

◆ **Research Article**

**Factors that Affect Usage of Educational Information Technologies by  
Children and Inequalities related with Such Usage**

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ABSTRACT

Usage of Information Technologies by children (6–15-year-olds) is increasing day by day. All schools have adopted online education after the breakout of the Covid-19 Pandemic. This new situation is affected by households' socioeconomic backgrounds. As there are inequalities among households via socioeconomic conditions that lead to education inequalities, the pandemic has exacerbated the existing inequalities related to education. From this point of view, it is crucial to examine the factors that affect the usage of information technologies and the Internet for educational purposes. This paper uses the 2013 Household Information Technologies Usage Survey (HITUS). We estimate the probability of using information technologies and the Internet for education with logistic regression. Age has the highest impact on increasing Internet use for teaching. Being a girl has a negative effect on using the Internet for education. Conversely, being a girl has a positive impact when we use only Internet users as the sample. This means that whenever a girl starts using the Internet, the probability of using it for education is higher for girls than for boys. Educational impact changes based on the sample used. Education increases lead to the rise for all, while it decreases when we use only Internet users. All the regions have a higher probability of using the Internet for education compared to the Southeast. However, regional impacts are changing. Istanbul and the West Black Sea region have the most significant changes in the probability while being in urban areas loses its effect whenever a child starts using the Internet.

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## **1 Introduction**

Widespread use of the Internet by educational institutions has led to changes in traditional educational methods. By learning via the Internet, individuals can save time, remove geographical limitations, and have access to information in less time and with lower costs. On the other hand, by providing education via the Internet, educational institutions can provide personalized education based on the needs and demands of students, less costly and easier. In addition to that, in early March 2020, the spread of the COVID-19 pandemic caused all universities and schools in Turkey to be closed. As a result of this, schools and universities have to use online education as a substitute for face-to-face teaching. This leads to the adaptation to the new situation. Most of the teachers and professors are not familiar with new technologies and methods for dealing with online education. Therefore, to improve the effectiveness of online education, not only educational institutions, teachers, and professors, but also policymakers should reorganize the education strategies and methods. During structuring online education, it is very important to learn the factors that affect individuals in using the Internet for educational purposes.

As stated in the UNICEF reports (UNICEF, 2020a; 2020b), the Covid-19 pandemic has exacerbated educational inequalities. The measures such as school closures taken by the authorities to control the spread of this virus have increased inequalities among the children in families with different socioeconomic conditions (UNESCO, European Commission, 2020). Most school-age children, especially ones in low-income families, have limited opportunities to access digital technologies such as the Internet, computers, and tablets. The UNICEF report (UNICEF, 2020c) stated approximately 31% of school-age children cannot attend distance education because they do not have access to digital technologies. The World Bank report (2021) revealed that Covid-19 pandemic leads to deteriorations in the system of education, and this aggravates educational inequalities. Besides, the studies analyzing the relationship between Internet usage and educational inequality exhibit that the Covid-19 pandemic causes deepened pre-existing social and educational inequality because of the disadvantages in accessing the technologies which are necessary for distance education. These studies also show that the learning opportunities of the children in families with low income are less than ones with high income (Jæger & Blaabæk, 2020; Dreesen et al., 2020; Jones et al., 2021).

In this paper, the Household Information Technologies Usage Survey (HITUS) for children, obtained from the Turkish Statistical Institute through the logit model<sup>3</sup> is used. We estimate the probability of using information technologies and the Internet for educational purposes with the explanatory variables: Childrens' characteristics (age, gender, education level, and, living area-Nuts1 level and urban-rural areas) and household characteristics such as the number of children under 15 years old in the household, house head's characteristics (gender, age, labor market situation) and income. Note that we take the logarithm of income to adjust for the nonlinear effect of extreme values of income. This paper contributes to the literature in terms of education reforms planned by policymakers.

