Intra and Intergenerational Digital Divide through ICT Literacy, Information Acquisition Skills, and Internet Utilization Purposes: An Analysis of Gen Z

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***Abstract*- The aim of this study is to measure and assess information and communications technology (ICT) literacy and information acquisition skills of high school students and their parents, and to determine factors associated with different levels of ICT literacy and information acquisition skills. Within the scope of the study, a measurement model was developed to examine the ICT literacy from technical and cognitive aspects. A framework for assessing information acquisition skills was proposed in order to distinguish cognitive capabilities from technical ones and to conduct comparative analysis. Besides, ICT literacy levels for students and parents were analyzed based on different criteria and significant differences were explored. ICT literacy and information acquisition scores of students and parents were compared and differences were demonstrated. Further, Internet utilization purposes for students and parents were examined and presented.**

Keywords **– ICT literacy, digital literacy, information, digital divide.**

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1. Introduction

Socio cultural, technological, demographical and environmental factors constituting remarkable influencers of social change amend the way how people live. Along with the social change, skills, knowledge and capabilities required for new generations to be a part of the society shift as well. Nowadays, technological developments, globalization, proliferation of information and communications technologies, numerous applications in a wide range of fields have impacted the community life and its dynamics profoundly. Changing requirements of society and individuals, and the notable influence of technology on community life necessitate effective utilization of these technologies. High school education bridging the gap between primary education and university, encompasses a critical period by constituting a foundation for the university education. High school education also provides guidance for concerting the career path by shaping university preferences. Knowledge, skills and other achievements gained at this age should be in concordance with the changes in the world and should be of global quality. It is necessary to determine and develop skills for using information technologies and acquiring information effectively, which are among the most important skills of the age. In addition, it is essential to identify the differences and to examine the reasons behind. High school education, which is considered as a pre-university education, includes a period that requires acquisition and development of knowledge and experience before the university. In order to train the workforce that develops and innovates in the field of science and technology, special emphasis should be put on high school education.

[1] noted that nowadays most of the US job positions necessitate skills in information technologies. The STEM (Science, Technology, Engineering, Mathematics) movement which was

introduced for this purpose all over the world was rapidly embraced and the applications became widespread. In this context, it is aimed to provide science and technology education, to achieve acquisition of information skills and to enhance the interest of students in the field of science and technology [2]. This area draws attention to the skills needed in the 21st century, with special importance given to donate both students and teachers with STEM skills.

Individuals who have achieved a certain level of competence in effective use of information technologies are described as ICT literate. [3] stated that information literacy means "to be aware of information as a necessity, to be able to effectively determine its existence and location, to have access to information, to organize and to evaluate it". Developments in science and technology and recently developed products, require good communication between science community and society. As a matter of fact, the European Union aims to educate technology literate individuals with executing appropriate policies [2]. High school students of today who are born after 1995, known as Generation Z, born into technology, and on average they consume minimum three hours a day on Internet. Most of them were introduced at a very young age with mobile phones and tablets, which had an impact on their computer and Internet skills. These shaping events make traditional education efforts and other conventional approaches useless in the case of Gen Z [4]. In order to know more about them, their varying degrees of ICT literacy and information acquisition skills, and their preferences should be examined. It is important to explore factors causing intragenerational differences. Within this framework, it is required to determine the scope of the ICT literacy competencies of the age, to make measurements and evaluations in accordance with this scope, and to produce the necessary strategies in the light of the obtained results. As a consequence, applications and improvements can be integrated to the existing curriculum for bringing up generations who are capable of competing globally and adapting to the recent technological environment.

Gen Z, is largely raised by Gen X parents whose attitudes, values and habits are very different. Even though they are interested in traditional media including newspapers, TV, magazines and radio, they are familiar with digital environment and they spend time on social media as well. They conduct some research and activities online. However, they perform a limited amount of transactions online. Raising their children with assessing their skills, capabilities, tendencies, providing appropriate guidance and satisfying their requirements are among their goals [4]. Parents' responsibility in career planning, tracking of academic success of their children and taking precautions regarding the dangers of the virtual world is critical. The quality and effectiveness of the support provided by parents in growing up individuals who have caught up the age of information and communication should be increased. Therefore, it is necessary to take the level of the ICT literacy of parents into account as well, in order to maintain the gain of the essential skills in the non-school environment and to prevent disadvantaged groups stemming from intrafamilial socio-cultural, economic or other factors. The implementation of effective action plans depends on the analysis of ICT literacy and information acquisition skills of parents in addition to students'. Investigating students' and parents' purposes for the use of Internet and exploring their areas of interest are expected to contribute to take measures for meeting the requirements.

