurship education experience (Lee et al., 2021) on entrepreneurial attitude, desire, intention, and tendency. This study collected data related to these variables and analysed whether entrepreneurship education scores differed according to these variables. Thus, it was aimed to compare the findings with the findings of previous research, and it was examined whether the scale gave consistent results with those revealed by other studies. Therefore, it is thought that these analyses will also support the scale's reliability.

The data collected from the participants were grouped according to the variables (gender, the field of education, volunteering, work experience, experience with self-employment, entrepreneurship education experience, having parents who were born in the same city as where the participants usually live, having parents, or an adult they grew up with, a university degree and having a self-employment acquaintance), and it was evaluated to whether there were significant differences between the groups by independent samples t-test and ANOVA from parametric tests since it was determined that the data showed normal distribution. The effect sizes of the variables with significant differences were also calculated. While the  $p$ -value

reported in group comparisons reports whether there is an effect, it does not reveal the effect size. The  $p$ -value, which expresses statistical significance, examines whether the findings were by chance. The effect size refers to the size of the differences found (Sullivan & Feinn, 2012). Cohen (1988) categorized the  $d$  value, which shows the effect size between the two means: small if it is .20, medium if it is .50, and large if it is .80 and above. This value was calculated for analyses using the independent samples t-test in the study. The eta squared value indicating the effect size is calculated when there are more than two groups. Eta squared values are from 1 to 0; 0.01 is evaluated as small, 0.06 as medium, and 0.14 as a large effect (Prajapati et al., 2010). This value was calculated for analysis using ANOVA in the study. SPSS 28 was used to calculate effect sizes.

### 3. FINDINGS

A confirmatory factor analysis (CFA) was conducted to examine the model fit of EESS and reveal whether the existing model is valid in Turkish. For the scale's reliability, the Cronbach alpha coefficient and Spearman-Brown coefficient with the split-half method were calculated, and the results were analysed.

#### 3.1. Confirmatory Factor Analysis

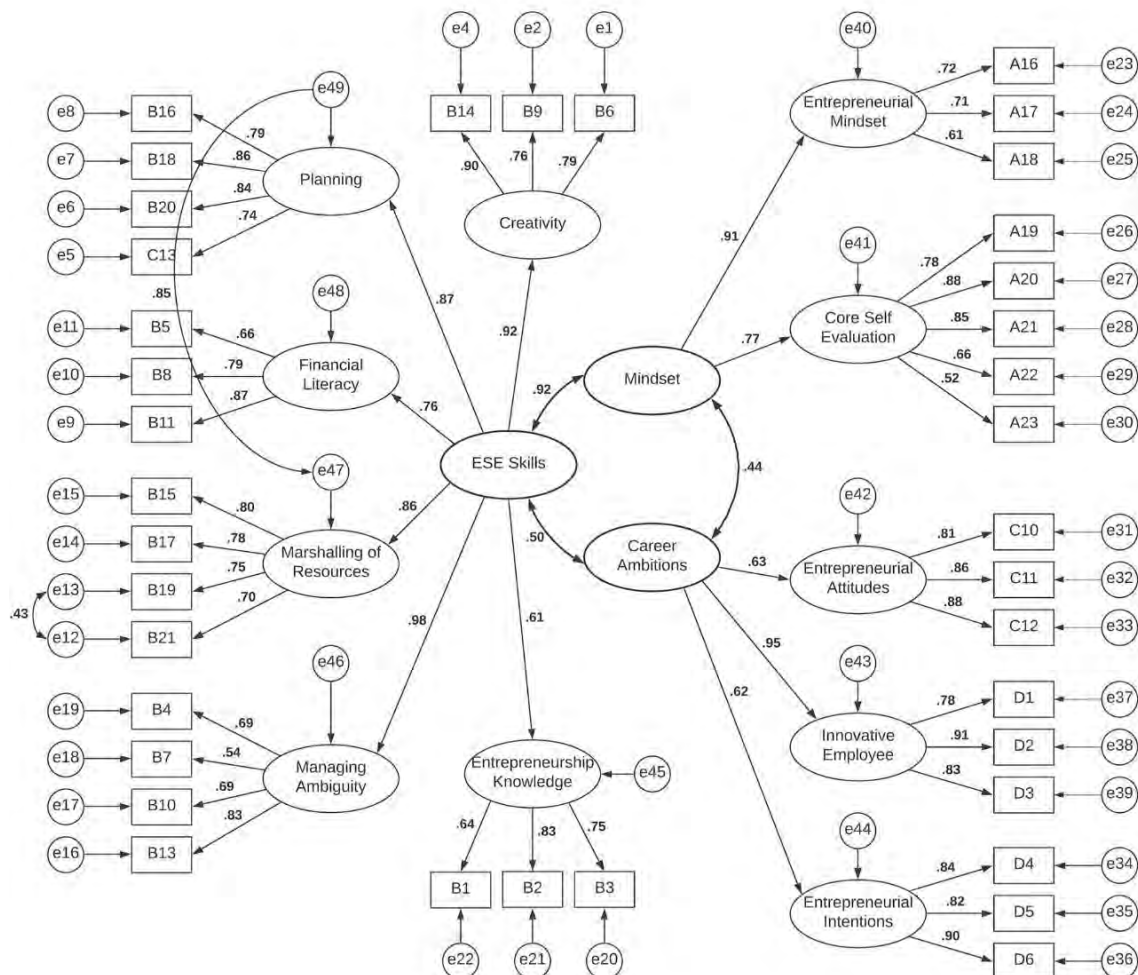
In order to examine the model fit of the Turkish-adapted version of the scale, fit values were calculated and evaluated with CFA. According to the results of the analysis, a very high covariance was found between the error value of the "Entrepreneurial Attitude" sub-dimension under the "Mindset" main dimension and the "Career Ambitions" main dimension. It is stated that the "intention", which is a sub-dimension of career ambitions, depends on the "attitude related to behaviour" (Muofhe & Du Toit, 2011), and in entrepreneurship education, career ambitions are related to entrepreneurship attitude (Dabale & Maseese, 2014). Therefore, this sub-dimension was moved from the "Mindset" dimension to the "Career Ambitions" dimension.