Following this introduction, section 2 presents an overview of the literature review. Section 3 presents data and methodology. Section 4 introduces empirical results. Section 5 concludes the paper by providing some policy recommendations.

## **2 Literature Review**

There are various studies analyzing the determinants of the use of the Internet and digital technologies for educational purposes as one can see in Table 1 (Alkan et al., 2015; Chang et al., 2016; Correa et al., 2017; Alderete, 2019; Daoud et al., 2020; Martinez-Dominguez & Mora-Rivera, 2020; Zhao et al., 2022; Martinez-Dominguez & Fierros-Gonzalez, 2022)<sup>4</sup>. Chang et al. (2016) investigate the differences in Internet use between adolescents living in urban and rural areas in Taiwan. They exhibit that adolescents living in rural areas have a higher frequency of Internet use. Correa et al. (2017) indicate that age is the most important factor in Internet usage because the younger have greater chances to develop their skills. Besides, they show that level of educational attainment is the main driver of Internet use. Alderete (2019) shows that Internet use by children aged 3 to 18 living in low-income places in Argentina is affected by education, level of income, and geographic location. Martinez-Dominguez and Mora-Rivera (2020) revealed that the probability of Internet usage for entertainment purposes is higher for young people, although working-age

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<sup>3</sup> Note that, we are able to use only 2013 HITUS because this is the only year that the survey is conducted for children (6-15 year-olds) and the one which is available for researchers. In 2021 HITUS, there is also a module for children; however, it is not available for researchers yet.

<sup>4</sup> Table 1 shows the summary of literature review.

people use the Internet for information and communication purposes. Mertinze-Dominguez and Fierros-Gonzalez (2022) examine the determinants of Internet use for school-age children in Mexico. They find that the probability of Internet use for educational purposes among children depends on economic status, level of schooling, digital skills, and the existence of electronic devices in the household. Zhao et al. (2022) analyze the inequality of the outcomes between urban and rural students in terms of e-learning in China. They conclude that there are differences between urban and rural students, and e-learning self-efficacy, parental support, and intrinsic motivation are the most important factors in these differences.

Some studies investigate the effect of the Covid-19 pandemic on educational inequality in terms of distance learning (Ariyo et al., 2022; Korkmaz et al., 2022). Ariyo et al. (2022) state that the usage of WhatsApp online packages for distance learning plays an important role in school communication in Nigeria during the Covid-19 school closure. Korkmaz et al. (2022) indicate that an increase in Internet access declines educational inequality, and however the Covid-19 pandemic leads educational inequality to rise.

**Table 1.** Literature Review

Author(s)	Age Range	Country	Method	Findings
Martinez-Dominquez & Fierros-Gonzalez (2022)	6-17	Mexico	Heckman selection model	The probability of Internet use for educational purposes among children depends on economic status, level of schooling, digital skills, and the existence of electronic devices in the household
Chang et al. (2016)	12-15	Taiwan	Multiple regression analyses	There are differences between adolescents living in rural and urban areas.
Alderete (2019)	3-18	Argentina	Heckman selection model	The probability of Internet use of an individual, who lives in a region with low Internet access but medium use, is higher. adolescents living in rural areas have a higher frequency of Internet use.
Zhao et al. (2022)	Middle school students	China	ANOVA	E-learning self-efficacy, parental support and intrinsic motivation are the most important factors in differences between the urban and rural students.
Alkan et al. (2015)	6-15	Turkey	Logistic regression	The Internet usage of children in urban areas is more than the ones in rural areas. Besides, socioeconomic and demographic factors affect children's Internet usage.
Daoud et al. (2020)	Children and young people	World	A systematic review of literature	There is a more positive correlation between Internet usage and educational value.

