

HIERARCHICAL EFFECT OF ACADEMIC SELF-EFFICACY AND SOCIO-DEMOGRAPHIC CHARACTERISTICS ON SATISFACTION AND DROPOUT OF STUDENTS WITH DISABILITY IN HIGHER EDUCATION

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ABSTRACT

Even though distance education from the home environment has seemed comfortable and economic for students with disability in formal higher education during the pandemic, insufficiency in their academic self-efficacy, satisfaction and an increasing tendency to drop out were observed. This quantitative research is based on development of the scales and hierarchical regression analyses to determine the resources of academic self-efficacy, satisfaction and the tendency to drop out of students with disability in higher education beyond physical accessibility. The hierarchical effect of sub-dimensions of academic self-efficacy on satisfaction and the tendency to drop out and hierarchical predictor roles of socio-demographic characteristics (gender, rate of personal disability, type of disability, and four fields of study) were analysed. Some of the important findings are; self-efficacy in training, emotional well-being, technique and communication are determined as the sub-dimensions of academic self-efficacy. Self-efficacy in emotional well-being is the most effective sub-dimension of academic self-efficacy on satisfaction. Hierarchically, fields of study (social science and health sciences), rate of disability and types of disability (chronic illness and hearing disability) are effective on academic self-efficacy. The results support the decision makers to increase the quality of more inclusive higher education by considering differences based on education fields, types of disability and rate of (personal) disability and gender.

Keywords: Distance higher education, students with disability, self-efficacy, satisfaction, dropout.

INTRODUCTION

According to Postsecondary National Policy Institute (2021), there are 21% of undergraduate students and 12% of postgraduate students with disabilities in higher education. 25% of them drop out in the first year. 35% of them drop out in the second year of their higher education in the United States of America (Shaewitz and Crandall, 2020).

From a psychological aspect, self-efficacy and satisfaction affect the academic performance of students (Jones et. al., 2010; Fabio and Fabio, 2011). But, the sources (sub-dimensions) of academic self-efficacy from training to emotions and their effects on satisfaction and the tendency to drop out have not been determined completely. There is some research (Blake and Rust, 2002; Sattuck et. al., 2014 etc.) about the socio-

demographic characteristics and self-efficacy of students with disability. But, the moderator role of the rate of (personal) disability, type of disability, fields of study, and gender on the relationship between academic self-efficacy, satisfaction and tendency to drop out in higher education has not been determined adequately. The hierarchical predictor role of the socio-demographic characteristics of students with disability on the mentioned concepts is still not clear enough as well.

In Türkiye, there are 51,647 students with disability in higher education. Because of inaccessible conditions, 89% of them continue to Open University (Higher Education Board of Türkiye, 2020). Inaccessible conditions affect their self-efficacy (Shen et. al., 2013; Shattuck et. al., 2014), academic participation (Matonya, 2016), and satisfaction (Manandhar and Gaulee, 2022).

At first glance, distance education seemed to be appropriate for students with disabilities in formal (in-person) higher education. Particularly, this is because of the easement to access education from a comfortable and safe home environment. However, it was observed by the researchers of this study that they have some challenges during distance education and this affected their tendency to drop out or suspend their education as well as satisfaction and academic self-efficacy. The importance of determining the factors that affect academic self-efficacy, satisfaction and tendency to drop out has emerged considering distance education. So, the factors that affect academic self-efficacy, satisfaction and tendency to dropout might be determined beyond physical accessibility (such as accessible ramp and lift in the building, Bas: 2016) in higher education.

Evaluation of distance education through the eyes of students with disability from different fields of study in formal higher education provides useful implications to increase the quality of distance education in different fields including medicine, fine arts, tourism etc. The implications may contribute to a possible hybrid model for students with a high rate of disability that allows students with disability to participate in formal higher education more.

Therefore this research is important to determine (1) if academic self-efficacy and its sub-dimensions affect satisfaction and the tendency to drop out; (2) if satisfaction affects the tendency to drop out; (3) if there is a moderator role of socio-demographic characteristics (rate of disability, type of disability, fields of study, and gender) on the relationship between academic self-efficacy, satisfaction and tendency to drop out; (4) if there is predictor role of socio-demographic characteristics for academic self-efficacy, satisfaction and tendency to drop out of students with disability in formal distance higher education in Türkiye.

The scale of academic self-efficacy (with four dimensions), satisfaction and tendency to drop out have been analysed based on the mixed method of this research. Importantly, this research analyses distance education from the viewpoint of students with disability in formal higher education in different fields of study. The results contribute to increasing the number of students with disability and quality of inclusive higher education (for both face-to-face and distance education).

ACADEMIC SELF-EFFICACY, SATISFACTION, DROPPING OUT BEHAVIOUR OF STUDENTS WITH DISABILITY IN HIGHER EDUCATION

According to Bandura (1997 retrieved from Bandura, 2016) self-efficacy refers to “beliefs in one capability to organize and execute the courses of action required to produce given attainments”. Self-efficacy affects people’s behaviours, efforts, and choices as well as their thoughts and feelings. Physical inaccessibility and communicational, psychological and financial challenges may cause a lack of self-efficacy and dissatisfaction of the student with a disability (Manandhar and Gaulee, 2022).

There was temporary distance education in higher education during the pandemic (COVID-19) that was declared on 11th March 2020 by the World Health Organization. Lack of online support on the websites of the colleges (Meleo-Erwin et. al., 2021) and required technological devices (Salmi, 2020; Aquino and Scott, 2022) have been the challenges in distance education during the pandemic. During this period, physiological and psychological states have affected self-efficacy (Van Dinther et. al., 2011). Lack of self-efficacy (Alivernini and Lucidi, 2011; Dogan, 2015) and dissatisfaction (Sakurai et al., 2012; McFarland and Hamilton, 2016) affect their academic performance. Therefore, this may cause them to drop out of higher education. For this reason, behavioural support (e.g., guiding students on how to communicate with others), personalize instruction (e.g., motivating students to believe they can succeed), rigorous and relevant

instruction (e.g., equipping the students with the skills to prevent them dropping out) (Pyle and Wexler, 2012) may increase their self-efficacy and their satisfaction with learning.