After this change, the analysis was repeated, and the modification indices revealed that the covariance between the error value of item 12b (I can identify opportunities for new ways of doing things) and the "Marshalling Resources" sub-dimension was very high. Actively seeking information is one of the key elements that helps entrepreneurs identify various opportunities (Baron, 2006). Yet, as different authors have highlighted, rather than being well planned, such seeks can mostly be performed spontaneously (Ardichvili et al., 2003; Fiet et al., 2004). Kirzner (1985) defined this concept for the first time in the entrepreneurial literature as alertness to changing conditions or reviewing possibilities. This definition demonstrates that people can still find opportunities even if they don't do a detailed examination. This alertness rests, at least in part, on creativity since it helps entrepreneurs identify new solutions. Additionally, it has been proven that, as opposed to only being influenced by creativity (12b belongs to this dimension in the original scale), opportunity recognition is inherently creative (Hansen et al., 2011). Thus, it was seen that item 12b did not have a theoretical direct relationship with the sub-dimension entitled "Marshalling resources". After removing item 12b from the scale, the subsequent analysis revealed a clearer and more accurate representation of the sub-dimension "Marshalling resources". This adjustment ensured that only relevant and meaningful items were included in the assessment. As a result, the revised scale provided a more comprehensive and reliable measure of the construct under investigation. In addition, all modifications to the scale's Turkish adjustment have been discussed and approved via correspondence with the scale's owner. He has actively participated in the decision-making process and given his permission for the modifications.

After the third analysis, a high covariance value was found between the error values of the "Planning" and "Marshalling Resources" sub-dimensions. According to Kickul et al. (2009),

these two concepts are the broad stages of creating a new venture that can be nonlinear and iterative. Further studies (Cox et al., 2002; McGee et al., 2009) have indicated that these two concepts are among the key characteristics of ESE that may be quantified. In an experimental study in which entrepreneurship education students evaluated the change in ESE skills, Karlsson and Moberg (2013) found a significant change in both the “Planning” and “Marshalling Resources” dimensions. Marshalling resources involves the willingness to take risks (Jones & English, 2004). Yet, one of the strategies entrepreneurs employ to eliminate uncertainty in risky opportunities and reduce unpredictability in expected results is to create a plan (Forlani & Mullins, 2000). Therefore, as Moberg et al. (2009) stated, these two sub-dimensions are theoretically related, so a modification was made. Similarly, a modification was made for the high correlation between items 19b (*I am able to network*) and 21b (*I am able to establish new contacts*). Entrepreneurs are actively seeking opportunities by making connections with other individuals and organizations (Baron, 2006). For this reason, how actively entrepreneurs use their networks can vary in terms of the number of connections, background, and change in the process (Greve, 1995). That is, these two items are theoretically related to each other. As a result, the model pictured in Figure 1 was validated.

Figure 1. Structural equation model of EESS, standard values of items, main and sub-dimensions.



