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TURKEY THE VIEW OF POBLEM SOLVING SKILLS WITH INTENSIVE TECHNOLOGY ACCORDING TO PIAAC APPLICATION DATA

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Abstract

The research aims to examine the changes in the numerical, verbal and technology intensive problem solving (TIPS) scores of adults according to the data of the PIAAC application implemented in 2016 and to examine the predictions of TIPS skills by other skill scores. The PIAAC aims to provide an overview of the "basic information processing skills in of adults aged 16-65. The focus is on verbal skills, numerical skills and problem-solving skills in technology-intensive environments. As a result of the analyzes, t test was conducted to determine whether there is a difference between the numerical skill scores, verbal skill scores and TIPS skill scores of the individuals according to gender and it was seen that numerical skill scores and verbal skill scores showed significant differences according to gender. However, there was no significant difference between TIPS skill scores according to gender. TIPS skill scores, it was seen that the interaction of the individuals with the computer was made by asking and the individuals who did not want and did not know the use were not involved in the application. It is also among the results that the TIPS skills scores are predicted by verbal and numerical skill scores and the increase in numerical and verbal skill scores leads to an increase in TIPS skill scores. It can be interpreted that the change in TIPS skills by age and the high relationship between other skill scores may also be related to the education process. In addition, the distribution of TIPS skill scores according to the educational status of the individuals was examined and it was observed that there were significant differences in the educational status of the three groups.

Keywords

Turkey, PIAAC, Technology, Problem Solving, Skills

Introduction

The general point of view of large scale tests is that individuals solve problems by structuring their knowledge for daily life based on their knowledge. In these internationally applied examinations, the comparison of the countries and the comparison of the place of the countries among the other countries is determined by the individuals and the current situation is revealed. Generally speaking, exams aim to determine individuals' knowledge and skills related to a subject while case studies; as Stake (2000) states, they examine culturally the subject or situation investigated analytically with repeated measurements (Çepni, 2016). These large-scale tests focused on determining the situation on the basis of education systems and countries, not on an individual or school basis.

Large-scale test applications are developed and implemented for different purposes and by different institutions. As an institution, the International Association for the Evaluation of Educational Achievements (IEA) and the Organization for Economic Cooperation and Development (OECD) stand out in the implementation of these examinations. In order to determine the status of different skills, they develop and apply exams with different characteristics (similar aspects are not underestimated).

When the characteristics of these large scale tests are examined, they include similarities and differences in the subject area of interest, age group applied, background questionnaires, and style of application. Based on the similarities, the background questionnaires are similar and include similarities in the way of implementation and the change of this method over time. Large-scale test applications are exam applications for collecting data in two basic dimensions. The first of these dimensions consists of standardized achievement tests in which individuals' knowledge and skill levels are tried to be determined (based on this information) and the second dimensions as a background questionnaire that collects information about individuals, schools, teachers, parents, learning processes

and life skills. Although these test practices are not frequently mentioned about the discourses that have economic and political reasons behind them, they become important in terms of increasing interest in the number of parti TIPS and considering the results.

The importance of daily life skills, which have become more prominent in recent years, and the relationship between these skills and the use of information has been at the center of these tests. Another important point has been the 21st century skills, which have been emphasized frequently in recent years and focused on the multi-faceted development of individuals. The development of these skills in individuals has led to trends and changes in the educational process and these characteristics have been reflected in the tests. In addition, the importance of issues such as global warming, globalization and environmental awareness was reflected in the tests and was effective on both themes and substances.

The questionnaires are based on the individual characteristics behind the large-scale tests, which help to describe the current situation and provide both the education system and the country's educational profile. These surveys aim to reveal the characteristics of individuals, schools, administrators, parents, teaching process and teachers by starting from individuals. The number and characteristics of the questionnaires differ according to the type of examination administered. In addition, the implementation of some questionnaires can be selected by countries and some standard success tests may be selected in this process. For example, while the school and student survey is compulsory in PISA application, education career survey, computer use questionnaire and financial literacy test are applied on an optional basis.

Literature review

In today's world where information management becomes more and more difficult, the skills required by daily life have been transformed. How much of these skills required by the age, as well as how much we can use, is an important factor in defining where we stand in life. The OECD report published on 28 June 2016, entitled “Skills Matter: Results from the Adult Skills Screening”, is similar to PISA focusing on the basic skills of 15-year-old students in the 16-65 age range and comprehensively addresses the skills adults are expected to have.