Accordingly, considering students with disability in formal higher education during distance education, it was hypothesized that H_1 : There is a significant negative effect of academic self-efficacy on dropping out behaviour. H_2 : There is a significant positive effect of academic self-efficacy on satisfaction. H_3 : There is a significant negative effect of satisfaction on dropping-out behaviour (as seen in Figure 1).

The needs of persons with disability can vary by socio-demographic characteristics (Bas, 2016). Some of the socio-demographic characteristics, such as severity and visibility of disability, are effective on self-efficacy (Blake and Rust, 2002). Gender is effective on satisfaction (Ashong and Commander, 2012; Holcomb et. al., 2004) and academic performance (Matonya, 2016). Relatedly, it was hypothesized that $H_{2,1}$: There is a moderator influence of socio-demographic characteristics on the relationship between academic self-efficacy and satisfaction. $H_{3,1}$: There is a moderator influence of socio-demographic characteristics on the relationship between academic self-efficacy and the tendency to drop out. H_4 : There is a significant effect of socio-demographic characteristics on self-efficacy. H_5 : There is a significant effect of socio-demographic characteristics on satisfaction. H_6 : There is a significant effect of socio-demographic characteristics on dropping-out behaviour.

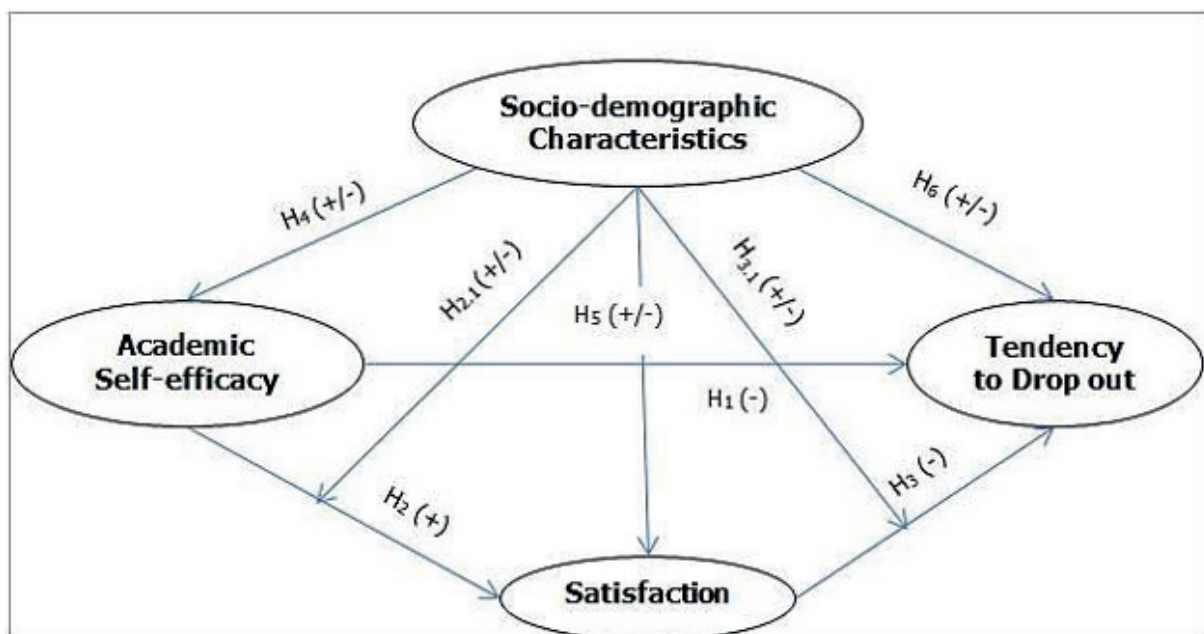


Figure 1. Proposed Research Model and Hypotheses

METHOD

In this research, a mix method was applied. The scales of (1) academic self-efficacy, (2) satisfaction and (3) tendency to drop out of students with disability in higher education were developed based on the interviews in the qualitative part of the research. The survey was conducted in the quantitative part of the study. Ethical approval of this research was obtained from the Ethical Board of (anonymised) University.

Participants

The data was gathered with qualitative (interviews) and quantitative (survey) methods. A purposive sampling technique was used that depends on the researcher's decision to choose the appropriate participants for the sample (Etikan et. al., 2016). Due to the lack of a completely adaptable academic self-efficacy scale for this research, the items of the scale consisted of the data acquired from the in-depth interview with 28 students with four different types of disability in formal higher education who experienced distance education during

the pandemic in Türkiye. The sample of both qualitative and quantitative research parts of this research includes students with four types of disability at different levels (30% - 100% disability). These are; visual disability (e.g., night blindness), hearing disability, physical disability, and chronic illness (e.g. Attention Deficiency and Hyperactivity Disorder, and Thalassaemia). The interviews were made by the researcher. Mainly, based on the findings of interviews, the scales of academic self-efficacy, satisfaction and tendency to drop out of students with disability were developed.

Data Collection and Analysis

The survey was emailed to disability coordinators of 207 universities in Türkiye and 32 universities in the European Union, Britain, Australia, North America and New Zealand through official correspondence to forward the survey link directly to the students with disability (via WhatsApp groups, email or in person). The survey was translated from Turkish into English and German as well. Some of the students with disability in the researchers' university were called directly to ask for answering the survey. The data of the survey were gathered between the dates 1st March – 30th May 2022. Finally, 134 students with disability from 17 universities in Türkiye responded to the survey, and 123 responded surveys were valid and taken into consideration for the analyses (n=123). According to the Council of Higher Education Board of Türkiye (2020), there are nearly 5,649 students with disability in formal higher education in Türkiye. But the population size (N) is still not precise for this research due to uncertainty in the number of students with disabilities who attended the lecture continuously and had enough temporary distance education experience in formal higher education. Some researchers (Gorsuch, 1983 retrieved from MacCallum et. al. 1999; Guadagnoli and Velicer, 1988) accept the minimum sample size (n) as 100 and as 50 for exploratory factor analysis (Winter et. al., 2009). Some of the disability-related research includes around 100-150 sample size (Gatchel et. al., 2006; Dryer et. al. 2016; Tanveer et. al. 2018 etc.). As a result, the present research was decided to be continued with a sample of 123 (n=123) participants depending on the information mentioned earlier and the rarity of sample characteristics.