Ariyo et al. (2022)	Primary and secondary school children	Nigeria	Regression analysis	School communication, household size, socioeconomic status, and income of parents are important for distance learning during the Covid-19 period.
Korkmaz et al. (2022)		OECD	Spatial panel data	An increase in the Internet access decreases educational inequality. The Covid-19 pandemic causes educational inequality to increase especially in the low-income families.
Martinez-Dominguez & Mora-Rivera (2020)		Mexico	Heckman selection model	Internet use patterns change based on demographic properties such as age, and educational level. Besides, working-age people use the Internet for information and communication purposes.
Correa et al. (2017)		Chile	Hierarchical logistic regression	Age, level of education, and social resources are the most important factors in determinants of Internet use. Besides, the existence of children in the household increases Internet use.

### 3 Data and Methodology

#### 3.1 Data

In this paper, we use the 2013 Information Technologies Usage Survey (HITUS). First of all, we merge the dataset for individuals (older than 15 years old) and the dataset for households by using household ids. Afterward, we append the dataset with the dataset for 6–15-year-olds. Therefore, we have information related to children, their parents, and also households in which they live. We examine the fact that there are some households with no children, so we exclude them from the sample. In addition to that, there are some households where only young individuals live. We also exclude these households from the sample. While creating the variable related to households' head characteristics, we choose the oldest one. If there are two individuals who are of the same age, we choose males as household heads. Then, we recode the ones whose education level is higher. The last recording criteria for household heads is choosing the one who is employed. In the end, we have 6994 observations from 29577.

Table 2 shows descriptive statistics for total girls and boys under 15 years of age. There are 6994 observations. For the total sample, the mean age of children is 10, and the mean age of household head is 44. The families have 2 children on average. 67.48% of household heads are employed. 41.72% of household heads are primary school graduates, 10.10% of them are secondary school graduates, 19.87% are high school graduates, and 6.7% of them are university graduates. 35.77% of households have a desktop, and 23.20% of them have a laptop. 40.43% of children under 15 use the Internet for educational purposes. 68.8% of them live in urban areas. The regions where children live and their percentages are distributed as follows: 11.11% in Istanbul, 3.56% in West Marmara, 8.8% in Aegean, 7.52% in East Marmara, 8.56% in West Anatolia, 11.3% in the Mediterranean, 6.34% in Central Anatolia, 5.71% in West Black Sea, 3.64% in East Black Sea, 7.8% in Northeast, 9.73% in Central East, and 15.8% in Southeast. As seen in Table 1, 39.65% of the girls under 15 use the Internet for educational purposes, while this ratio is 41.11% for boys. The ratio

of having a desktop computer is 33.88% for girls, while it is 37.48% for boys. Besides, 23.97% of the girls have laptops, while 22.51% of the boys have one.