The results of the two-round adult skills survey of the OECD under the International Assessment of Adult Competencies Program (PIAAC) included data from 216250 adults in 33 countries. The results of the research involving 5277 participants from Turkey also indicate the policy areas in particular need to focus attention on our country. The PIAAC aims to provide an overview of the basic information processing skills in of adults aged 16-65. The focus is on verbal skills, numerical skills and problem-solving skills in technology-intensive environments. Within the scope of adult skills survey, individual performances are measured over 500 points. However, proficiency levels are defined for each skill field. Thus, it has become possible to explain what individuals can do within the scope of the focused skills, whose score corresponds to the range of points covered by any level of competence. While 6 different proficiency levels (below level 1, level 1, level 2, level 3, level 4 and level 5) have been defined for verbal and numerical skills, four levels of competence for problem solving skills in technology-intensive settings (Level 1, Level 2, Level 3).

In addition, participants were expected to complete a comprehensive background questionnaire. In addition to demographic information, this questionnaire included many questions that would support the interpretation of findings such as the use of verbal and quantitative skills by adults and the use of information and communication technologies at work or in daily life. This application was applied to individuals via computer. This type of application, which has started to increase in large-scale test applications in recent years, also contains the compatibility of technology-related life which is nowadays described as the digital age.

When the items and background questionnaires used in the application of PIAAC to determine skill levels are examined, it is seen that they contain differences compared to other large scale tests. One of the most important of these is the fact that it contains materials which include easier response process compared to applications such as PISA and TIMSS. It focuses more on the verbal, numerical and technological characteristics that adults use in daily and especially business life. Such a tendency may have been made in the determination of the items, since daily life is faced in simpler and simpler operational processes and general situations are taken into consideration. In addition, when surveys are conducted on the basis of surveys, it is seen that data loss is high in the surveys in general.

Especially when examined as a background questionnaire, PIAAC implements a wider survey process than other large-scale examinations. Data are collected in detail on the educational status of the individuals, their working lives, the educational processes they receive and the amounts and changes of earnings. It also raises criticisms for examining in detail the effects of individuals over the age of 15 in business life and their processes in business life. The OECD's implementation of this practice and the analysis of the countries' future for their future is another critical point. The distribution of the labor force according to age groups and providing detailed survey information according to these age groups are also considered positive in terms of revealing the current status of the business skills of the society.

Technologically developed items (TEIs) are now used to determine the level of skills of individuals and their use is increasing. Although the classification, advantages and disadvantages of these items, which have a rapid development process, are not fully elucidated, it can be foreseen that they will facilitate the gathering of information about individuals under the influence of the increasing age of technology. However, the bases of these items need to be well filled and made ready for their use in individuals. In an article published in 2007, Bryant explained the descriptive properties of these items in terms of developmental processes, uses and the whole process. PIAAC has a close relationship with TEIs in terms of its proximity to these technology-based items and the individuals' use of technology in business life and their familiarity.

Adults (227) in Turkey remained well below the OECD average by getting an average score of 268 points in verbal skills. Turkey was one of the three countries with the lowest score gained in verbal skills among the countries which were surveyed. In OECD countries, only Chile (220), while the OECD countries surveyed outside Indonesia (Jakarta) has a lower rating than Turkey. However, adults in Turkey by gaining 219 points in the average numeracy score 263, took place in a location well below the OECD average. Turkey had one of the lowest points in two OECD countries in verbal and numeracy skills, scoring 206 in verbal skills and showed a slightly better performance than last-placed Chile. Indonesia (Jakarta, 210) has a lower score than Turkey as a non-OECD country (OECD, 2016).

Another skill measured within the scope of adult skills is the ability to solve problems in technology intensive environments. According to the findings, a large part of Turkey in adult problem-solving skills in the field of technology-intensive environments is located on level 1 and six levels of proficiency. In fact, 40% of adults stated that they had never met computers or could not take or complete the test within the scope of information and communication technologies. As seen in Table 1, Turkey has remained in last place with only 8 % at the top skill area proficiency level 2 and 3, well below the OECD average with 31 %.