Exploratory factor analysis (EFA) was made through the SPSS statistics package program. Exploratory factor analysis is applied to analyse factor structure and the validity for new scale development (Di Fabio and Perio, 2018; Le et. al., 2020). Pearson correlation analysis (95% confidence interval) was used to determine the relationship between variables. The data were assumed normally distributed since Kurtosis and Skewness values are between +1, 5 and -1, 5 (Tabachnick and Fidell, 2013). Hierarchical multiple regression analysis was made to measure the effects of independent variables hierarchically (gradually) on dependent variables and to compare their contributions to the regression model considering the change in significance and R² (R²). Also simple and multiple regression analyses were made. Categorical variables (gender, types of disability, education areas) were defined as dummy variables before the regression analyses. *K (number of categorical variables) - 1* dummy variable were included in the analyses to prevent a dummy variable trap (multicollinearity). The critical tolerance value ($>1 - R^2$, Gurbuz and Sahin, 2018) and VIF value (<10 , Hair et al., 2014) were considered to prevent the problem of multicollinearity. Standardization (Z score) of independent variables and interaction values (X*M) were used in hierarchical regression analysis to measure the moderator influence of socio-demographic characteristics on the relationship between academic self-efficacy and satisfaction and the tendency to drop out.

The Scales

Three main scales were developed in this research: *Academic self-efficacy*, *tendency to drop out* and *satisfaction of students with disability*. Despite the self-efficacy scales in the literature (Sherer and Maddux, 1982; Tschannen-Moran and Hoy, 2001; Bandura 2006; Jenson et. al., 2011; Shen et. al, 2013 etc.), no completely adaptable scale was found for this research considering the sample characteristics. The items of the scales were revealed according to the results of the depth interviews with 28 students with four different types of disabilities. Seven-point Likert scale was used for all three scales. At the end of the survey, there was one (optional) open-ended question to determine if there is anything to mention by the participants. Additionally, some research

in the literature about self-efficacy (Sherer and Maddux, 1982; Tschannen-Moran and Hoy, 2001; Bandura 2006; Jenson et. al., 2011; Shen et. al, 2013; Du et al., 2019 etc.), satisfaction (Caprara, 2006; Smedema et. al., 2022), tendency to drop out (States et. al., 2005; Fabio and Fabio, 2011) and the structure of the scales were used as references. Prereading of the survey was made by ten students with different types of disability and academicians to check its understandability.

FINDINGS

Sample Description

The total number of the sample is 123 students with four types of disabilities who experience hybrid education formal higher education. Male participants (63; 51, 2%) are slightly more than female participants (60; 48, 8%). Students with chronic illness have the highest frequency level (46; %37, 4) in all types of disability. Frequencies of other types of disability are subsequently: physical disability (40; 32, 5 %), hearing disability (20; 16, 3 %), and visual disability (17; 13, 8%). Participants whose personal disability rates are between 30% - 49% has the highest frequency level (the number of those: 47 = 38, 2 %). Frequency of personal disability rates are subsequently; 50%-69% (the number of those: 40 = 32, 5 %), 70%-89% (the number of those: 19 = 15, 4%), and 90%-100% (the number of those: 17 = 13, 8%). The frequency of education levels is subsequently; bachelor's degree (80; 65%), associate degree (39; 31, 7%), master's degree (3; 2, 4%), a doctoral degree (1; 0, 08%). The highest participation is from social sciences (61; 49, 6%), and the rest of them are subsequently physical sciences (31; 25, 2%), educational sciences (20; 16, 3%), health sciences (11; 8, 9%).

Reponses to the (Optional) Open-Ended Question

Eight students with disability answered the optional **open-ended** question asking if there was anything else they wanted to mention about the topic. The topics that were mentioned by the students in this part of the survey were: (1) support for course notes and course records and uploading of them before the time of the online course (25%); (2) being more tolerating of absence by illness or treatment (25%); (3) making online courses optional for the students with disabilities in formal higher education (25%); (4) the need for psychological support to adapt to university (12.5%) ; (5) inability to achieve the online exams and courses due to inaccessibility and hearing disabilities (12.5%).

Validity and Reliability

The Scale of Academic Self-Efficacy and the Dimensions

Firstly, the survey was conducted with 42 items. A seven-point Likert scale A seven-point Likert scale, which ranged from 1: Completely low (disagree) to 7: Completely high (agree) was used. As seen in Table 1, after exploratory factor analysis, the number of items was reduced to 25 items. This is because of the low level of factor loading (<0.5), loading more than one item with close values (<0, 1), causing meaningless dimension/s and the aim of increasing the total variance. Cronbach's alpha value on the scale of academic self-efficacy was determined as 0,953 and assumed as adequate due to being close to 1 (Ural and Kilic, 2013). Value of Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO= 0,896) and Bartlett's Test of Sphericity (0.000; sig. < 0, 05) was adequate for the factor analysis (Hair et al., 2014). The total variance coverage ratio is 72, 296% and is accepted as adequate due to being over 60% (Gurbuz and Sahin, 2017). Intercorrelation between the items was significant (p<0, 05). As seen in Table 1 thoroughly, there are four items with the eigenvalues; academic self-efficacy in (1) training (11,986), (2) in emotional wellbeing (emotions-focused) (2,726), (3) in technique (2,136), (4) in communication (1, 227).