According to Hooper et al. (2008), it is not necessary and unrealistic to include all indexes in the program output in structural equation modelling, but different indexes reflect different aspects of model fit. The Chi-Squared test, RMSEA, CFI, and TLI values included in two index categories mentioned in Hooper et al. (2008) were used. However, the indexes in the third

category are not included because no threshold level is recommended for them; therefore, their interpretation has become more difficult. The Chi-Square/df value was 2.939, RMSEA value was .058, CFI .910, TLI .903, IFI .910 from model fit indices. Chi-Square/df values between 2 and 3, RMSEA values between .05 and .08, CFI and TLI values above .90 indicate an acceptable fit (Baumgartner & Homburg, 1996; Crowley & Fan, 1997). These findings show that the scale adapted to Turkish is a valid measurement tool for university students. [Table 3](#) displays the item distribution and factor loadings by main and sub-dimensions for the EESS.

**Table 3.** Factor loadings of EESS items.

Items	Mindset		ESE (Skills)						Career Ambitions		
	Entrepreneurial mindset	Core self-evaluation	Creativity	Planning	Financial literacy	Marshalling of resources	Managing ambiguity	Entrepreneurial Knowledge	Entrepreneurial attitudes	Innovative employee	Entrepreneurial intentions
16a	.723										
17a	.706										
18a	.615										
20a		.879									
21a		.847									
19a		.778									
22a		.661									
23a		.521									
14b			.896								
6b			.787								
9b			.760								
18b				.858							
20b				.836							
16b				.793							
13c				.743							
11b					.866						
8b					.794						
5b					.659						
15b						.798					
17b						.781					
19b						.753					
21b						.704					
13b							.830				
4b							.694				
10b							.690				
7b							.543				
2b								.830			
3b								.753			
1b								.644			
12c									.879		
11c									.861		
10c									.807		
2d										.896	
3d										.843	
1d										.820	
6d										.910	
4d										.831	
5d										.780	

The factor loads of the items belonging to the “Entrepreneurial Mindset” are .723 and .615; the factor loads of the items belonging to the “Core self-evaluation” are .879 and .521; the factor loads of the items belonging to the “Creativity” are .896 and .760; the factor loads of the items belonging to the “Planning” are .858 and .743; the factor loads of the items belonging to the “Financial Literacy” are .866 and .659; the factor loads of the items belonging to the “Marshalling Resources” are .798 to .704; factor loads of the items belonging to the “Managing Uncertainty” are between .830 and .543; factor loads of the items belonging to the “Entrepreneurship Knowledge” are between .830 and .644; factor loads of the items belonging to the “Entrepreneurial Attitude” are between .879 and .807; factor loads of the items belonging to the “Innovative Employee” are between .896 and .820; factor loads of the items belonging to the “Entrepreneurial Intentions” are between .910 and .780. For the validity of the model, the factor loadings of the items should be above .50 (Farooq, 2016). The fact that the factor loadings of all items are above .50 supports the construct validity of the EESS.

### **3.2. Reliability Analysis**

The reliability of the EESS, whose validity was proven by confirmatory factor analysis and whose last version consisted of thirty-eight items, was examined with Cronbach’s alpha and Composite Reliability coefficients and split-half method. Cronbach’s alpha coefficient was calculated for the overall scale and each sub-dimension. Cronbach’s alpha coefficient was .95, the reliability coefficient for the “Mindset” sub-dimension was .83, .94 for the “Entrepreneurial Skills” sub-dimension, and .88 for the “Career Ambitions” sub-dimension. The composite reliability coefficient was found to be .98. The Spearman-Brown Correlation coefficient was calculated as .86 in the split-half reliability test. In coefficient calculations, values above .70 indicate an acceptable level of reliability (Wilson & Joye, 2017), while between .80 and .90 means highly reliable, and above .90 means very highly reliable (Cohen et al., 2007). Accordingly, it can be said that the EESS is highly reliable.

### **3.3. Evaluation of Participants’ EESS Scores in Terms of Various Demographic Variables**

The mean scores of females and males, those with and without entrepreneurship training, and those with and without self-employment experience according to the sub-dimensions of EESS are presented in [Table 4](#). Accordingly, it is seen that the means differ based on groups. However, to determine whether this difference is significant, the EESS scores of the participants were analysed correlationally in terms of these variables.



**Table 4.** *EESS mean scores of participants grouped according to gender, entrepreneurship education, and self-employment variables.*