These results obtained in Turkey's verbal and numerical skills show that the average score below the international average more than 40 points. The mean scores in literacy and numeracy skills of adults in Turkey, the upper limit of 1 to 2 proficiency levels located in the lower limit of the level of proficiency; Located in the upper border of Turkey thus remains under a level 2 qualification proficiency level of the OECD average (OECD, 2016).
The usage areas and number of users of information and communication technologies are increasing rapidly. While the slogan “computer for all” adopted in the 1970s was replaced by internet for all in the 1980s in terms of literacy types, ABC literacy is nowadays replaced by computer literacy, internet literacy, and visual literacy.

It is seen that over time, the meaning that individuals attribute to information, to its usage and to access to it have shown differences (Keser, 2011). With the advancement of technology, access to information has become easier and more complex. It is undoubtedly the most effective one in technological development. Keser (2011) explains this process in his study as follows:

Children and young people gain the skills of producing, consuming and marketing information and acquiring these literacy skills through courses such as “Computer”, “Information Technologies”, “Information and Communication Technologies” which are given as compulsory or elective courses in preschool, primary and secondary education programs. When the first reflection of this process in primary and secondary education programs in Turkey are examined, it is seen that “Computer” course has been taken as an elective course in secondary education programs since 1985-1986 academic year with the recommendations of the Computer Education Specialization Commission in Secondary Education. Computer laboratories were established in 100 secondary schools (secondary and high schools) selected as pilot schools. The process of training the teachers who would give computer courses through in-service training was followed by formal education and in this direction, Computer Education and Instructional Technology Departments were opened in 1998 within the Faculties of Education (pg: 86).

For the first time, the computer was included in the elective course list of the primary school in the weekly timetable published with the decision no 143. In 4., 5., 6., 7. and 8th grades, 1 or 2 hours were selected and taught. In the decision no. 180 dated 1998 there has been no change the in the selection of the computer course time and the curriculum of the course has been published. In the same year, undergraduate programs were opened in faculties in order to structure the educational programs in our country and to meet the needs of teachers in this department in higher education. Since 2002, Computer Education and Technology Education (CEIT) departments have started to graduate but with this decision, the hours of the courses have been reduced to 1 and the evaluation with grades has been removed in elective courses. However, in 2008, a privilege was granted to the elective English course, and an arrangement enabling grading was made in this elective course.

With the decision taken in 2007, the total number of elective courses has been reduced. The students were not given the chance to choose, and a schedule of only 2 hours of elective courses was published. Foreign Language (English) course, which has questions in central exams, has become more preferable than Information Technology (IT) course which is costly and requires a special class.

In addition, the “Media Literacy Course”, which is included in the “Internet” unit is deemed appropriate to be taught by social studies teachers, and it was included in this table for the first time. Television advertisements and public spots related to Media Literacy Course were published. It can be thought that because of such points, IT

course has to compete unfairly with other elective courses. From another point of view, the cost of IT classes, the cost of maintenance led some IT teachers, especially those who do not have an IT class in their schools, to attend one-week courses to receive an assistant chess coaching certificate and to conduct elective Chess Lessons instead of IT. With the decision no. 69 published in 2012, Information Technologies and Software Courses were included in the schedule and the hours were increased to 2 hours. The course started to be implemented in the 5th grade with a whole new curriculum.

With the latest education program, 2 hours of compulsory courses in the 5th and 6th grades under the name of information technologies contribute to the effective use of computers by individuals. With Coding Training and Coding Workshops, our country aims to make individuals conscious about this issue and make progress in computer science. Orientation and upbringing of individuals who interact with technology at an early age will certainly lead to an increase in the number of equipped and effective individuals. However, this process brings serious problems about the conscious use and spread of technology.

Considering the history of computer in our country, students were offered elective at the high school level after 1985 and at the secondary and primary level after 1997, the students had these courses in the formal education process. In particular, considering the completion of the infrastructure of the schools and the implementation of the program as necessary, it is expected that the individuals who have taken the first PIAAC application are approximately 40 years of age and under, if it is to associate the access to computer knowledge of the individuals involved in the education process with the education process only. It is thought that almost all of the individuals who are 16 years of age and older, as well as post-secondary individuals have an interaction with the computer course during the education process. For this purpose, it was aimed to investigate the use of technology by individuals according to their age groups, and accordingly the use of computers in business life and changes in the problem solving (TIPS) skills in the technology-intensive environment. In addition, this research is another aspect of the use of technology in the relationship between the other skill scores and TIPS skill scores of the individuals participating in the PIAAC application and its effect on the field of education.