2. Literature Review

There are differences in the utilization of a particular terminology for defining the extent of digital technology capabilities. Various concepts and definitions such as information, information and communications technology literacy, network literacy, digital literacy and 21st century skills are used within this domain. 21st century skills incorporate learning, innovation, life, career, information, media and technology skills. These capabilities, which are closely associated with the digital technology, are considerably required in the 21st century [5].

Beside these well-known concepts, concepts of media literacy and new media literacy were also introduced to describe the skills required to get the advantage of digital technology and media [6]. In addition to terminology, assessment methods and tools developed for this purpose show versatility as well.

2.1. Concepts of Information Literacy, Digital Literacy and ICT Literacy

Information literacy means individuals ability of understanding their own information requirements, evaluating information quality, accessing, exploring and utilizing information efficiently [7].

Definition of computer literacy alters according to different researchers. Based on a particular definition computer literacy means possessing knowledge about features of computers and applications and making use of this knowledge so as to utilize computer applications in an effective manner [8]. Recently, substantial changes in information and communications technologies have influenced the

alteration of the computer literacy concept. Gilster pointed out that these changes have led the conceptualization of the word "literacy" from different view of aspects and concepts such as information technologies literacy, digital literacy, online literacy and network literacy have come out [8].

[9] indicated that ICT literacy has become the most important literacy of the age after the emergence and diffusion of information technologies. ICT literacy means using technology for accessing information and using it effectively. Usage of technologies including Internet, world-wide-web (www) and e-mail to search for information and communicate is closely linked with ICT literacy [10].

According to [11], ICT literacy is the utilization of digital technology, communication mechanisms and networks in order to access, manage, arrange and discover new information sources. ICT literacy defines at what extent individuals cope with digital technology including smart phones, computers and tablets [12] and within the 21st century framework ICT literacy includes skills for addressing digital information, communication and knowledge problems [12].

In 2001, International ICT Literacy Panel that come together with the initiative of Educational Testing Services (ETS) developed a tool assessing ICT literacy for the implementation at schools and various work places. ETS aimed to provide a framework for potential future studies, which are associated with wide-scale international applications in an attempt to evaluate educational processes and ICT literacy of adults. This ICT literacy assessment framework combined both technical and conceptual skills for the assessment [11] and the approaches considering both technical and conceptual sides of ICT literacy have been used by a substantial number of evaluation mechanisms developed for students [13].

A number of tests proposed by the relevant literature focus on to assess the ability of students in terms of investigating, retrieving and assessing digital information in addition to technical skills [6].

This blended approach requires handling information literacy and digital literacy alltogether. Even though various terminologies and definitions regarding digital literacy exist, mainly digital literacy is associated with the Internet and computer literacy. In this sense, ICT literacy can be considered as an umbrella term encompassing information literacy, computer literacy and Internet literacy [14].

2.2. ICT Literacy Studies in the Field of Education

[15] indicated that although students of today are capable of using Internet and technology, they cannot use technology in an effective manner in the case of conducting research and accessing information.

Related with this issue, [16] argued that ICT literacy's position should be between the idea of information literacy and technology literacy as a bonding concept. This kind of hybrid assessment approaches specifically emerged with student involved ICT assessment studies [11].

At Purdue University after revealing ICT literacy levels of students by means of implementing a measurement tool on first year students, teaching & education requirements of students were discovered, and appropriate ICT applications needed to be integrated with course contents were identified [17]. [16] used the same tool at 30 U.S. universities to investigate the validity of the tool and aimed to reveal supportive findings for studies associated with the enhancement of ICT literacy. OECD's initiative of "International Assessment of Adult Competencies (PIAAC)" consists of a wide-scale survey and an applied assessment mechanism, which assesses literacy, mathematical skills, problem solving and computer skills of adults in a technology intense environment [18].

"IEA International Computer and Literacy Study (ICILS)", "Programme for International Student Assessment (PISA) Digital Reading Assessment" and "Assessment and Teaching of 21st Century Skills (AT21CS)" are among other wide-scale studies focusing on ICT literacy [19].

[20] evaluated the ICT literacy of middle grade students by means of an instrument called "Student Tool for Technology Literacy". Assessment was dependent on performance based tasks examining skills for manipulating a file, using word processor, conducting research by means of a flowchart, demonstrating creativity, using graphics, videos, communicating through browsers, thinking critically and digital citizenship [20].

[21] employed "Learning in Digital Networks, ICT Literacy Test" for examining ICT literacy of students based on their actual real-time performance. While the ICT literacy level of students increased by the level of socioeconomic status, no gender based differences was detected. Moreover, relationship of ICT literacy with academic goals, self-efficacy, perceived usefulness of ICT and collective efficacy was examined. Results revealed significant link of ICT literacy with factors compromising self-efficacy and academic goals of the students [20].