Table 1. Findings of exploratory factor analysis of academic self-efficacy scale

Items	Components and Factor Loadings			
	(1) Self-efficacy in Training	(2) Self-efficacy in Emotional Wellbeing	(3) Self- efficacy in Technique	(4) Self-efficacy in Communication
1	Being able to understand online practical courses	0,958		
2	Being able to understand online course notes of practical courses	0,860		
3	Being able to complete homework that requires group work	0,839		
4	Being able to achieve exams of online theoretical courses	0,838		
5	Being able to achieve practical exams and home works	0,813		
6	Being able to study enough (e.g. having enough time)	0,623		
7	Being able to understand the theoretical online courses without any problem	0,617		
8	Being able to feel good during distance education		0,977	
9	Being able to feel happy during distance education		0,953	
10	Being able to feel comfortable and safe during distance education		0,908	
11	Being able to feel motivated well during distance education		0,856	
12	Being able to feel productive during distance education		0,855	
13	Being able to feel successful during distance education		0,696	
14	Being able to access technical services during the online course when there are disconnections and other problems		0,967	
15	Being able to access online library and resources without any problem		0,878	
16	Being able to access the equipment (headphone, microphone, camera and internet etc.) during distance education		0,763	
17	Being able to complete the online theoretical exams without any disconnections or internet slow down		0,643	
18	Being able to upload homework to the online course management system and send it to the lecturer		0,629	
19	Being able to access and follow the synchronous courses without any problem (i.e. disconnection, slow down)		0,617	
20	Being able to access (open) the online theoretical exams without any problem		0,556	
21	Being able to communicate easily with the instructor outside of synchronous courses for example instructor's timely response to the email			1,034
22	Being able to communicate easily with the instructor during online exam			0,880

23	Being able to communicate easily with the instructor during the synchronous course without any problem (by writing, speaking and asking questions etc.)				0,769
24	Being able to be aware of written or verbal announcements in the online course system without any problem				0,681
25	Being able to have accessible applications within the course (e.g. slow and understandable lecture) and in the course notes (e.g. high font).				0,535
Eigenvalues		11,986	2,726	2,136	1,227
% of the variance (cumulative)		47,944	58,847	67,389	72,296
Total Variance		72,296%			
Cronbach's Alpha		0,953			
Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization					

The highest correlation was determined between academic self-efficacy in communication and technique ($r=0,685$, $p<0,01$). The lowest correlation was determined between academic self-efficacy in communication and emotional well-being ($r=0,448$, $p<0,01$).

The scale of Satisfaction for Students with Disability

A seven-point Likert scale (1: Completely dissatisfied; 7: Completely satisfied) was used. As a result of exploratory factor analysis, one item was removed from the scale due to low factor loading and decreasing total variance. As seen in Table 2, Cronbach's alpha value of the scale of satisfaction was determined as 0,877 and assumed as adequate (Ural and Kilic, 2013). Value of Kaiser Meyer Olkin Measure of Sampling Adequacy ($KMO=0,877$) and Bartlett's Test of Sphericity (0.000; sig. < 0,01) was adequate for the factor analysis (Hair et al., 2014). As seen in Table 2, one dimension (eigenvalue: 4,754) with 8 items and a 59,425% total variance coverage ratio were determined. Obtained variance is accepted to be adequate considering the single factor structure and being above 50% (Altunisik et al., 2012). Intercorrelation between the items was significant ($p<0,05$). The lowest value of factor loading is 0,723 and the highest value is 0,817. The mean of academic satisfaction is 5,44 of (slightly satisfied) according to descriptive analysis.

Table 2. Findings of Exploratory Factor Analysis of Satisfaction scale

Items	Component (1) and Factor Loadings
1 With my academic performance such as understanding the course and passing the exams in the distance education	0,817
2 With communication opportunities in distance learning period such as communication with the instructor, returning e-mails and messages	0,773
3 With accessible opportunities in the distance education period such as course notes with high font size, subtitles on online courses, support of reader and writer during the online exams	0,752
4 With the sufficiency of equipment that is necessary for distance education such as computers, internet, and headphones	0,763
5 With psychological effects of distance education such as feeling safe, happy or unhappy	0,723
6 With economic conditions in distance education such as the ability to have a computer, no transport cost, and cost of internet using	0,775
7 With the appropriateness of my home or dormitory for distance education in terms of silence, cleanness and safety	0,759
8 Generally, with the period of distance education	0,800
Eigenvalue	4,754
Total Variance	59,425%
Cronbach's alpha	0,877
Extraction Method: Principal Component Analysis, 1 component extracted	

The Scale of Tendency to Drop out

Dropping-out behaviour was measured with 4 items. Seven-point Likert scale was used: (1: Completely disagree; 7: Completely agree) Two of them were reverse coded and removed from the scale due to decreasing total variance coverage ratio and reliability of the scale. Values of inter-item correlations are significant ($p < 0,05$). Cronbach's alpha value of the scale of the tendency to drop out was determined as 0,810 and assumed as adequate (Ural and Kilic, 2013). The total variance coverage ratio is 84,102%. Values of Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO= 0,50) and Bartlett's Test of Sphericity (0.000; sig. < 0,05) were adequate for the factor analysis (Hair et al., 2014). Relatedly, the requirement for the acceptable minimum level of KMO (0,5 < KMO < 1) (Le et. al., 2020; Kaiser, 1974; retrieved from Samir et. al, 2022) for the sample size around 100 - 200 (Shrestha, 2021) was considered. Additionally, some researchers (Silverstone et. al., 2002, Forsell et. al., 2019, Kraepelien et. al., 2021 etc.) developed the scale with 2 items and determined the scale as a working tool for the measurement. The scale of the tendency to drop out was applied with two items in this research with regard to the high level of reliability (0,810), total variance explained (84,102%) and acceptable values of KMO and Bartlett's Test of Sphericity,

The items are (1) I am thinking of dropping out of higher education, (2) I am thinking of suspending my studies (temporarily stopping) my higher education (factor loadings: 0,917; Eigenvalue: 1,682; Extraction Method: Principal Component Analysis). The item related to the school suspension was added to the scale based on the findings of interviews with students with disability and the significant relationship between suspension and increasing dropping-out behaviour (States et. al., 2005). According to the descriptive analysis, the mean of the tendency to drop out is 2,11 (mostly disagree).