Factors	Gender				Entrepreneurship Education				Self-Employment			
	Female		Male		Ent. Edu.		Non- Ent. Edu.		Exp.		Control	
	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd
Mindset	5.10	.95	5.21	1.06	5.28	1.05	5.06	.96	5.32	1.04	5.05	.96
Entrepreneurial mindset	4.86	1.07	5.14	1.17	5.23	1.11	4.81	1.09	5.32	1.15	4.78	1.05
Core self-evaluation	5.24	1.07	5.25	1.19	5.31	1.18	5.21	1.08	5.32	1.15	5.21	1.1
ESE (Skills)	4.82	.94	5.17	1.04	5.22	1.01	4.79	.95	5.28	1.02	4.78	.93
Creativity	4.92	1.14	5.37	1.22	5.33	1.18	4.95	1.18	5.43	1.21	4.91	1.14
Planning	5.06	1.2	5.34	1.30	5.42	1.22	5.02	1.23	5.48	1.28	5.01	1.19
Financial literacy	3.62	1.30	4.44	1.39	4.37	1.32	3.67	1.37	4.47	1.35	3.64	1.33
Marshalling of resources	4.99	1.22	5.14	1.37	5.27	1.28	4.92	1.25	5.32	1.32	4.90	1.23
Managing ambiguity	4.60	1.09	5.01	1.16	4.96	1.17	4.63	1.09	5.08	1.09	4.58	1.12
Entrepreneurial Knowledge	5.64	1.04	5.71	1.23	5.98	1.06	5.50	1.11	5.89	1.15	5.56	1.08
Career Ambitions	5.53	1.08	5.86	1.00	5.89	.91	5.52	1.12	6.13	.89	5.40	1.06
Entrepreneurial attitudes	5.86	1.27	5.92	1.12	6.05	1.06	5.79	1.29	6.16	1.1	5.74	1.25
Innovative employee	6.01	1.07	6.18	.89	6.24	.85	5.98	1.08	6.36	.77	5.92	1.08
Entrepreneurial intentions	4.72	1.61	5.47	1.55	5.37	1.48	4.78	1.67	5.88	1.42	4.55	1.55

During the research process, data were collected on the variables of gender, being born in the city where the parents usually live, field of education, volunteering, work experience, having a parent or an adult whom you grew up with a university degree, having someone self-employed, entrepreneurship education experience, and experience with self-employment. In order to conduct the necessary analyses, it was examined whether the student scores showed a normal distribution in terms of these variables, and the analysis methods were decided. Skewness and kurtosis values of the data are among the methods used to examine the normal distribution of a data set (Morgan & Driego, 1998). Table 5 shows the kurtosis and skewness values of the scores according to the variables considered in the study.

Tabachnick and Fidell (2013) state that data sets with kurtosis and skewness values between -1.5 and +1.5 can be normally distributed. When the values in Table 5 are examined, it is seen that the kurtosis and skewness values of the participants' entrepreneurship education scores for all variables are between the accepted limits. Accordingly, it was decided to use parametric tests in the analyses, t-test for independent samples was used for variables with two subgroups, and ANOVA test was used for variables with more than two subgroups.

**Table 5.** Skewness - kurtosis values of students' EESS scores according to demographic variables.

	Variable	Subgroups	Skewness	Kurtosis
1	Gender	Female	-.222	-.320
		Male	-.498	-.103
2	Having parents who were born in the same city with where they usually live	At least one	-.289	-.279
		None	-.290	-.284
3	Field of education	Science	-.445	-.168
		Health	-.265	-.468
		Social	-.198	-.191
4	Volunteering	Yes	-.076	-.543
		No	-.638	.496
5	Work experience	Yes	-.546	-.065
		No	-.107	-.198
6	Having parents or an adult they grew up with, a university degree	Yes	-.285	-.185
		No	-.296	-.363
7	Having self-employed acquaintance	Yes	-.285	-.333
		No	-.318	-.084
8	Entrepreneurship education experience	Yes	-.607	-.110
		No	-.187	-.119
9	Experience with self-employment	Yes	-.876	1.041
		No	-.072	-.304

### 3.3.1. Gender

Independent Samples T-test was conducted to determine whether the scores obtained from the scale showed a significant difference according to gender.

**Table 6.** T-test results of EESS scores by gender.

Group	N	$\bar{x}$	S	sd	t	p
Female	364	191.68	31.396	570	.4.04	.000*
Male	208	202.92	33.052			

\* $p < .01$

As seen in Table 6, there is a significant difference between the EESS scores of males and females,  $t(570)=4.04$ ,  $p < .01$ . The mean scores of male students ( $\bar{x}=202.92$ ) are higher than the mean scores of female students ( $\bar{x}=191.68$ ). The findings obtained show that there is a significant relationship between the mean score and the gender of the participants. The effect size value d is .351, indicating an effect between small and medium size.

### 3.3.2. Having parents who were born in the same city with where they usually live

Participants were asked whether their parents were born in the same city from where the participants usually live. The Independent Sample t-Test was used to analyse whether there was a significant relationship between the participants' EESS scores and whether their parents were born in the same city where they live now.

**Table 7.** *T-test results of EESS scores by having parents who were born in the same city with where participant usually live.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
At least one	258	194.69	32.907	570	.718	.473*
None	314	196.65	32.067			

\* $p > .01$ 

According to Table 7, there is no significant relationship between the participants' EESS scores and the fact that their parents were born in the city with where the participants usually live ( $t(570) = .718, p > .01$ ). Although the mean scores of the participants ( $\bar{x} = 196.65$ ), none of whose parents were born in the same city with where they live, were higher than the mean entrepreneurship education scores of the participants ( $\bar{x} = 194.65$ ), at least one of whose parents was born in the same city with where they live, this relationship was not significant.