In addition to performance-based tests, a significant number of research utilized the measures of ICT self-efficacy to evaluate ICT literacy. According to Papastergiou, ICT self-efficacy is assessed through one's own perceptions regarding his / her own skills regarding the computer and Internet usage [22].

[22] assessed primary school students' self-efficacy in terms of digital information processing and communication and investigated its link with the actual performance in ICT usage. ICT self-efficacy was positively related with students' actual ICT skills, whereas results indicated a negative relationship between ICT self-efficacy and ICT experience. [23] studied on ICT self-efficacy as well, and it was discovered that variations in the ICT levels can be explained by factors including technology experience, socioeconomic characteristics and autonomous learning. ICT self-efficacy was also positively linked with the computer and information literacy. Regarding the computer and information literacy, the most significant indicator causing differences was the socioeconomic status [23].

Model of media attendance which is defined as a social cognitive theory regarding the Internet utilization was adopted by [24]. The concept defined as ICT motivation inventory aimed to predict the ICT literacy by incorporating motivational and meta-cognitive aspects of ICT utilization [24]. For the purpose of assessment of university students' ICT literacy, [8] developed a scale compromising four sub-scales; computer operations, applications-software, internet skills and www skills. [14] evaluated ICT literacy of secondary school students by measuring their information literacy (information), Internet literacy (communication) and computer literacy (technology). [25] investigated ICT literacy of students based on a set of demographical factors. Results demonstrated digital gap among different types of schools with revealing differences based on gender, socio-economic status and ethnicity. The major findings of the study presented that students with higher socioeconomic status, female students and white students had higher levels of ICT literacy than the other students did.

[26] conducted a study on the ICT literacy of undergraduate students through a model integrating ICT utilization, cognitive processes and literacy tasks including reading and writing skills. Based on analysis, researchers stated that this 4-factor structure was sufficient for the proposed ICT literacy scale. Outcomes of the ICT literacy in terms of academic, personal and social achievements were evaluated and positive relationships were discovered between ICT literacy and self-reported gains of students [26].

[27] investigated students' access to ICT and their levels of ICT literacy based on demographical properties, socioeconomic status and democracy consciousness. According to the results, students generally had mid-level of ICT literacy and democracy consciousness had no correlation with ICT literacy. There was a meaningful relationship between access to ICTs and parameters such as gender and geographical region. [28] investigated the digital diversity of secondary school students and explored that factors including average grades, cultural capital, self-efficacy and language integration were significantly associated with the digital competence of students. [29] investigated the students' ICT usage patterns. Different ICT utilization profiles were explored, and factors such as self-efficacy, enjoyment, interest on ICTs and background characteristics were found associated with the user profile that a particular student belongs to.

Literature encompasses ICT literacy studies conducted on adults, as well. For instance, [13] analyzed ICT literacy of trainee teachers from both cognitive and technical aspects. Again a study performed by [30] focused on the ICT literacy of teachers' and explored significant differences among men and women in terms of technical capabilities. Men demonstrated higher levels of self-confidence than women in using ICTs, while no meaningful difference was observed in terms of general cognitive skills between men and women. [31] investigated the relationship between Internet skills and factors including gender, age and education. Researchers discovered that these factors were highly influential in causing inequalities in terms of Internet skills, and Internet usage capabilities diminished by getting older. Adults with higher level of education presented higher level of Internet skills. One another finding of the study revealed that men had greater means in all categories of Internet skills than women [31].

Despite the existence of a considerable number of research that investigated the ICT usage and its relationship with background characteristics and academic achievement, evidences represented a confusing picture regarding the impact of these variables. ICT utilization, its measurement and conceptualization is complicated. ICT utilization and its link with ICT capabilities should be evaluated by taking into account the context for which the ICTs are utilized [29]. [12] also mentioned the inconsistent research outcomes with regard to determinants of ICT literacy. Depending on these arguments, this study focuses to explore factors behind different ICT levels within a developing country context.