**Table 2.** Descriptive Statistics

Definition	Variable	Total			Girls			Boys		
		obs	mean	Sd	Obs	mean	sd	obs	mean	Sd
Age of children	age	6994	10.162	2.576	3329	10.232	2.572	3665	10.099	2.579
Size of household	hhszise	6994	4.986	2.027	3329	5.057	2.024	3665	4.921	2.028
Age of household head	head_age	6994	44.656	10.430	3329	44.760	10.402	3665	44.562	10.456
Number of children under 15 age	n_hhchildunder 15	6994	2.055	1.112	3329	2.112	1.127	3665	2.003	1.096
Household head in employment	hhead_emp	6994	0.674	0.468	3329	0.676	0.467	3665	0.673	0.469
Female Household head	hheadF	6994	0.218	0.413	3329	0.214	0.410	3665	0.222	0.416
Household head with no diploma	hhead_nodip	6994	0.215	0.411	3329	0.214	0.410	3665	0.215	0.411
Household head with primary school	hhead_prim	6994	0.417	0.493	3329	0.410	0.492	3665	0.422	0.494
Household head with no diploma	hhead_sec	6994	0.101	0.301	3329	0.106	0.308	3665	0.096	0.294
Household head with secondary school	hhead_high	6994	0.198	0.399	3329	0.203	0.403	3665	0.193	0.395
Household head with university	hhead_uni	6994	0.067	0.250	3329	0.063	0.243	3665	0.070	0.256
Having a destop in hh	hh_destop	6994	0.357	0.479	3329	0.338	0.473	3665	0.374	0.484
Having a laptop in hh	hh_laptop	6994	0.232	0.422	3329	0.239	0.426	3665	0.225	0.417
Hh log income	lnincome	6992	6.956	0.822	3328	6.943	0.822	3664	6.968	0.822
Internet use for purpose of education	intfor_Edu	6994	0.404	0.490	3329	0.396	0.489	3665	0.411	0.492
Household living in urban	urban	6994	0.688	0.463	3329	0.681	0.465	3665	0.693	0.461
Household living in İstanbul	istanbul	6994	0.111	0.314	3329	0.115	0.319	3665	0.108	0.311
Household living in West Marmara	west_marmara	6994	0.035	0.185	3329	0.033	0.180	3665	0.037	0.189
Household living in Aegean	aegean	6994	0.088	0.283	3329	0.087	0.282	3665	0.088	0.284
Household living in East Marmara	east_marmara	6994	0.075	0.263	3329	0.076	0.265	3665	0.074	0.262
Household living in Anatolia	west_anatolia	6994	0.085	0.279	3329	0.081	0.273	3665	0.089	0.285
Household living in Meditterrian	mediterrian	6994	0.113	0.316	3329	0.108	0.311	3665	0.117	0.321
Household living in Central Anatolia	central_anatolia	6994	0.063	0.243	3329	0.063	0.243	3665	0.063	0.244
Household living in West Black Sea	west_blacksea	6994	0.057	0.232	3329	0.059	0.237	3665	0.054	0.227
Household living in East Blacksea	east_blacksea	6994	0.036	0.187	3329	0.034	0.182	3665	0.038	0.191
Household living in Northeast	northeast	6994	0.078	0.268	3329	0.085	0.279	3665	0.071	0.257
Household living in Central East	central_east	6994	0.097	0.296	3329	0.091	0.288	3665	0.102	0.303
Household living in Southeast	southeast	6994	0.158	0.364	3329	0.162	0.369	3665	0.153	0.360

### 3.2 Methodology

The logit model is used to analyze the determinants of the probability of Internet use for educational purposes. The logit model is a statistical model used to examine the relationship between binary response probability and independent variables (Trueck & Rachev, 2009). In this model, the

dependent variable is a binary variable taking the value 0 or 1, and it is defined as whether or not children (6-15 years old) use the Internet for the purposes of education. The relationship between the probability of the Internet usage and independent variables is estimated by using Maximum Likelihood Estimation (Singh, 2004).

The logit model is defined as follows (Davidson and MacKinnon, 1999):

$$P_i = \frac{1}{1 + e^{-(\beta x_i)}} \quad i = 1, 2, \dots, n \quad (1)$$

where  $Z_i = \beta x_i$

$$P_i = \frac{1}{1 + e^{-Z_i}} \quad (2)$$

Equation (2) is known as the cumulative logistic distribution function (Brooks, 2008). In the logit model, the probability of success (P) is not constant, and depends on X. In other words, it changes from an observation to another (Stock and Watson, 2003).

$$\left( \frac{P_i}{1 - P_i} \right) = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} \quad (3)$$

where  $(P_i/(1 - P_i))$  is the odds ratio. The odds ratio can be defined as the ratio of probability of an output to the other. If the natural logarithm of the odds ratio is taken, it is obtained as follows:

$$L_i = \log \left( \frac{P_i}{1 - P_i} \right) = \sum_{j=0}^k \beta_j X_{ij} \quad (4)$$

Equation (4) is a logistic transformation of the P probability. With this transformation, the logit model is linearized. As P goes from 0 to 1, the logit L goes from  $-\infty$  to  $+\infty$  (Gujarati, 2004).