### 3.3.3. Field of education

Participants were asked about the main field of higher education in which they received their education. The answers were categorized into science, social, and health. ANOVA test was used to determine whether the entrepreneurship education scores of the participants showed a significant difference according to their field of study.

**Table 8.** *ANOVA results of EESS scores by field of education.*

Source of Variance	Sum of Squares	sd	Mean of Squares	F	<i>p</i>	Significant Difference
Intergroup	16686.115	2	8343.057	8.129	.000*	Science - Health Science - Social
Intragroup	583994,843	569	1026.353			
Total	600680.958	571				

\* $p < .01$ 

Based on Table 8, there is a significant difference between the EESS scores of the students in terms of field of education,  $F_{2-569} = 8.13, p < .01$ . This finding shows that students' scores vary significantly according to their field of study. To determine whether there was a significant difference between which groups, the Scheffe test was used. It is the only multiple comparison procedure that is consistent with ANOVA results. If there is a significant difference between the groups in the ANOVA results, Scheffe guarantees that at least one of the group comparisons will be equally significant. Also, as ANOVA, it has similar robustness to the assumptions of normality and homogeneity while allowing different sample sizes in each group (Ruxton & Beauchamp, 2008). In the sample of the study, there are 182 participants from the field of science, 110 from the field of health, and 280 from the field of social. According to the results of the Scheffe Test, it was found that the EESS scores of the students studying in the field of science ( $\bar{x} = 203.23, S = 31.86$ ) were higher than those of the students studying in the fields of health ( $\bar{x} = 188.83, S = 34.32$ ) and social studies ( $\bar{x} = 193.64, S = 31.22$ ). There is no significant difference between the scores of students in health and social fields. The eta squared value for the effect size was calculated as .028. This value indicates an effect between small and medium size.

### 3.3.4. Volunteering

In the study, participants were asked whether they had volunteered in a youth organization, a club, or another non-governmental organization. In order to determine whether the EESS scores

showed a significant difference according to their volunteering, an Independent Sample t-Test was conducted between the scores that met the necessary assumptions.

**Table 9.** *T-test results of EESS scores by volunteering.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Yes	229	200.36	31.381	570	2.79	.006*
No	343	192.70	32.806			

\* $p < .01$

According to [Table 9](#), students' EESS scores show a significant difference according to whether they have volunteered or not,  $t(570)=2.79$ ,  $p < .01$  ([Table 9](#)). The mean scores of the students who volunteered ( $\bar{x} = 200.36$ ) were higher than those who did not volunteer ( $\bar{x} = 192.70$ ). In other words, there is a significant difference between volunteering in a youth organization, a club, or another non-governmental organization and EESS scores. The effect size value *d* is .238 and indicates a small effect.

### 3.3.5. Work experience

In the study, participants were asked how many years of work experience they had. The participants were divided into two groups: those with part-time or full-time experience and those with no experience, and the data were analysed with an Independent Sample t-Test to determine whether the participants' EESS scores showed a significant difference according to their work experience.

**Table 10.** *t-test results of EESS scores by work experience.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Part-time or full-time work experience	288	201.73	33.292	570	4.5	.000*
No experience	284	189.71	30.423			

\* $p < .01$

Based on [Table 10](#), the EESS scores show a significant difference according to work experience,  $t(570)=4.5$ ,  $p < .01$ , and this difference favors those who work part-time or full-time. The scores of those with part-time or full-time work experience ( $\bar{x}=201.73$ ) are higher than the entrepreneurship education scores of those without such experience ( $\bar{x}=189.71$ ). There is a significant relationship between entrepreneurship education and part-time or full-time work experience. The effect size value *d* is .377, indicating an effect between small and medium size.

### 3.3.6. Having parents, or an adult they grew up with a university degree

Participants were asked whether their parents or any adults they grew up with were university graduates. Whether the EESS scores of the participants showed a significant difference according to whether their parents or an adult they grew up with were university graduates was analysed with the Independent Sample t-Test.

**Table 11.** *T-test results of EESS scores by having parents or an adult participants grew up with are university graduate.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Yes	280	196.17	32.017	570	2.91	.772*
No	292	195.38	32.880			

\* $p > .01$

According to Table 11, the EESS scores do not differ significantly according to whether or not having parents or an adult participant grew up with a university degree,  $t(570)= 2.91, p>.01$ . Based on this result, although the mean scores of the students whose parents or an adult they grew up with have a university degree ( $\bar{x}=196.17$ ) are higher than the mean scores of the students whose parents or an adult they grew up with ( $\bar{x}=195.38$ ), this difference is not significant.