The research aims to examine the changes in the numerical, verbal and TIPS scores of adults according to the data of the PIAAC application implemented in 2016 and to examine the predictions of TIPS skills by other skill scores. Especially, it is aimed to examine the changes in TIPS skills according to age groups and education levels and to determine whether this differs from age distributions and education levels due to training programs.

According to the data of PIAAC application, it is the first study to reveal the variables that predict the problem solving skills of the adults in the technology-intensive environment and it is a pioneer because it is a research that can help future studies.

Due to the fact that it is a first-time application, the understanding of the data involves difficulties and focuses on adult skills; the number of researches is very limited. Apart from the studies in which Yıldız is the responsible author and Kökrer is the responsible author, no study on PIAAC application has been conducted in our country yet. In addition, when the studies abroad were examined, more researches were conducted and these data were interpreted from different aspects. In this study by starting from the data obtained from Turkey with PIAAC application, adult TIPS skill points, age and educational level changes, numeracy scores, the regression by numerical skill scores and verbal skill scores were aimed to determine. For this purpose, answers to the following questions were sought.

1. How do the descriptive statistics of the distribution of numerical, verbal and TIPS skill scores change?
2. Do the skills scores of individuals differ according to sex groups?
3. Do the TIPS skill scores of individuals differ according to age groups?
4. Do the TIPS skill scores of the individuals differ according to the education level?
5. Do the numerical skill scores and verbal skill scores of the individuals predict the TIPS scores ?

Methodology

This section provides information about the research model, sample, and data analysis processes and explains the analysis process.

Research model

The research (descriptive) model was used as it was aimed to examine the status of the skill points of the adult individuals based on the research application data and to present the situation within their own conditions according to different variables.

Sampling

5277 individuals from Turkey participated in the PIAAC application. However, there was a lack of data in 83 individuals. Data were analyzed on the remaining 5194 individuals. For numerical and verbal skills, procedures

were conducted on 5194 participant scores. However, technology-based problem solving skills were analyzed according to data obtained from 2266 individuals depending on computer experience and usage.

As a way of determining the research sample, the countries first identified the survey companies to fill in the questionnaires and provided the necessary information to the international commission and trained them for the national information collection process. For our country, data of Turkey Statistical Institute (TSI) was utilized, then the regions, households and individuals were selected and for identifying the sample, a sampling method expressed in three stages was used. Although it is stated that the same method is not followed in each country in sampling determination, this situation raises questions about the representation of the sample population.

Data collection tools

The assessment designs assumed approximately 30-40 minutes of administration time for the BQ and JRA, and 60 minutes for the direct assessment. The JRA items collected information on skills use at work, while the BQ collected contextual information about respondents, including their demographic characteristics, educational background, labor market experiences, and skill use outside of work. The JRA and background items were collected and processed through the use of a CAPI system. The target population ranged from 16 to 65 years of age.

PIAAC was designed as a computer-based assessment (CBA) and was delivered on a laptop computer. The cognitive assessment was taken by most respondents in the CBA format under the supervision of the interviewer. Respondents with no (or extremely limited experience) with the use of computers were given a pencil-and-paper version of the literacy and numeracy components of the assessment. Respondents with computer skills but who possessed poor literacy and numeracy skills were directed to the reading components test, which was taken in pencil-and-paper format only. However, interviewers timed the completion of the reading components tasks using the computer application. Respondents took the assessment in their own homes or in another location to which the interviewer agreed (OECD, 2016).

Validity and reliability

The Main Study data showed a high degree of agreement for within-country scoring reliability, averaging 99.1 % and surpassing the goal of 95 %. In Round 2, the Main Study data also showed a high degree of agreement for with-in country scoring reliability, averaging 98.7 %. The most likely explanation for this finding is that in a few cases, countries implemented a resolution process that eliminated any scoring discrepancies. The Main Study data also showed that average scoring accuracy across countries was very high, averaging 96.4 % agreement. The cross-country reliability measures obtained from the anchor booklet scoring ranged from 89.9 % to 98.5 % across participating countries. Only three countries were below 95 %. For Round 2, the cross-country reliability measures ranged from 94.4 % to 97.7 % and only one country was below the target 95%. Thus the use of the anchor booklets verified thatoverall agreement across countries was good and allowed us to achieve common item parameters across countries, with very few items being assigned unique item parameters (OECD, 2016).