3. Methodology

3.1. Purpose and Scope

The main aim of this research is to evaluate the ICT literacy and information acquisition skills of high school students and their parents, and to examine differences according to pre-defined factors. Within this framework, goals of this research can be summarized as follows;

1) To examine the technical side of the ICT literacy of high school students and their parents according to computer literacy (basic skills and office skills) and Internet literacy (Internet skills) and to examine the cognitive side of the ICT literacy according to information literacy (information acquisition skills)
2) To analyze and demonstrate differences between high school students in terms of ICT literacy (computer & Internet literacy) and information literacy based on the variables of school type, gender, academic success and the level of study
3) To analyze and demonstrate differences between parents of students in terms of ICT literacy (computer & Internet literacy) and information literacy based on the variables of school type, gender, occupation and income
4) To perform comparative analyses in terms of ICT literacy (computer & Internet literacy) and information acquisition skills for different gender groups among students and parents
5) To analyze and demonstrate differences based on gender in terms of Internet utilization purposes of students and parents
6) To investigate the purposes for Internet utilization of students and parents, and to examine their link between ICT literacy (computer & Internet literacy) and information acquisition skills

3.2. Data and Sample

Universe of this study was the Serdivan district of the city of Sakarya in Turkey and five different types of schools in Sakarya were studied as a sample. A total of 1000 questionnaires were distributed to 9^{th}-10^{th}-11^{th} and 12^{th} grade students in those high schools and a total of 2000 questionnaires were distributed to their parents, and 477 students and 883 parents responded the questionnaire. At the time of the application, as general success score for the grade 9 students could not be provided, these students were evaluated based on their Entrance to High School Exam (TEOG) scores. On the other hand, 10^{th}, 11^{th} and 12^{th} grade students were analyzed according to previous years' average success scores.

3.3. Measurement Tool

The scale used to measure the concept of ICT literacy was developed from scales, which evaluated ICT literacy from both cognitive and technical aspects [14], [30]. ICT literacy was assessed based on basic skills, office skills and Internet skills. Information acquisition skills, which refer to information literacy were evaluated separately for comparison. From this aspect, measurement tool was based on the scales from the relevant literature, which assessed the technical side of ICT literacy with computer and Internet literacy, and the cognitive side with information literacy [14].

3.4. Analysis Plan

When assessing the ICT literacy score, basic skills, office skills and Internet skills that represent the technical aspect of the ICT literacy were taken into account. Cognitive side of the ICT literacy represented by information acquisition skills was evaluated separately and comparisons were performed. In this manner, comparison was between computer-Internet literacy (technical side) and information literacy (cognitive side). Following formulas were calculated so as to enable comparison of skills between the technical side of ICT literacy and its cognitive side.

For Students;

ÖBOYP: *ICT literacy score for students (T)*
TBP: *Score for basic skills (x)*
OBP: *Score for office skills (y)*
IBP: *Score for Internet skills (z)*
Using the following formula;

T=55/6.x+55/20.y+z Minimum score obtained by means of this formula;
minT=55/6.0+55/20.4+11=22 (Maximum score maxT=55.3=165, maxT - minT=165-22=143)
Difference among levels=143:5=28,60
22-50,60: very low, 50,61-79,21: low, 79,22-107,82: medium, 107,83-136,43: high, 136,44- 165,00: very high. After the calculation of scores, the scores were converted so as to make comparisons on the scale of 100 (ÖBOYP=100.T/165).

For Parents;

VBOYP: *ICT literacy score for parents (T)*
TBP: *Score for basic skills (x)*
OBP: *Score for office skills (y)*
IBP: *Score for internet skills (z)*
Using the following formula;

T=50/6.x+50/20.y+z Minimum score obtained by means of this formula;
minT=50/6.0+50/20.4+10=20 (Maximum score max T=50.3=150, maxT-minT=150-20=130)
Differences among levels=130:5=26
20-46: very low, 46,01-72,01: low, 72,02-98,02: medium, 98,03-124,03: high, 124,04-150: very high.
For representing scores on the scale of 100 the formula of VBOYP=100.T/150 was used.

Scores for Information Acquisition Skills

Depending on the fact that same items were utilized for both students and parents, scores were computed in a similar manner. As the assessment was again based on 5-point Likert Scale, minimum and maximum scores that can be taken from this part were determined as 5 and 25, respectively. After calculation of the scores, 100-point scores for "scores for the information acquisition skills (BEBP)=x" were calculated based on this formula: BEBP=100.x/25=4x

4. Results and Discussion

4.1. Findings for Students

This section introduces the results of analyses with regard to students' ICT literacy and their scores on information acquisition skills. Scores were evaluated based on parameters including type of school, gender, level of study (9^{th}-10^{th}-11^{th} and 12^{th}), TEOG score (for 9^{th} grade) and general success score. In addition, the purposes for Internet utilization were examined. Table 1. presents rankings for both scores of ICT literacy (computer and Internet literacy) and information acquisition skills (information literacy) which were the same for both cases.