### 3.3.7. Having a self-employed acquaintance

Participants were asked whether they had any acquaintance (parent, relative, or friend) who is self-employed. Whether the EESS scores of the participants show a significant difference according to whether they have an acquaintance who is self-employed was evaluated with the Independent Sample t-Test by evaluating the normal distribution of the data.

**Table 12.** *t-test results of EESS scores by having self-employed acquaintance.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Yes	445	196.13	32.450	570	.497	.620*
No	127	194.50	32.475			

\* $p>.01$

Based on Table 12, there is no significant difference between the EESS scale scores and whether the students have an acquaintance who is self-employed or not,  $t(570)= .497, p>.01$ . There is a very small difference between the mean scores of students who do not have self-employed acquaintance ( $\bar{x}=194.50$ ) and the mean scores of students who have an acquaintance ( $\bar{x}=196.13$ ). The results showed that this difference was not significant and that there was no significant relationship between EESS scores and having an acquaintance who owns their own business.

### 3.3.8. Entrepreneurship education experience

In order to determine entrepreneurship education experience, the participants were asked whether they had taken an entrepreneurship course/lesson and whether they had received any extra-curricular activity that focused on entrepreneurship/self-employment. Participants who answered yes to at least one of these two questions were considered those with entrepreneurship education experience, while those who answered no to both questions were considered those without entrepreneurship education experience. Independent Samples T-test was used to determine whether the scores of the two groups on the entrepreneurship scale differed significantly.

**Table 13.** *T-test results of EESS scores by entrepreneurship education experience.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Yes	202	204.89	32.874	570	5.076	.000*
No	370	190.79	31.125			

\* $p<.01$

According to Table 13, there is a significant difference between the EESS scores of the students who have entrepreneurship education experience and those who did not,  $t(570)=5.076, p<.01$ . The mean score of the participants with entrepreneurship education experience ( $\bar{x}=204.89$ ) is higher than the mean score of the group with no experience ( $\bar{x}=190.79$ ). This finding shows that there is a significant relationship between the students' EESS scores and having received/receiving any entrepreneurship education. The effect size value *d* is calculated as .444, indicating an effect close to medium size.

### 3.3.9. Experience with self-employment

Participants were asked about their experience in starting, running, or setting up their own business to consider their entrepreneurial behaviour in activities outside the curriculum. Participants were grouped into those who had relevant experience in the past or present and those who did not. Independent Samples t-test was used to examine whether the participants' EESS scores differed significantly according to their experience of starting, running, or setting up their own business.

**Table 14.** *t-test results of EESS scores by experience with self-employment.*

Group	N	$\bar{x}$	S	sd	<i>t</i>	<i>p</i>
Yes	191	208.66	30.597	570	7.009	.000*
No	381	189.30	31.420			

\* $p < .01$

According to Table 14, The EESS scores of the students show a significant difference according to the relevant experience,  $t(570)=7.009$ ,  $p < .01$ . The mean entrepreneurship education scores ( $\bar{x}=208.66$ ) of the students who started a business in the past, are currently running a business or are trying to start a business are higher than the mean scores ( $\bar{x}=189.30$ ) of the students who do not have any business venture. This finding shows a significant relationship between the experience of starting/running/setting up their own business and students' entrepreneurship education scores. The effect size value *d* is calculated as .621, indicating an effect between medium and large size.

## 4. RESULTS and DISCUSSION

In this study, the adaptation of the tertiary level entrepreneurship education assessment tool developed within the scope of the ASTEE Project into Turkish was conducted. As a result of CFA and reliability tests conducted with 572 participants, an acceptably valid and highly reliable scale consisting of 3 main dimensions, 11 sub-dimensions, and a total of 38 items was obtained (Table 15). The scale, which is a 7-point Likert type in which the participation rates of the items are scored between 1 and 7, can be used to measure and assess the impact of entrepreneurship education students receive in the context of university education.

**Table 15.** *Entrepreneurship education self-assessment scale factors and number of items.*

Factors	Number of Factor Items	Sub-factors	Number of Sub-factor Items
Mindset	8	Entrepreneurial mindset	3
		Core self-evaluation	5
ESE (Skills)	21	Creativity	3
		Planning	4
		Financial literacy	3
		Marshalling of resources	4
		Managing ambiguity	4
		Entrepreneurial Knowledge	3
Career Ambitions	9	Entrepreneurial attitudes	3
		Innovative employee	3
		Entrepreneurial intentions	3
Total	38	11	38

In the Turkish adaptation of the scale, it was observed that it preserved its original form. However, in the Turkish adaptation, unlike the original, “Entrepreneurial Attitude” was included in a different sub-dimension (Career Ambitions) as a result of the analysis. Liñán et al. (2011) state that entrepreneurial intention relates to personal attitude. As seen in the model of the adapted scale (Figure 1), “Entrepreneurial Attitude” was included in the “Career Ambitions” dimension, which is also the main dimension of “Entrepreneurial Intention”. In this case, it can be said that this change is theoretically possible and correct. Another difference in the Turkish scale is that the sub-dimension “Creativity”, a sub-dimension of the main dimension “Mindset”, consists of 3 items in the Turkish version with the removal of 1 item, while it was 4 items in the original. As a result, the Turkish adaptation of the scale contains 38 items, while the original scale has 39 items.