Hypothesis Tests

Effect of Academic Self-efficacy on Tendency to Drop out

The results of correlation and simple regression analysis show that there is no significant relationship between academic self-efficacy and tendency to drop out ($p = 0,300 > 0,05$). H_1 hypothesis is rejected.

Effect of Academic Self-efficacy on Satisfaction of Students with Disability

The results of correlation analysis and Simple linear regression analysis show that there is a positive and strong significant relationship between academic self-efficacy and satisfaction (Pearson Correlation=0,808; $p = 0,000 < 0,01$). [$f_{(1,121)} = 228,301, p < 0,01$]; H_2 hypothesis is accepted. Based on the simple regression model ($Y = a + bx$), unstandardized coefficients, and mean of academic self-efficacy of this research (5,5366; between slightly and *mostly high*), the regression equation for the satisfaction of students with disability is $0,100 + 0,966(5,5366) = 5,44835$. The participants are close to *slightly satisfied* (=5). Academic self-efficacy explains satisfaction at 65% (adjusted $R^2 = 0,651$). One unit standard deviation in academic self-efficacy causes differentiation in satisfaction of students with disability at 80% ($\beta = 0,808$).

Hierarchical Effects of Sub-dimensions of Academic Self-efficacy on Satisfaction of Students with Disability

Hierarchical multiple regression analysis was made to determine how each dimension of academic self-efficacy affects the satisfaction of students with disability gradually. According to the correlation analysis, there are moderate and strong correlations between all the variables ($p < 0,01$). "Self-efficacy in emotional well-being" has the highest correlation ($r = 0,713$) with satisfaction. "Self-efficacy in training" has the lowest correlation ($r = 0,585$) with satisfaction.

As seen in Table 3, the dimension of self-efficacy in emotional wellbeing has a significant contribution to the regression model 1 ($f_{(1,121)} = 125,345, p < 0,01$) that one unit standard deviation in self-efficacy in emotional wellbeing causes 71% differentiation ($\beta = 0,71$) in satisfaction. Self-efficacy in emotional well-being explains the total variance of satisfaction with 50% (Adjusted $R^2 = 0,505$) and makes a high (significant) contribution to the satisfaction.

In model 2, self-efficacy in technique explains additional variance at 16% (R^2 change [R^2] = 0,160) in satisfaction. This differentiation in R^2 is significant ($f_{(2, 120)} = 125,129, p < 0, 01$). One unit standard deviation in self-efficacy in technique causes differentiation in satisfaction at 46% ($\beta = 0,460$) and this dimension secondly makes the highest significant contribution to the satisfaction.

In model 3, self-efficacy in communication explains additional variance at 1, 6 % (R^2 change [R^2] = 0,016) in satisfaction. This differentiation in R^2 is significant ($f_{(3, 119)} = 89,179, p < 0, 01$). One unit standard deviation in self-efficacy in communication causes differentiation in satisfaction at 17% ($\beta = 0,178$).

In model 4, self-efficacy in training causes differentiation at 0, 1 % (R^2 change [R^2] = 0,001) in the satisfaction, but this differentiation is not significant considering Sig. F Change ($=0,603 > 0, 05$). However, all the dimensions of academic self-efficacy (in model 4) explain the satisfaction of students with disability at 68% (Adjusted $R^2 = 0,682$; $p < 0, 01$). Based on the unstandardized coefficients in Table 3, the hierarchical regression equation is *Academic satisfaction of students with disability* = 0,306 + 0,371 (*self-efficacy in emotional wellbeing*) + 0,348 (*self-efficacy in technique*) + 0, 179 (*self-efficacy in communication*) + 0, 04 (*self-efficacy in training*). There is no multicollinearity in the hierarchical regression analyses of each model: Tolerance values of model 1, 2, 3, 4 $> 1 - R^2$, and the highest VIF value of model 1,2,3,4 is 2,313 < 10 .

Table 3. Results of Hierarchical Multiple Regression Analysis Between Dimensions of Academic Self-Efficacy and Satisfaction of Students with Disability

Model		B	Std. error	Beta (β)	R^2	Adj. R^2	R^2	Sig. Change	Sig. F Change	Sig.
1	^a Emotional wellbeing	0,586	0,05	0,71	0,509	0,505	0,509	0,000	0,000	*0,000
		0,402	0,04	0,49	0,676	0,670	0,16	0,000		
2	^a Emotional wellbeing									
	^a Technique	0,461	0,05	0,46				0,000	0,000	*0,000
3	^a Emotional wellbeing	0,380	0,04	0,46	0,692	0,684	0,016	0,000		
	^a Technique	0,354	0,07	0,35				0,000	0,014	*0,000
	^a Communication	0,197	0,07	0,17				0,014		
^b 4	^a Emotional wellbeing	0,371	0,05	0,45	0,693	0,682	0,001	0,000	0,603	*0,000
	^a Technique	0,348	0,07	0,35				0,000		
	^a Communication	0,179	0,08	0,16				0,03		
	^a Training	0,040	0,07	0,38				0,603		

Dependent Variable: Satisfaction, ^aPredictors (constant), * $p < 0, 01$; ^b constant=0,306

Effects of Academic Self-efficacy in Training, Technique and Communication on Academic Self-efficacy in Emotional Wellbeing

Hierarchical regression analysis revealed that academic self-efficacy in training (adjusted $R^2 = 0,28$; $\beta = 0,38$; $p < 0,01$) and technique (adjusted R^2 change = $0,4$; $\beta = 0,26$; $p < 0,01$) explains academic self-efficacy in emotional wellbeing. There is no significant contribution by academic self-efficacy in communication to the regression model. Academic self-efficacy in training made the most significant contribution to the regression model that one unit standard deviation in academic self-efficacy in training causes 38% differentiation in academic self-efficacy in emotional wellbeing.