These data for both the within- and cross-country reliability studies demonstrate the success of international scoring training and the national application of that training. Overall, the data supportthat the result of this work by the Consortium and participating countries resulted in accurate and comparable scoring of the PIAAC paper-based items.

Data analysis

Descriptive statistics, t test, One Way Analysis of Variance (ANOVA), Tukey and multiple regression analysis were used for the data. In the process of data analysis, firstly descriptive statistics were examined, normality assumptions were examined and then the appropriate analysis methods were determined and analyzed using SPSS 22 program.

Results

Descriptive statistics were made on the data for the first sub-goal determination question. According to the data obtained after the application, the assessment scores of verbal skills, numerical skills and TIPS skills were calculated. In the light of the collected data, descriptive statistics of the verbal, numerical and TIPS skills scores of the individuals are given in Table 1.

	N	Mean	Min.	Max.	Sd	Skewness	Kurtosis
Verbal Skills	5194	229.72	98.28	358.05	39.16	-.294	-.063
Numerical Skills	5194	223.43	53.24	377.02	50.80	-.324	.065
TIPS	2266	256.91	91.42	408.23	39.90	.051	.539

Table1. Descriptive Statistics of Numerical, Verbal and TIPS Skills

When Table 1 was examined numerically, when verbal and of their problem-solving skills in the condensed environment with technology score changes were examined, Turkey's ranking took place under the general mean score of the OECD average and in general, the average score of problem-solving skills in the technology-intensive environment was (256.91) observed to be higher than the numerical (223.43) and verbal (229.72) skills. When the distribution of the scores of skills is considered, it is accepted that skill scores show a normal distribution since they are between the kurtosis and skewness values (+ 1, -1) (Tabachnick and Fidell, 2017). In order to determine whether there are differences between skill points by gender, it was decided to examine the mean differences. Firstly, the distributions of the points were examined and it was determined that they showed a normal distribution. t test is a strong parametric test and can be used even if the assumption of homogeneity of variances is not provided (Büyüköztürk, Çokluk and Köklü; 2011). As assumptions were provided, it was decided to conduct a t test to compare the two groups. In all three areas, skill scores were tested by t-test to determine whether scores differed significantly according to gender variable. The results of the t-test for the changes in skill scores are given in Table 2.

		N	Mean	ss	Sd	F	t	p
TIPS	Male	1289	256.82	41.4	2264	5.227	-.204	.000
	Female	977	257.02	37.86				

Table 2. T-Test Analysis Results of Skill Scores According to Gender Variable

When Table 2 is examined, it is seen that the scores of 2266 individuals are calculated according to the technology-intensive problem solving (TIPS) skills of individuals who have knowledge and experience of computer use. As a result of the analyzes, it was concluded that the scores of TIPS skills did not show significant differences according to gender ($t_{[2266]}$ = -.204 ; p> .05) and it was observed that the scores of the female subjects (257.02) were higher than the scores of the male subjects (256.82). According to the results of the t test analysis, in which the difference between the averages of the TIPS scores between the sexes was examined, the value (ete-square) was determined as 0.001 to calculate the effect size. This value has a small effect compared to Green and Salkind (1976) classification.

	N	Mean	Ss	SH	Min.	Max.
24 and below	585	257.74	35.20918	1.45572	91.42	368.44
25-34	795	265.26	39.70423	1.40816	122.16	392.34
35-44	538	249.76	40.71092	1.75517	100.77	386.79
45-54	245	247.77	41.17679	2.63069	100.44	365.15
55 and above	103	246.76	45.59801	4.49291	130.55	408.23
Total	2266	256.91	39.89991	0.83819	91.42	408.23

Table 3. Descriptive Statistics of TIPS Skills According to Age Distribution of Individuals

Table 3 above shows the descriptive statistics of the TIPS skill scores according to age subgroups. When the table is examined, it is seen that skill scores of 24 years and under and 25-34 age group skill scores are higher than the average scores of other groups. It was decided to perform variance analysis for the significance of the difference.

This study was tested with variance analysis techniques because the number of age groups was more than three. For the analysis of variance, the normality of the data was examined in accordance with descriptive statistics and graphical analyzes and it was observed that the data showed normal distribution. Since variance analysis would be performed in the analysis of changes in age groups according to skill scores, homogeneity of variances of age groups was tested and it was seen that variances were distributed homogeneously. After the assumptions were checked, ANOVA, one of the parametric variance analysis techniques, was applied on the data. The results of the analysis of variance are given in Table 4.