Table 1. Scores for ICT Literacy and Information Acquisition Skills Based on School Type

School Rank	Score of ICT Literacy	Score of ICT Literacy	School Rank	Score for the Information Acquisition Skills
4	132,35	80,21	4	81,96
2	125,58	76,11	2	75,83
1	123,97	75,13	1	75,58
5	116,72	70,74	5	73,51
3	114,27	69,26	3	71,26
Mean	*122,62*	*74,31*	***Mean***	*74,99*

1*: Sakarya Anatolian High School,* ***2****: Sakarya Cevat Ayhan Science High School,* ***3****: Serdivan-Farabi Vocational & Technical High School,* ***4****: Özel Şahin Private Anatolian High School,* ***5****: Sakarya Sports High School*

Analyses indicated that students of Technical & Vocational High School had a significant difference from other high school students except from Sports High School in terms of ICT literacy.

Table 2. Differences Based on School Type

	Homogeneity of Variances-p	Anova-p	Differences Between School Types
ICT Literacy	0,352	0,000	1-3, 2-3, 3-4
Information Acquisition Skills	0,000	0,004	3-4

ICT literacy scores based on gender signified that no meaningful difference existed between boys and girls in terms of ICT literacy (p=0,022>0,005). On the other hand, in terms of information acquisition skills, the results demonstrated that there were meaningful differences based on gender (p=0,002<0,05). This finding of the study contradicts with [25], which indicated that female students at secondary school had higher levels of ICT literacy than male students. However, this study evaluated technical and conceptual side of the ICT literacy separately, and another study incorporating these skills may produce similar results. Because there was a significant difference between male and female students with regard to information acquisition capabilities according to the findings of this study. This result, which was previously supported for adults by [30], is solely prevalent for the information literacy dimension in the case of students.

In terms of level of study, no statistically significant difference appeared among students for both ICT literacy (p=0,125>0,05) and information acquisition skills (p=0,667>0,005).

According to the analyses results summarized in Table 3., students having TEOG scores within the range of 401-500 points had lower levels of ICT literacy than those within the range of 301-400 points. A similar pattern was observed in the case of information acquisition skills as the students with 100-200 TEOG score demonstrated higher levels of information acquisition skills than those having scores between 201-300 points. Considering the differences, the difference in ICT literacy scores of the students within the range of 100-200 and 401-500 TEOG score was statistically meaningful (p=0,006<0,05). As a result, it was explored that significant differences solely appeared in terms of ICT literacy levels and among the students having the highest and lowest TEOG scores.

Table 3. Scores for ICT Literacy and Information Acquisition Skills Based on TEOG Score (for grade 9 students)

Score of ICT Literacy			Score for the Information Acquisition Skills		
	Mean	St. Deviation		Mean	St. Deviation
301-400	76,54	8,388	301-400	78,55	11,767
401-500	75,20	14,766	401-500	78,35	14,355
201-300	68,79	15,738	100-200	74,74	19,507
100-200	62,57	18,568	201-300	72,46	19,005
Mean	*72,14*	*15,704*	***Mean***	*76,05*	*16,555*

When scores of ICT literacy and information acquisition skills according to average success score were examined, there was no regular increase in these scores according to academic achievement. However, it is an important finding that the students with the lowest success scores (0-49,99) had the

lowest ICT literacy scores and the students with the highest scores (90-100) had the highest ICT literacy scores. When the differences were analyzed, results revealed existence of meaningful differences among groups (p=0,004<0,05). No significant differences were observed in any of the tests performed with regard to information acquisition skills. These tests based on the average success score at school and TEOG score aided in investigating the correlation of academic success with ICT literacy and information literacy. As a result, differences were only observed among students with lowest and highest academic achievement. Despite students' academic success was positively correlated with their computer and Internet literacy, it was an interesting finding that information acquisition skills did not change with academic success significantly.

Table 4. Scores for ICT Literacy and Information Acquisition Skills Based on Average Success Score (for 10th, 11th and 12th grade students)

Score of ICT Literacy			**Score for the Information Acquisition Skills**		
	Mean	St. Deviation		Mean	St. Deviation
90-100	78,00	11,597	70-79,99	78,67	16,227
60-69,99	77,69	6,727	80-89,99	76,78	14,27
80-89,99	76,61	13,648	90-100	75,94	13,776
70-79,99	75,04	15,732	60-69,99	75,08	18,773
50-59,99	67,91	13,769	50-59,99	66,83	20,577
0-49,99	56,35	17,919	0-49,99	46,67	21,713
Mean	*75,51*	*13,599*	***Mean***	*74,33*	*16,95*

4.2. Purposes of Internet Utilization of Students

Students use the Internet more for "listening to music" and it is a remarkable finding that the purpose of "performing research for their lessons" took the 5th place. In the case of female students, using the Internet for "entering the e-school system" was in the foreground compared to male students. Another remarkable result was that the purpose of "playing online games" took 7th place for boys and 12th place for girls. There were no significant differences regarding the order of other purposes.