The study grouped the participants under 9 variables to test how distinctive the scale items were. It was determined that the participants’ EESS scores were significantly correlated with their gender, field of education, volunteering, work experience, experience with self-employment, and entrepreneurship education experience, while the scores did not show a significant difference according to having parents who were born in the same city with where the participants usually live, having parents, or an adult they grew up with a university degree and having a self-employment acquaintance. However, it was seen that the effect sizes of the variables that show a significant difference in entrepreneurship education scores differ. Gender, the field of education, and work experience had effect sizes between small and medium; volunteering had a small effect size; the effect size of entrepreneurship education experience is close to medium size; experience with self-employment had an effect size between medium and large. In this case, it can be said that among these variables, experience with self-employment has the greatest influence on entrepreneurship education.

In the study, it was determined that the entrepreneurship education scores of male students were significantly higher than female students, and it was seen that previous studies supported this result. According to the research done by Vodă and Florea (2019) and Tessema Gerba (2012), it has been shown that there are disparities in entrepreneurial intentions between men and women, with men exhibiting stronger inclinations to engage in entrepreneurial intentions compared to their female counterparts. The study by Petridou et al. (2009) expressed that women feel less confident and less capable of starting entrepreneurial activities than men, even if they have the same education and come from similar backgrounds. Wilson et al. (2007) found that the ESE of female students in middle school, high school, and graduate education was lower than that of male students. Marques et al. (2018) stated that there is a difference between male and female students regarding individual entrepreneurial orientation and that gender affects individual entrepreneurial orientation differently. In the study conducted by Yılmaz and Sünbül (2009), no significant correlation was found between gender and levels of entrepreneurship. However, Büyükyılmaz et al. (2021) reported a significant and partial difference favoring men in terms of gender and perspective on entrepreneurship in their respective studies. As a result, it is seen that there is a situation against women in general in studies related to entrepreneurship. In this context, it can be said that national education programs should plan courses tailored to the specific needs of women, consider their concerns and perceptions about entrepreneurship, and focus on encouraging them (Petridou et al., 2009); in other words, plans and regulations should be made by considering gender differences in entrepreneurship education.

The result that EESS scores differ by the field of education is supported by Marques et al. (2018). In the current study, the scores of the students studying in the field of science were significantly higher than the scores of the students studying in the fields of Health and Social fields, while the scores of the students in the social and health fields did not differ significantly.

Marques et al. (2018) found that entrepreneurship education differs among business, social and human sciences, and engineering majors; the strength of the impact of entrepreneurship education may differ among students depending on the program they have completed. In addition, although entrepreneurship education scores did not differ according to family background in the current study, Marques et al. (2012) explained that having a businessowner in the family has a negative impact on the entrepreneurial intention of individuals, which may be due to the fact that students do not have positive experiences with their family's business activities and see starting and running a business as an undesirable goal. In contrast to this study, Lee et al. (2021) state that the effect of entrepreneurship education on entrepreneurial ambition is strengthened when students have entrepreneurs in their close families. Similarly, Duval-Couetil et al. (2014) state that students with an entrepreneurial family member are more likely to be more interested in starting a business or becoming self-employed. However, According to Shinnar et al. (2009), the presence/absence of entrepreneurs in the family does not have a significant effect on shaping students' behavioural intentions towards entrepreneurship and their employment intention. While this result supports the conclusion of the current research, Tessema Gerba (2012) found no significant difference between the entrepreneurial intentions of students who were exposed to entrepreneurial activities through their families and students who were not exposed to entrepreneurial activities in their families. In this case, it is seen that there is no generalizable result regarding the effect of the relationship of families with entrepreneurship on students.