Moderator Role of Socio-demographic Characteristics

As a result of hierarchical multiple regression analysis, there is no moderating effect of socio-demographic characteristics on the relationship between academic self-efficacy and satisfaction and the tendency to drop out behaviour of students with disability ($p > 0,05$). $H_{2,1}$ and $H_{3,1}$ hypotheses are rejected.

Effect of Satisfaction on Tendency to Dropping out Behaviour of Students with Disability

The results of correlation and simple regression analyses show that there is no significant relationship between satisfaction and tendency to drop out ($p = 0,259 > 0,05$). H_3 hypothesis is rejected.

Hierarchical Effects of Socio-Demographic Characteristics on Academic Self-efficacy of Students with Disability

Hierarchical multiple regression analysis was made to explain the effect of socio-demographic characteristics on academic self-efficacy (Table 4). There are significant correlations between academic self-efficacy and chronic illness ($r = 0,19$; $p < 0,05$), hearing disability ($r = -0,21$; $p < 0,05$), rate of disability ($r = -0,15$; $p < 0,05$), social sciences ($r = 0,23$; $p < 0,01$) and health sciences ($r = -0,22$; $p < 0,01$). There is a negative relationship between academic self-efficacy and hearing disability, rate of disability and health sciences. Aforementioned socio-demographic variables that have a significant correlation with academic self-efficacy were included in the hierarchical multiple regression analysis. Despite no moderating effect on the relationship between academic self-efficacy and satisfaction and the tendency to drop out the behaviour of students with disability.

Three models were revealed in hierarchical multiple regression analysis (Table 4). Model 1 which includes the effect of chronic illness and hearing disability on academic self-efficacy makes a significant contribution to the regression model ($f_{(2,120)} = 3,923$; $p < 0,05$). They explain academic self-efficacy at 4% (Adjusted $R^2 = 0,04$). One unit standard deviation in chronic illness causes differences at 13% ($\beta = 0,13$) in academic self-efficacy. One unit standard deviation in hearing disability causes negative differences at -16% ($\beta = -0,16$) in academic self-efficacy.

In model 2, the rate of disability explains additional variance with 4% ($R^2 = 0,04$) in academic self-efficacy. This differentiation in R^2 is significant ($f_{(3,119)} = 4,454$; $p < 0,01$). One unit standard deviation in the rate of disability causes negative differentiation in academic self-efficacy at -20% ($\beta = -0,20$). The rate of disability makes the lowest significant contribution to academic self-efficacy but increased the general level of R^2 value of Model 2.

In model 3, social sciences and health sciences (fields of study) explains additional variance with 7% ($R^2 = 0,07$) in academic self-efficacy. This differentiation in R^2 is significant ($f_{(5,117)} = 5,872$; $p < 0,01$). One unit standard deviation in the social sciences causes differentiation in academic self-efficacy at 15% ($\beta = 0,15$). One unit standard deviation in the health sciences causes negative differentiation in academic self-efficacy at -18% ($\beta = -0,18$). Social sciences and health sciences make the greatest significant contribution to academic self-efficacy. The socio-demographic variables explain academic self-efficacy at 14% ($R^2 = 0,14$).

Table 4. Results of Hierarchical Multiple Regression Analysis Between Socio-Demographic Characteristics and Academic Self-Efficacy of Students with Disability^a

Model		B	Std. error	Beta (β)	R ²	Adj. R ²	R ²	Sig. Change	Sig. F Change	Sig.
1	Chronic Illness	0,33	0,22	0,13	0,06	0,04	0,06	0,14	0,02	*0,02
	Hearing Disability	-0,51	0,29	-0,16				0,08		
2	Chronic Illness	0,34	0,22	0,14	0,10	0,07	0,04	0,12	0,02	**0,005
	Hearing Disability	-0,61	0,29	-0,19				0,03		
	Rate of (personal) Disability	-0,22	0,09	-0,20				0,02		
3	Chronic Illness	0,35	0,21	0,14	0,17	0,14	0,07	0,10	0,006	**0,000
	Hearing Disability	-0,61	0,28	-0,19				0,03		
	Rate of (personal) Disability	-0,19	0,09	-0,17				0,04		
	Social Sciences	0,35	0,20	0,15				0,08		
	Health Sciences	-0,75	0,36	-0,18				0,04		

^aDependent variable: Academic self-efficacy ; *p<0,05; **p<0,01

According to descriptive analysis students with 70% - 89% disability have the highest level of academic self-efficacy (mean=5, 88: mostly high). Students with 30% - 49% disability have the second highest level of academic self-efficacy (mean=5, 74: mostly high). Students with 90% -100% disability have the lowest level of academic self-efficacy (mean=4, 93: slightly high). The mean of academic self-efficacy is 5, 53 which is between slightly and mostly high. There is no significant relationship between gender, study areas (physical and social and natural sciences), physical disability and academic self-efficacy ($p > 0, 05$). H_4 hypothesis is partially accepted.

Hierarchical Effects of Socio-Demographic Characteristics on Satisfaction of Students with Disability

According to correlation analysis, there are significant correlations between satisfaction and chronic illness ($r = 0, 19$; $p < 0, 05$), hearing disability ($r = - 0, 15$; $p < 0, 05$), social sciences ($r = 0, 26$; $p < 0, 01$) and health sciences ($r = -0, 18$; $p < 0, 05$). There is a negative relationship between satisfaction and hearing disability and health sciences. The socio-demographic variables that have a significant correlation with satisfaction were included in the hierarchical multiple regression analysis.