#### 4 Empirical Results

Table 3 shows the estimation results of the probability of Internet usage for girls, boys, and all. First, we estimate the models by using the whole sample, and then, we estimate them by restricting the sample. We restrict the sample by including the kids who are using the Internet. Briefly, "ALL" refers for the whole sample, while "Internet Users" refers to only Internet users.

As it is seen from the results for all girls, an increase in age enhances the probability of using the Internet for education. This probability is higher for the children in secondary school, while it is lower for the children in vocational secondary school than the ones in primary school. When the number of children under the age of 15 rises, the probability of using the Internet for education decreases. An increase in the level of income enhances this probability. The probability of Internet usage for educational purposes by household heads with primary, secondary, high school, and university degrees are higher than household heads with no diploma. The children living in urban areas have a higher probability of Internet usage for education than those who live in rural areas. Similarly, this probability is higher for the children who live in North East, East Black Sea, West Black Sea, Central Anatolia, East Marmara, Aegean, and West Marmara regions and in Istanbul than those who live in South East. According to the results obtained for Internet-user girls, the probability of using the Internet for education rises when age increases. The probability of using the Internet for the education of a girl, who is a student in secondary, generally high, and vocational high school, is lower than the probability of a girl who is a primary school student. An increase in the number of children under the age of 15 decreases the probability of using the Internet for education. The probability of using the Internet for education for the children living in the West Black Sea, East Marmara, and Istanbul is higher than for those who live in the Southeast. The other variables do not have any significant effect on the probability of using the Internet for education.

According to the results obtained for all boys, an increase in age rises the probability of using the Internet for education. The children in secondary and general high school have a higher probability of using the Internet for education, while the probability is lower for boys in vocational secondary school than those in primary school. An increase in the number of children under the age of 15 decreases this probability. The level of income enhances the probability of using the Internet for education. Similarly, this probability is higher for household heads with primary, secondary, high school, and university degrees than the household heads with no diploma. The children living in urban areas have a higher probability of using the

Internet for education than those who live in rural areas. This probability is higher for the children living in the West Black Sea, East Black Sea, Central Anatolia, East Marmara, Aegean, West Marmara, and Istanbul than for those living in Southeast.

For the case of Internet-user boys, age has a positive effect on the probability of using the Internet for education, as well. The probability of using the Internet for education for the children in secondary and vocational secondary schools is less than for those in primary school. The household heads who have university degrees have a higher probability than household heads with no diploma. This probability is higher for the children living in Central East, East Black Sea, West Black Sea, Mediterranean, West Anatolia, East Marmara, Aegean, West Marmara, and Istanbul than those who live in Southeast.

The results obtained for all samples show that an increase in age rises the probability of using the Internet for education. The children in secondary and general high school have a higher probability of using the Internet for education than the ones in primary school. However, this probability is less for the children in vocational secondary school. When the number of the children under the age of 15 increases, the probability of using the Internet for education decreases. The income of the household head affects this probability positively. The household heads with primary, secondary, high school, and university degrees have a higher probability of using the Internet for education than the ones with no diploma. The probability of using the Internet for the education of the children living in urban areas is higher than the ones who live in rural areas. This probability is higher for the children living in East Black Sea, West Black Sea, Central Anatolia, Mediterranean, West Anatolia, East Marmara, Aegean, West Marmara and Istanbul than the children who live in Southeast.

According to the results for all Internet users, an increase in age enhances the probability of using the Internet for education. This probability is less for the children in secondary, vocational secondary, and general high schools than the ones in primary school. The children living in Central East, Mediterranean, West Anatolia, East Marmara, Aegean, West Marmara and Istanbul have a higher probability of using the Internet for education than those living in Southeast.