4.3. Findings for Parents

Scores for ICT literacy and information acquisition skills of parents were analyzed based on students' school type, gender, occupation and income, and differences in ICT literacy were examined. In addition, Internet utilization purposes were investigated and gender based differences were analyzed. Table 5. demonstrates scores for ICT literacy and information acquisition skills of parents based on their children's type of school.

Table 5. Scores for ICT Literacy and Information Acquisition Skills of Parents

School Rank	**Score for ICT Literacy**	**Score for ICT Literacy**	**School Rank**	**Score for Information Acquisition Skills**
4	106.11	70,74	4	80,63
2	99,19	66,13	5	75,00
1	86,42	57,62	2	72,15
5	73,57	49,05	1	71,49
3	59,16	39,44	3	57,52
Mean	*87,23*	*58,15*	***Mean***	*70,39*

1*: Sakarya Anatolian High School,* ***2****: Sakarya Cevat Ayhan Science High School,* ***3****: Serdivan-Farabi Vocational & Technical High School,* ***4****: Özel Şahin Private Anatolian High School,* ***5****: Sakarya Sports High School*

Findings of the One-Way Anova test representing differences in ICT literacy and information acquisition skills of parents based on five different school types were illustrated in Table 5. above. Significant differences among different school types draw the attention in both cases (ICT literacy and skills for information acquisition of parents).

Table 6. Differences Based on School Type

	Homogeneity of variances-p	**Anova-p**	**Differences among Schools**
ICT Literacy	0,237	0,000	1-2, 1-3, 1-4, 2-3, 2-5, 3-4, 4-5
Information Acquisition Skills	0,000	0,000	1-3, 1-4, 2-3,2-4, 3-4, 3-5

Gender based analyses revealed that there was a statistically meaningful difference in the ICT literacy scores based on gender (p=0,000<0,05). However, no significant differences was discovered in information acquisition skills according to gender. The results demonstrated that male's ICT literacy was higher on the technical side (computer and Internet literacy) than women. This is consistent with the findings of [30] which revealed that males had higher levels of technical competence than females and there was no significant difference between genders in terms of general cognitive skills. Moreover, [31] supported those findings by confirming that men had higher scores on Internet skills than women.

When ICT literacy and information acquisition skills of parents were analyzed based on occupation, academicians by a mean of 89,78 hit the top of the list according to ranking based on ICT literacy scores. Others followed the following pattern in terms of ICT literacy scores: manager (73,83), civil servant (70,78), teacher (69,92) and retiree (67,45). Parents with the highest ability to acquire information were retirees (83,18). This was followed by tradespeople (78,75), academicians (76,43), managers (75,78) and teachers (74,82). The finding representing lower ICT literacy for teachers

compared to civil servants reveals a problematic situation for the educational community as it is usually expected that teachers have higher levels of ICT literacy than those from other occupational groups in order to provide proper guidance for students. Analyses performed revealed that differences among different occupational groups both in terms of ICT literacy ($p=0,000<0,05$) and information acquisition skills ($p=0,002<0,05$) were statistically significant. In general, ICT literacy differed in parents who were housewives and workers with those who were academics, teachers, administrators and civil servants. There were no meaningful differences between workers and the housewives. When examined from the aspect of information acquisition skills, there were significant differences between workers and parents compromising managers, teachers and other professionals. The finding that higher educated individuals had higher levels of ICT literacy obtained by [30], is consistent with the finding of this study as academicians achieved higher scores in both technical and cognitive sides of the ICT literacy.

It was observed that scores for ICT literacy and information acquisition skills increased by income levels. When the differences according to income status were examined, there was a significant difference in ICT literacy scores ($p=0,000<0,05$). Significant differences were explored between parents with income less than 1000 TL and those with income of (2000-3000) TL and (3000-4000) TL. In addition, parents having (1000-2000 TL) monthly income statistically differed from those who had income over 2000 TL in terms of ICT literacy. Differences in scores for information acquisition skills were significant ($p = 0,000 <0,05$). Differences appeared among parents earning less than 1000 TL and parents having income of more than 3000 TL. In addition, parents belonging to (1000-2000) TL monthly income group differed from the ones earning more than 2000 TL in terms of information acquisition skills.