		Sum of Sq.	sd	Mean of Sq.	F	p
TIPS	Between Groups	126982.303	4	31745.576	16.777	.000
	In-groups	4278259.403	2261	1892.198		
	Total	4405241.706	2265			

Table 4. ANOVA Results of Skill Scores of Individuals

When Table 4 was examined, the results of one-way analysis of variance ($F_{[4,2261]}$ = 16.777; p <.05), at least two of the subgroups of the age variable differed significantly. According to the ANOVA results, the numerical skill scores, verbal skill scores and TIPS skill scores differed according to age sub-groups and p values were determined. Tukey test was performed from multiple comparison tests in order to find out which group was

different and it was determined that the 24-year-old and younger and 25-34-year-old groups differed with other groups for TIPS skill scores. According to the result of variance analysis, to calculate the effect size ete-square (η^2) value was determined as 0.03. This value has a small effect compared to Green and Salkind (1976) classification. It can also be said that 3 % of the total variance on TIPS scores is the result of the change in age groups.

	N	Mean	ss	SE	Min.	Max.
Below High School	700	239.5	36.02732	1.367	100.7	348.79
High School	822	256.7	37.14682	1.296	91.42	394.84
Above High School	742	273.4	39.37333	1.445	138.2	408.23
Uncertain	2	298.4	27.70419	19.59	278.8	317.94
Total	2266	256.9	39.89991	0.8381	91.42	408.23

Table 5. Descriptive Statistics of Individuals' TIPS Skills Scores by Level of Education

Table 5 shows the descriptive statistics of the education levels of the individuals and the distribution of TIPS skill scores according to their education levels. According to the results of the analysis, it was seen that TIPS skill scores increased as individuals' educational level increased. However, since the educational level of the two individuals in the sample was coded as undefined, this level was not examined for comparison. It is seen that individuals have close distribution with each other as sample in three groups.

However, it was decided to perform one-way analysis of variance by considering the number of groups in order to determine whether the TIPS skill scores of the individuals differ according to their educational level. For this purpose, the distribution of the scores was examined and the normal distribution of TIPS skill scores was already examined with the kurtosis and skewness values. Afterwards, homogeneity of variance according to groups was tested and it was found that homogeneity of variance between groups was not violated. Based on this, ANOVA was performed on the groups and the results of this analysis are given in Table 6.

	Sum of Sq	Sd	Mean of Sq	F	p
Between Groups	416210.923	3	138736.974	98.387	.000
In-groups	3189675.749	2262	1410.113		
Total	3605886.672	2265			

Table 6. ANOVA Results of TIPS Skill Scores According to Education Level of Individuals

According to ANOVA, significant differences were found between at least two groups ($F_{[3,2262]} = 98.387$; $p < .001$) and Tukey test was performed from multiple comparison tests in order to determine which group was the different group. According to the multiple comparison test; there was a significant difference between each of the three groups. In order to calculate the effect size (eqe-square) value was determined as 0.11 according to the result of variance analysis in which the difference between the averages of TIPS scores between groups was examined according to the level of education. This value has a moderate effect according to Green and Salkind (1976) classification. It can also be said that 11 % of the total variance on TIPS scores is the result of a change in education levels.

Multivariate regression analysis was applied to reveal the predictive status of the TIPS skill scores of the individuals participating in the PIAAC application according to verbal skill scores and numerical skill scores of individuals. TIPS skill scores as the dependent variable, verbal skill scores and numerical skill scores as independent variables were determined. The assumptions of multiple regression were examined before the variables were included in the analysis process. Firstly, correlations between variables were examined and it was found to have moderate correlation values (Pearson correlation coefficient between numerical and TIPS; r = .59, Pearson correlation coefficient between verbal and TIPS skill scores r = .64). As a result of the literature studies, the sample size was observed to be sufficiently large. Afterwards, normality assumptions were examined and the distribution scores were determined according to the test results showing normal distribution. For the homogeneity of variances, Fligner Killer test was applied and homogeneity of variances was determined. Afterwards, the data of the analyzes performed to determine the predictive status of TIPS skill scores by numerical and verbal skill scores are presented in Table 7.