2 models were revealed by hierarchical multiple regression analysis (Table 5). Model 1 includes the effect of chronic illness and hearing disability on the satisfaction of students with a disability that does not make a significant contribution to the regression model ($f_{(2,120)} = 2,952$; $p > 0, 05$). In model 2, fields of study (social science and health sciences) explain additional variance with 8% ($R^2 = 0, 08$) in satisfaction. This differentiation in R^2 is significant ($f_{(4, 118)} = 4,369$; $p < 0, 01$). One unit standard deviation in social sciences causes positive differentiation in satisfaction at 21% ($\beta = 0, 21$). One unit standard deviation in health sciences causes negative differentiation in satisfaction at -13% ($\beta = -0, 13$). Relatedly, fields of study came into prominence to predict satisfaction more than types of disability.

Table 4. Results of Hierarchical Multiple Regression Analysis Between Socio-Demographic Characteristics and Satisfaction of Students with Disability^a

	Model	B	Std. error	Beta (β)	R ²	Adj. R ²	R ²	Sig. F Change	Sig.
1	Chronic Illness	0,47	0,27	0,16					
	Hearing Disability	-0,35	0,35	-0,09	0,04	0,03	0,04	0,05	0,056
2	Chronic Illness	0,47	0,26	0,164					
	Hearing Disability	-0,35	0,34	-0,09					
	Social Sciences	0,60	0,25	0,21	0,12	0,09	0,08	*0,005	*0,002
	Health Sciences	-0,64	0,44	-0,13					

^aDependent variable: Satisfaction ; *p<0,01

There is no significant relationship between gender, rate of disability, physical disability, life sciences and satisfaction of students with disability ($p > 0,05$). H_5 hypothesis is partially accepted.

Effects of Socio-Demographic Characteristics on Tendency to Drop out of Students with Disability

Hierarchical multiple regression analysis was made to explain the effect of socio-demographic characteristics on satisfaction. A significant (negative) correlation was found between only gender (female) and the tendency to drop out ($r = -0,23$; $p < 0,05$). H_6 hypothesis is partially accepted. Gender (female) explains the tendency to drop out of students with disability at 4,5% (adjusted $R^2 = 0,045$; $f_{(1,121)} = 6,772$; $p < 0,01$). One unit standard deviation in gender (female) causes negative differentiation in the tendency to drop out at -23% ($\beta = -0,23$). Additionally, the regression analysis between gender (male) and tendency to drop out is significant ($p < 0,05$). Gender (male) explains the tendency to drop out at 5,3% (adjusted $R^2 = 0,053$). One unit standard deviation in gender (male) causes positive differentiation in the tendency to drop out at 23% ($\beta = 0,23$).

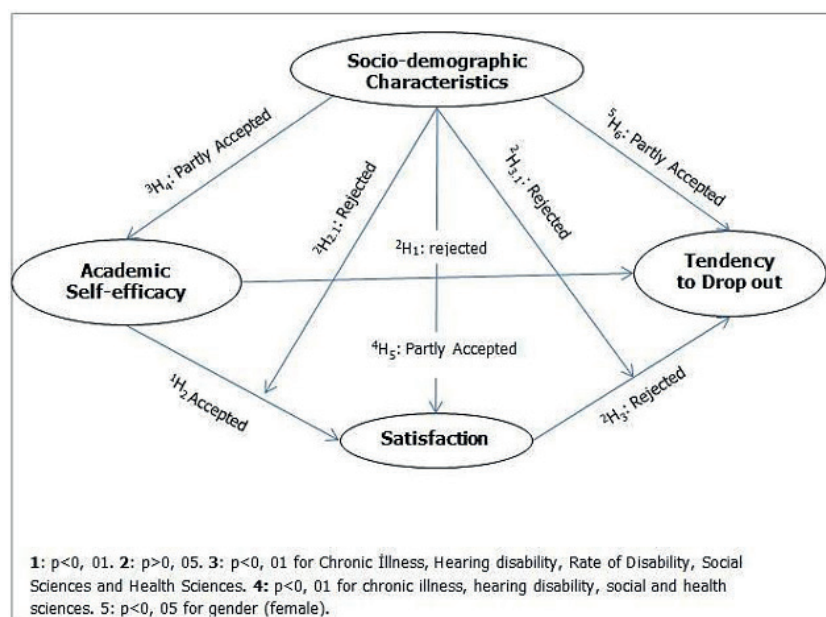


Figure 2. Research Model with Acceptance - Rejection Status of Hypothesis

DISCUSSION

Dissimilar to the literature (Jones et al. 2005; Fabio and Fabio, 2011), self-efficacy and satisfaction do not affect the tendency to drop out according to the findings of this research. This might be because of financial problems in Turkiye. Students with disability have difficulties finding a job after graduation and financial problems (Ataman et al., 2023). So, if they can be appointed as a result of the Public Personnel Selection Exam (PPSE), they drop out higher education since they see public positions guaranteed. Additionally, persons with disability are given priority to be appointed to the state staff.

Self-efficacy affects satisfaction in face-to-face (Coffman and Gilligan, 2002; Caprara et al., 2006) and online education (Shen et al., 2013; Hamdan et al., 2021) for students with disability (Smedema et al., 2022). Interaction with the instructor, classmates and ability to complete the online course are significant indicators of the satisfaction of students (Shen et al., 2013). Interestingly, *self-efficacy in learning* (understanding the online courses, uploading homework without problems, fulfilling the requirements of the course etc.) was determined as the least effective sub-dimension on satisfaction. The disability may cause feeling unsafe and uncomfortable in the learning environment (Afolabi, 2019). So, in distance education, the importance of self-efficacy in emotional well-being (e.g., being able to be comfortable and safe during distance education) was revealed. In this research, self-efficacy in emotional well-being is determined as the most significant predictor of satisfaction during distance education in the present research. Importantly, academic self-efficacy in training is the most significant indicator of self-efficacy of emotional well-being in all sub-dimensions of academic self-efficacy.

Inaccessibility in communication (e.g., fast speech and lack of sub-titles) causes the negative relationship between hearing disability and academic self-efficacy as mentioned by the student with hearing impairment in the (optional) open-ended question of the survey form. Yet, the academic self-efficacy of students with chronic illness was not affected as negatively as the students with hearing disabilities due to not having sensory or mobility disabilities. The rate of disability affects academic self-efficacy negatively and should be considered.