4.4. Purposes of Internet Utilization of Parents

Parents use the Internet mostly to follow the news, social media and conduct research. While "e-school" and "e-health" systems were among the top 10 in Internet utilization purposes, "e-government" and "Internet banking" shared 13th and 12th rank, respectively.

Parents do not use online school, healthcare, banking and government information systems very often. This may be because of the parents not trusting their own competences in using information systems or their limited ability in using complex applications. The Internet is often used for getting information and for general navigation. The finding revealing higher scores for information acquisition skills than ICT literacy for parents, verifies this consequence.

When differences based on gender were examined through Independent Samples T-test, it was revealed that some purposes were altered based on gender. "E-health", "e-school" systems were more likely to be priority for mothers, which might stem from the tendency of following their children more. In the case of fathers, "e-government" system had become the priority. While utilization of Internet for the purpose of "checking the e-mail account" took 2nd place for fathers, it was the 11th reason for mothers. Mothers' second reason was appeared to be the "social media" whereas it took 5th order according to fathers' preferences. The 3rd reason for fathers which was "performing research associated with occupation" was positioned at the 10th place according to mothers' preferences.

While one reason for this situation might be the lower number of working women compared to men, the other reason might be the higher number of housewives within the sample (Female participators' 66,2% were housewives). Computer and Internet utilization frequencies impact on the individuals' self-confidence in terms of technical skills [29]. Thus, experience and competence in this area may be one of the reasons behind the variations in utilization of more complex applications according to gender.

4.5. Correlation of ICT Literacy and Information Acquisition Skills with Purposes of Internet Utilization

Common purposes among students and parents were chosen and their Pearson Correlation values were identified. The strongest positive relationship was determined between ICT literacy of parents and the purpose of "using my own e-mail account" ($r=0,620$). On the contrary, the value of this coefficient was 0,332 in the case of students. The other strong correlation was between ICT literacy of parents and the purpose of "online banking" ($r=0,555$). Correlation of ICT and information literacy with purposes of Internet utilization was stronger for parents compared to students. The strongest relationship for students appeared between ICT literacy and the purpose of "checking the e-mail account" ($r=0,338$).

4.6. Comparison of Students and Parents

Students' ICT literacy scores were higher than their parents,' which demonstrated digital divide among students and their parents. In the case of parents and female students, skills for information

acquisition were higher than their scores for ICT literacy. Overall picture depicts that the group having highest scores of information literacy was female students with a mean of 77,75, while male students had the highest scores on ICT literacy. As indicated before information literacy scores of parents were found to be higher than their ICT scores, which might be an indicator of growing importance of getting knowledge by age. Furthermore, meeting with the Internet and computer at older ages, less technological experience compared to new generations may lead to more limited development of technical skills than cognitive skills. It is believed that the highest level of ICT literacy of male students is due to being more interested in computers and Internet.

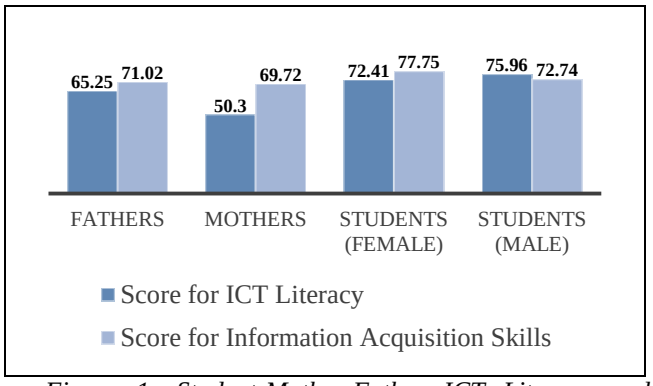

Figure 1: Student-Mother-Father ICT Literacy and Information Acquisition Skills

Correlation test which was carried out so as to observe the degree of the relationship between technology and communication skills (Computer & Internet literacy) and information acquisition skills (Information literacy) showed that there was a meaningful relationship for both students and parents ($p= 0,000<0,01$). The value of Pearson Correlation that signifies the degree of the relationship were appeared as $r=0,426$ for students and $r=0,516$ for parents. Regarding the values, there was a moderate positive relationship for both groups. There was a stronger relationship between information acquisition skills and ICT literacy of parents than students'. In this study, technology and communication skills were measured together and information acquisition skills (information literacy) represented the cognitive dimension. For this reason, the analysis performed at this stage reveals that there was a positive relationship between technical and cognitive skills.

5. Conclusion

In this study, ICT literacy, information acquisition skills and internet utilization purposes of high school students and their parents were analyzed. Among students, the presence of digital divide according to factors compromising school type, average success score and gender was observed. In the case of parents, there was also digital divide based on school type of the student, occupation and income groups. Although there was no significant difference in information literacy of parents among the genders, male had higher scores on ICT literacy than female parents.