The study concluded that there is a significant correlation between the employment status of students, whether they have part-time or full-time work, and their scores in entrepreneurship education. The findings of Büyükyılmaz et al. (2021) research align with the outcomes of the present study, indicating that there is a variation in students' perceptions of entrepreneurship based on their prior job experience. Shinnar et al. (2009) state that the student's prior work experience does not have a significant effect on shaping students' behavioural intentions towards entrepreneurship and their employment aspirations. Similarly, Fatoki (2014) found that the entrepreneurial intentions of undergraduate university students in South Africa did not differ significantly according to work experience. Peterman and Kennedy (2003) determined students' entrepreneurial experience with the questions "Have your parents ever started a business?", "Has anyone else you know started a business?", "Have you ever worked for a small or new company?", "Have you ever started a business?". In their study results, they stated that students' exposure to entrepreneurial experiences encouraged their desire to self-employment. Considering the questions, they used to determine entrepreneurial experience, and it is seen that this study supports the results of the current research related to the variables related to these questions, "work experience" and "experience of starting/running their own business" but does not support the results of it related to the variable "having a relative who owns their own business". However, in Atabay and Alamur's (2016) research, it was seen that there is a significant difference between the entrepreneurial tendencies of the students whose mother or father, who provides the family's living, has their own business and those whose mother or father is retired or unemployed. As a result, it is seen that different results have been obtained regarding the effect of work experience on concepts related to entrepreneurship in the studies.

Findings also show that the entrepreneurship education scores of students with entrepreneurship education experience are significantly higher than those without entrepreneurship education. Supporting this result, Vodă and Florea (2019) state that entrepreneurship education prepares young individuals to enter the labour market and provides them with the knowledge, skills, and capacity to take on different challenges. The study by Lee et al. (2021) also supports these results. In the study, it was observed that students who took entrepreneurship courses had higher levels of intense positive emotions towards starting a business than those who did not. In addition, the fact that there was a significant difference between the entrepreneurship scores of



the students who had previously taken entrepreneurship education, class, or course and those who had not shown that the scale is distinctive; in other words, it distinguishes students with high entrepreneurship knowledge and skills from those with low entrepreneurship knowledge and skills.

In conclusion, when the research results are evaluated together with the results of related studies in the literature, there are different results are found regarding the effect of demographic variables on entrepreneurship and entrepreneurship education, except gender and entrepreneurship education experience, and there are no generalizable results.

## 5. LIMITATIONS AND RECOMMENDATIONS

In the study, the Entrepreneurship Education Self-Assessment Scale (EESS), translated and tested in 13 European countries, including Denmark, Sweden, England, France, Italy, and Germany, was adapted from English into Turkish. The researchers encountered some limitations in this process. The first one is about reaching only undergraduate students with entrepreneurship education experience. This group is frequently employed to investigate entrepreneurship because they show a higher propensity toward venture creation than the general population (Liñán & Santos, 2007). Due to the lack of entrepreneurship education policies and strategies at the universities in Turkey, entrepreneurship education is not yet widespread compared to the EU in undergraduate education. For this reason, more participants with entrepreneurship education experience could not be reached in the study. Secondly, the universities that offer entrepreneurship education or stand out with their entrepreneurial university climate are mostly foundation ones that provide education in English, and their number is relatively low in Turkey. Therefore, the participants were mostly from the state universities in Turkey. It is thought that universities may be the subject of future research. Such research results will also reveal the effects of entrepreneurship education in foundation universities and whether there is a difference between both types of higher education institutions.

Based on the results regarding the comparison of entrepreneurship education scores according to certain demographic characteristics, which constitute the second part of the study, it was observed that while there was a significant difference between some variables and entrepreneurship education, some had no effect on the scores. Although it is explained in detail in the discussion section, it is seen that different results that support and do not support each other are obtained in the studies in the literature. In this context, conducting in-depth analyses with qualitative methods in future studies and comparing qualitative results with research results may contribute to the field in terms of generalizability. In addition, examining the entrepreneurship education scores of student groups with different demographic characteristics in quantitative studies can be considered as further research.

Finally, the developed scale aims to meet the needs of researchers, educational policymakers, and, of course, instructors practicing within the domain of entrepreneurship education in Turkish universities. These practitioners can demonstrate the impact of educational designs on students through multiple interrelated variables in accordance with the nature of education rather than a single isolated variable. Using a pre-test post-test quasi-experimental design, practitioners can measure the impact of a course, program, or whole institution of entrepreneurship education in higher education, comparatively examine the impact of entrepreneurship education in different fields or programs or compare mean scores with the EESS data in this study.

The ASTEE scale is limited to the participants' own responses to the items in the relevant sub-dimensions. It may be a good idea to complement these self-assessed measures with course grade scores or additional measures of different entrepreneurial skills, especially creativity.

Researchers or educational policymakers in Turkey can evaluate the mean scores of their sample by comparing them with the participants in this study.

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The authors declare no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in IJATE belongs to the authors. **Ethics Committee Number:** Gazi University, 26.06.2019, 2019-195.

### Authorship Contribution Statement

Both named authors contributed equally to a collaborative and collective process in conducting this research and in the authorship of this manuscript.

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