The reason behind the positive relation between social sciences and academic self-efficacy is not including practical courses that can make distance education more accessible or interactive. Some departments require intense practices, such as health-related and recreation departments, that make distance education difficult to understand. Additionally, working in hospitals during the pandemic can be exhausting for those in health-related departments. This seems to cause the negative effect of health sciences as a field of study on academic self-efficacy and satisfaction.

A very limited amount of research in the literature about the effects of fields of study, types of disability, and rate of disability on self-efficacy and satisfaction of the students with disability in higher education. The severity and visibility of disability affect the social self-efficacy of college students positively due to the inability to hide and necessity to be open about their disability (Blake and Rust, 2002). Dissimilarly, according to the present research, hearing disability is invisible but negatively affects academic self-efficacy. Chronic illness is invisible and positively affects academic self-efficacy, and the rate of disability affects self-efficacy negatively. The differences might be because of the difference between academic and social self-efficacy. Technical, communicational and emotional wellbeing-related factors are determined to be effective on academic self-efficacy in the present research. However, at one point, this study revealed that the students with a high rate (70%-89%) of disability have the highest level of academic self-efficacy parallel with findings of Blank and Rust, (2002) this can be due to flexibilities (e.g. education in the home environment) in distance education. However, the ones with the highest rate (90%-100%) of disability have the lowest level of academic self-efficacy.

Having the required information and handling things are related to higher self-efficacy for students with autism spectrum (Shattuck et al., 2012). Partly, similar to the present research, academic self-efficacy in emotional well-being, technique, and communication contributes to the satisfaction of students with disability in higher education. Similarly, Hampton and Mason (2003) did not find a significant relationship between gender and the self-efficacy of students with learning disabilities. Dissimilar to the research of Ashong and Commander (2012) and Holcomb et al. (2004) in online learning, there is no significant relationship between gender and satisfaction. This might be due to the sample characteristics of the present

study. Fields of study (social sciences and health sciences) come into prominence rather than gender to predict satisfaction for students with disability.

According to the present research, male students with disability tend to drop out more than female students with disability. According to the interviews with some female students, they find distance learning easier than face-to-face education during the pandemic due to participation in the courses from a comfortable and safe home environment. They do not need to carry heavy materials for the practical courses. Distance education ensures economic advantages and the opportunity to feel more family support at home. Supportively, engagement in high-risk behaviours (e.g. substance use) is an indicator of the tendency to drop out the behaviour of students with learning disabilities according to the research of Doren et. al. (2014). Matonya (2016) revealed that family support and accessibility in higher education are effective for the participation of female students with disability.

CONCLUSION AND IMPLICATIONS

In conclusion, this research contributes to the literature with three scales for students with disability in formal higher education considering distance (emergency remote) education experience during the pandemic with an eye to: (1) Academic self-efficacy, (2) satisfaction, and (3) tendency to drop out. The scales were applied to four different types of disability and may be adapted to specific types of disability. The importance of self-efficacy and its sub-dimensions on the satisfaction of students with disability in higher education came into prominence. Hierarchically, academic self-efficacy in emotional well-being, technique, communication and training are the parts of academic self-efficacy and effective on satisfaction. There are no moderating roles of socio-demographic factors in this relationship while some socio-demographic characteristics of students with disability are significant to predict academic self-efficacy, satisfaction and tendency to drop out one by one. Differently, the present research considered particularly education fields, types of disability, and rate of disability of students besides their gender during the analyses.

Practically, the scales of academic self-efficacy, satisfaction and tendency to drop out can be used regularly by advisors of students with disability in higher education. The developed scales additionally can be adapted to face-to-face education and a specific type of disability as well. Thus, authorities in higher education can have information about the level of academic self-efficacy, satisfaction and tendency to drop out behaviour of students with disability. This may help the authorities to take preventive measures for performance issues. Based on the results of this research, increasing emotional well-being of students with disability, accessible technical conditions, qualifying their communication (with instructors during and outside of course/exams as well as online accessible announcements), accessible training environment (e.g., online course without disconnection and with subtitles) affect positively both academic self-efficacy and their satisfaction. The rate of (personal) disability, the different requirements of fields of study and types of disability should be taken into consideration. The tendency to drop out by male students with disability should be considered as well. According to the results of the present research, students with hearing disabilities and chronic illness studying health sciences have a lower level of academic self-efficacy and satisfaction than the ones in social sciences. Accordingly, making regular interviews with those students about how to make them feel confident and motivated may help to increase satisfaction and academic self-efficacy and prevent them from leaving the study program. Departments that include practical courses should be intensely cared for in order to reduce the challenges. Students with disabilities who have experienced both distance and formal (face-to-face) education answered the questions of this research considering the temporary distance education period during the pandemic (emergency remote teaching). This experience lets them evaluate the questions from a comparative perspective (distance and face-to-face education). Accordingly, optional online courses came into prominence for students with disability to increase their participation in the course and prevent their absences caused by treatments. This option was particularly emphasized in answers to the open-ended question of the survey.

Limitations and Future Research

This research was able to be conducted with 123 students with disability. This is a limit for the present research. The determined scales can be applied to a larger sample size and this may allow the carrying out

of structural equation modeling and confirmatory factor analysis. The scales may be used for a comparative analysis of face-to-face and distance education, and/or students with and without disabilities. The factors or sources which are effective on the emotional well-being of students with disability, in addition to academic self-efficacy in training and technique, should be investigated more in the coming future due to being the most significant factor in satisfaction. The reasons that cause a negative significant relation between health sciences and academic self-efficacy of students with disability, and other related terms (self-esteem, motivation and risk perception etc.) are worth to be studied as well. The findings allow for searching ways to increase the self-efficacy and satisfaction of students with disability and achieving more inclusive higher education. The reasons for the tendency of students with disability to drop out and its differentiation by gender are still not completely clear and should be analysed considering socio-economic profiles of the countries and perceived financial risk as well.

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