Differences based on school type might stem from factors such as the content of education programs, resources, and the level of integration of web-based and information-centric applications into the curriculum.

In terms of average success score and TEOG score, there was a significant difference in ICT literacy among students with highest and lowest scores. This is related to the higher cognitive competence of students with high scores. Depending on the fact that students are settled down to a particular school based on their TEOG score, differences among students based on school type and average success score can be explained by the argument of successful students are good at transferring their knowledge and skills into the field of ICTs in an effective manner. This finding is believed to be an important starting point for the improvement of the digital divide. In this sense, outputs of this study and the differences among schools are important both for the improvement of the technology and the information literacy of the students and the society. Differences between schools should be used as a strategic management tool to implement the necessary plans and programs. First of all, in order to reveal these differences in a more tangible manner, mechanisms for the evaluation of digital divide among schools should be established. The metrics and tangible measures to assess schools should be used to plan resources to be allocated to schools and to design computing practices that will be integrated into the curriculum. It is important to set standards related to technology use and literacy and to have practice-based tests so as to measure ICT literacy. This study evaluates students and parents on their self-efficacy perceptions. Technology and information acquisition skills should be measured, and analyzed with real-time, practice-based applications. Traditional education is not enough nowadays, it is necessary to identify benchmarking criteria for achievement and to prepare courses associated with ICT applications within this framework. The fact that the ICT literacy and information acquisition skills of parents differ according to the type of school that their children attend, underlies the socio-demographic, cultural and economic factors causing the digital divide. The problem of digital divide should also be anticipated from the macro-factors perspective and the impact on the individuals of the society should be assessed.

According to gender, female students had the highest scores on information literacy. On the other hand, although there was no significant difference statistically, the level of ICT literacy of female students was lower than male students. Activities that will encourage the use of technology and regulation of course contents for students with low levels of ICT literacy are essential. When Internet use of girls was examined, the conducting research was ahead compared to male students, and for male students playing online games was more preferential. It is believed that the time spent on activities can be effective in having better information acquisition skills for girls. Generally, students use the Internet for non-educational purposes. For this reason, students' priorities need to be directed towards research and activities that will improve them personally and academically. Activities that improve the skills of accessing, organizing, evaluating, and disseminating information that will improve the information literacy are important for male students. Collaborative group work, applications based on accessing and using digital information and tasks associated with experiencing various computer applications will provide support to students with low information and technology literacy.

The digital divide between students and parents revealed in this study is remarkable. Students had higher ICT literacy and better information acquisition skills than parents. Parents, on the other hand, achieved higher scores on acquiring information rather than ICT literacy. Examining the parents' purposes of using the Internet, it seems that the activities to obtain information were in the forefront according to the students. When the differences in ICT literacy and information acquisition skills of parents were examined according to occupation, parents who were academicians, teachers, administrators and civil servants differed significantly from housewives and workers. Educational experience of academicians, cognitive competence, and practical experience depending on the time spent on the Internet can be effective in achieving high scores in ICT literacy and information acquisition skills. As the income level increases, the information literacy and level of information acquisition skills have also increased. This supports the findings of similar studies in the literature. When parents' purposes of Internet utilization were examined in detail, for all individuals the purpose of "following the news" following the news hit the top of the list. Other preferences were differed based on gender and occupation. Among mothers, priorities in Internet utilization were to follow social media, to research, to use information systems such as e-school and e-health. Regarding fathers, their priorities were checking the e-mail account, conducting research about their profession, following the social media and perform internet banking transactions respectively. In this context, it is believed that the detailed measurement of the time spent on the computer and how much time is devoted to which activities may explain the reasons for the differences in ICT literacy and information acquisition skills. For the future, existence of the studies that can provide support for this area is important. One of the remarkable findings of the research is that the average ICT literacy score of the students was 74,31 while the teachers had 69,92 average ICT literacy score. Considering the roles and responsibilities of educators in enhancing the community's ICT literacy and information acquisition skills, it turns out that teachers also need special training programs that will enhance their ICT skills. For teachers who have a remarkable role in the development of the society's ICT literacy, it is necessary to gain skills to follow the up-to-date scientific activities, acquire information, transfer digital information and utilize technology. The preparation of digital course materials, effective use of social media, increasing the interest of students in science, and science and technology trainings should be the main components of the training programs designed for teachers. It is clear that the theoretical studies focusing on measuring and evaluating technology and information literacy of students and educators according to rapidly changing ICTs, comparative researches conducted at different countries, contribute to the literature and strategies to be developed in practice.

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