**Table 3. Probability of Using the Internet for Education**

	GIRLS				BOYS				TOTAL			
	All (Model1)		Internet Users (Model2)		All (Model3)		Internet Users (Model4)		All (Model5)		Internet Users (Model6)	
intfor_Edu												
Age	0.363***	(0.029)	0.626***	(0.075)	0.400***	(0.026)	0.499***	(0.051)	0.382***	(0.019)	0.537***	(0.042)
Secondary	0.337**	(0.134)	-0.644**	(0.296)	0.240*	(0.123)	-0.458**	(0.212)	0.272***	(0.090)	-0.488***	(0.171)
voc_sec	-1.020**	(0.485)	0.000	(.)	-0.977*	(0.564)	-2.235***	(0.784)	-0.998***	(0.367)	-2.003***	(0.686)
general_high	0.148	(0.401)	-1.855**	(0.885)	1.445**	(0.602)	-0.765	(0.812)	0.585*	(0.329)	-1.215**	(0.593)
voc_high	-0.521	(0.594)	-2.442**	(1.181)	0.000	(.)	0.000	(.)	0.379	(0.514)	-0.951	(1.064)
n_hhchildunder15	-0.271***	(0.051)	-0.219*	(0.113)	-0.251***	(0.048)	0.002	(0.094)	-0.261***	(0.035)	-0.084	(0.072)
hhead_emp	0.002	(0.134)	-0.522	(0.329)	0.048	(0.128)	-0.139	(0.237)	0.031	(0.092)	-0.236	(0.191)
Lnincome	0.517***	(0.099)	0.013	(0.138)	0.466***	(0.076)	-0.122	(0.140)	0.484***	(0.061)	-0.038	(0.099)
hhead_prim	0.711***	(0.161)	-0.341	(0.434)	0.328**	(0.146)	0.348	(0.300)	0.496***	(0.108)	0.153	(0.245)
hhead_sec	1.110***	(0.203)	-0.112	(0.539)	0.648***	(0.197)	-0.083	(0.338)	0.863***	(0.140)	-0.034	(0.286)
hhead_high	1.235***	(0.194)	-0.186	(0.477)	0.833***	(0.180)	0.359	(0.335)	1.016***	(0.131)	0.191	(0.273)
hhead_uni	1.399***	(0.279)	-0.537	(0.527)	1.386***	(0.247)	0.807**	(0.395)	1.382***	(0.185)	0.282	(0.311)
hheadF	0.352**	(0.147)	0.014	(0.332)	0.300**	(0.139)	0.168	(0.244)	0.330***	(0.101)	0.127	(0.195)
hhead_age	0.000	(0.006)	-0.021	(0.013)	0.001	(0.005)	-0.007	(0.010)	0.001	(0.004)	-0.011	(0.008)
Urban	0.433***	(0.115)	0.048	(0.268)	0.682***	(0.109)	0.022	(0.208)	0.559***	(0.078)	-0.017	(0.163)
central_east	0.227	(0.214)	0.511	(0.637)	0.062	(0.193)	1.072**	(0.421)	0.137	(0.142)	0.865**	(0.348)
Northeast	0.379*	(0.216)	0.281	(0.651)	0.108	(0.212)	0.399	(0.406)	0.243	(0.151)	0.337	(0.337)
east_blacksea	0.925***	(0.253)	-0.469	(0.520)	1.053***	(0.242)	1.379***	(0.440)	0.976***	(0.175)	0.591*	(0.328)
west_blacksea	1.130***	(0.229)	1.393**	(0.637)	0.864***	(0.219)	1.118***	(0.379)	0.985***	(0.158)	1.136***	(0.313)
central_anatolia	1.051***	(0.211)	-0.060	(0.445)	0.776***	(0.219)	0.477	(0.320)	0.905***	(0.152)	0.277	(0.255)
Mediterranean	0.788**	(0.184)	0.100	(0.437)	1.013***	(0.171)	1.125***	(0.297)	0.907***	(0.124)	0.752***	(0.238)
west_anatolia	0.902***	(0.203)	0.412	(0.448)	1.057***	(0.194)	1.550***	(0.326)	0.980***	(0.140)	1.136***	(0.257)
east_marmara	1.433***	(0.201)	0.963**	(0.480)	1.399***	(0.187)	0.963***	(0.290)	1.408***	(0.137)	0.917***	(0.240)
Aegean	1.267***	(0.198)	0.020	(0.425)	1.318***	(0.191)	0.762**	(0.300)	1.292***	(0.137)	0.457*	(0.235)
west_marmara	1.593***	(0.287)	-0.467	(0.487)	1.803***	(0.252)	1.292***	(0.361)	1.702***	(0.188)	0.568**	(0.278)
Istanbul	1.478***	(0.189)	0.909**	(0.429)	1.247***	(0.184)	1.443***	(0.299)	1.360***	(0.132)	1.242***	(0.238)
Girl												
_cons	-9.404***	(0.780)	-2.391	(1.475)	-9.235***	(0.620)	-3.322***	(1.145)	-0.115*	(0.061)	0.513***	(0.112)
N	3093		1460		3389		1780		6496		3263	
Aic	3144.107		833.736		3417.006		1385.287		6543.581		2212.282	
Bic	3307.104		971.177		3576.342		1527.880		6733.391		2382.814	
Ll	-1545.054		-390.868		-1682.503		-666.643		-3243.790		-1078.141	
chi2type	Wald		Wald		Wald		Wald		Wald		Wald	
chi2	662.853		154.825		810.218		203.628		1457.016		326.259	
P	0.000		0.000		0.000		0.000		0.000		0.000	
Rho												
p_c												

Standard errors in parentheses, \*\*\* Significant at the 1% level; \*\* significant at the 5% level \*significant at the 10% level. Robust Standard Errors )

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Base: Male, Primary, South East Region, Rural, Hhead\_nodiploma

Table 4 shows the changes in probabilities for model 6. This table helps us to easily read the probability changes when there is a change in the explanatory variable. The first column shows the probability changes while the explanatory variable increases from min to max. The second column represents the change in probability when there is a change from 0 to 1. Increasing age by one year leads to an increase of 0.01 points in probability. Being a girl increases it by 0.11 points. Being in secondary, vocational secondary, general high, or vocational high schools causes decreases of 0.07, 0.19, 0.20, 0.12 points in probability, respectively. The number of children under 15 decreases by 0.014 points. The household head's being employed leads to a decrease by 0.04 points. Being a household head with a primary, secondary, high school, or university degree leads to increases of 0.041, 0.003, 0.053, and 0.071 points in probability, respectively. Living in urban areas causes an increase by 0.009 points in probability. Living in Central Asia, Northeast, East Black Sea, West Black Sea, Central Anatolia, Mediterranean, West Anatolia, East Marmara, Aegean, West Marmara, and Istanbul, respectively, cause rises by 0.19, 0.09, 0.15, 0.28, 0.05, 0.16, 0.24, 0.21, 0.08, 0.11 and 0.27 points in probability.

To sum up, age has the highest impact on the increase in the use of the Internet for education. Being a girl has a negative effect on the use of the Internet for education, while, on the other hand, being a girl has a positive effect when we use only Internet users as the sample. This means that whenever a girl starts using the Internet, the probability of using it for education is higher than a boy. There is another important finding regarding education level. Educational impact changes concerning the sample used. As the level of education increases, it leads to an increase in the probability of the use of the Internet for all; however, it decreases when we use only Internet users. All the regions have a higher probability of using the Internet for education compared to the Southeast region while being in urban areas loses its effect whenever a child starts using the Internet. There is an interesting finding related to household income: as income increases, using the Internet for education increases; on the other hand, this result is the opposite for Internet users. Due to the fact that a child needs to have a laptop or desktop for using the Internet, the probability of using the Internet for education is more likely to have a relationship with having a desktop or a laptop. However, if a child is already using the Internet, then, as the income increases, s/he will be more likely to use the Internet for other reasons (not for education).

**Table 4.** Changes in Probabilities for Model 6

	min->max	0->1	TOTAL		MargEfct
			Internet users		
			+1/2	+sd/2	
Age	0.711	0.010	0.094	0.230	0.094
Girl	0.108	0.108	0.097	0.048	0.097
Secondary	-0.071	-0.071	-0.080	-0.039	-0.080
voc_sec	-0.191	-0.191	-0.300	-0.040	-0.305
general_high	-0.200	-0.200	-0.326	-0.077	-0.333
voc_high	-0.0129	-0.129	-0.164	-0.020	-0.165
n_hhchild~15	-0.0661	-0.014	-0.014	-0.011	-0.014
hhead_emp	-0.0430	-0.043	-0.045	-0.020	-0.045
Lincome	-0.091	-0.008	-0.007	-0.005	-0.007
hhead_prim	0.041	0.041	0.039	0.019	0.039
hhead_sec	0.003	0.003	0.003	0.001	0.003
hhead_high	0.053	0.053	0.050	0.022	0.050
hhead_uni	0.070	0.0707	0.065	0.020	0.065
hheadF	0.023	0.023	0.022	0.008	0.022
hhead_age	-0.086	-0.002	-0.001	-0.016	-0.001
Urban	0.009	0.009	0.008	0.003	0.008
central_east	0.194	0.194	0.164	0.036	0.165
Northeast	0.097	0.097	0.088	0.017	0.088
east_blacksea	0.150	0.150	0.131	0.025	0.131
west_blacksea	0.280	0.280	0.229	0.053	0.231
central_anatol	0.059	0.059	0.055	0.014	0.055
Mediterrian	0.168	0.168	0.145	0.046	0.145

west_anatol	0.247	0.247	0.204	0.063	0.206
east_marmara	0.213	0.213	0.179	0.055	0.180
Aegean	0.098	0.098	0.089	0.028	0.089
west_marmara	0.115	0.115	0.102	0.023	0.103
Istanbul	0.276	0.276	0.226	0.081	0.228
<i>N</i>	3553				

## 5 Conclusion

In this paper, the Household Information Technologies Usage Survey (HITUS) for children, obtained from the Turkish Statistical Institute, is used. The probability of using information technologies and the Internet for the purpose of education with explanatory variables is estimated. As we have found, age, the level of education, the number of children under the age of 15, and living in West Black Sea, East Marmara, and Istanbul significantly affect the probability of using the Internet for education for girls who are Internet users. Similarly, age, the children's being in secondary and vocational secondary schools, household head with a university degree, living in Central East, East Black Sea, West Black Sea, Mediterranean, West Anatolia, East Marmara, Aegean, West Marmara and Istanbul have significant impacts on the probability of Internet use for boys who are Internet users.

Briefly, age has the highest impact on the increase of the probability of using the Internet for education. Being a girl has a negative effect on the probability of using the Internet for education, while, on the other hand, being a girl has a positive effect when we use only Internet users as the sample. This means that whenever a girl starts using the Internet, the probability of using it for education is higher than for boys. For the case of education, the level of educational impact changes concerning the sample used. As education increases, it leads to an increase in the probability of using the Internet for education for all; however, when we use only Internet users, the probability decreases. All the regions have a higher probability of using the Internet for education, compared to the Southeast, while being in urban areas loses its effect whenever a child starts using the Internet. When income increases, using the Internet for education increases, but this result is the opposite for Internet users.

From these results, it can be concluded that using only financial subsidies to encourage children to use the Internet will not lead to an increase in the use of the Internet for educational purposes. Therefore, other mechanisms should be used if the aim is to increase the use of the Internet for educational purposes. These mechanisms may be put in place through training and workshops about the advantages of online education aimed at children. However, during the Covid-19 Pandemic, online education methods started to be utilized. All schools and universities have adopted online education after the Covid-19 Pandemic. To examine the impact of the Pandemic on the use of the Internet for education and to compare their findings with the ones in this research, we need to conduct another research which also includes the data after Covid-19 Pandemic.

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