Variables	B	se	β	t	p
Constant	72.98753	4.60603		15.846	.000
Verbal	.56920	.03352	.482	16.983	.000
Numerical	.18726	.02759	.193	6.787	.001
$R^2 = 0.43$	F= 829.6	p= 0.00			

Table 7. Results of Regression Analysis of TIPS Skills Scores

When Table 7 is examined; the regression model was statistically significant ($F_{[2,2263]} = 829.6$, $p < .001$), and independent variables accounted for 43 % of TIPS scores. The relationship between TIPS skills scores predicted by other regression analysis is given equality 1.

TIPS Skill Points = 72,98753 -0,56920 (Verbal Skill Points) (Equality 1) + 0,18726 (Numerical Skill Points)

According to Equality 1, it was found out that verbal skill scores and numerical skill scores together accounted for 43 % of the TIPS skills scores. In addition, it was observed that one unit increase in verbal scores increased 0.56920 points in TIPS skill points, and one unit increase in points in numerical skills increased 0.18726 points in TIPS skill points. As can be seen in the regression coefficients, it was seen that the scores of verbal skills were more effective than the numerical skill scores in increasing TIPS skill scores.

Findings and discussion

As a result of the analyzes, t test was conducted to determine whether there is a difference between TIPS skill scores of the individuals according to gender and it was no significant difference between TIPS skill scores according to gender.

In the calculation of TIPS skill scores, it was seen that the interaction of the individuals with the computer was made by asking and the individuals who did not want and did not know the use were not involved in the application. It is also among the results that the TIPS skills scores are predicted by verbal and numerical skill scores and the increase in numerical and verbal skill scores leads to an increase in TIPS skill scores. In addition, the comparison tables of the students' TIPS skill scores according to age groups and educational information were examined and it was observed that individuals under the age of 34 were more involved in the educational processes. On the other hand, it was observed that the education level of the group over 34 years was lower. Based on this information, it can be interpreted that the change in TIPS skills by age and the high relationship between other skill scores may be related to the education process. In addition, the distribution of TIPS skill scores according to the educational status of the individuals was examined and it was observed that there were significant differences in the educational status of the three groups.

In the last 20 years, the effectiveness of technology in formal education has increased especially with the processes such as turning to technology and integration of technology in education. The development of computers and the increasing use of them as a support in education has increased the interaction of individuals with computers. Although it is not very old to be given as a course in education and the equality and adequacy of physical infrastructure is discussed, it can cause a positive effect in terms of computer usage in individuals because it provides interaction.

It is thought that reaching individuals' technological gains may be related to age if evaluated with the education process. For this purpose, according to variance analysis and multiple comparison analysis, it was seen that the skill scores of individuals under 34 years of age were higher than those over 34 years of age. If it is associated with computer education in the education process of individuals under 34 years of age, the TIPS skill scores may be high in practice since they experience interaction with computer during the education process. However, to find out the reason for this, it would be more accurate to interpret it in line with the data supported by qualitative research. It is another result reached in the study where the TIPS scores increase as the education level increases and the scores differ according to the education level. On the other hand, today's adults, who have not been exposed to information technologies since the day they were born, sometimes have difficulty in adapting to this new world. Although this adaptation is easy for the generation that is defined as generation Y, born between 1980-2000 and witnessing the development of technology step by step from their childhood, it is a very difficult process for the previous generations (Bulduk et al., 2017).

Especially when the PIAAC data is analyzed on the basis of our country, it is determined that approximately 53% of the data do not participate in the TIPS skill subtest because there is no interaction with computer. This rate, which is more than half of the sample of this study, indicates that there may be a major deficiency in adults on the basis of increasing technology usage. As a result, there is a growing trend between the traditional literacy as a global tendency and the recent increasing use of technology and the digital literacy, and consequently the deepening of the economic, social and cultural disparities between the sectors lacking basic education and the qualified / educated sectors active in international competition markets. (Lam, 2006; Hull, Zacher and Hibbert, 2009; *As cited in* Yildiz et al., 2018). According to the results of the regression analysis, the necessity of developing numerical and verbal skills in order to increase the TIPS scores of individuals was determined. It is thought that especially the increase in numerical scores may cause more increase in TIPS scores than in verbal scores. Considering the mathematical relationship of the algorithms in the infrastructure of information and technology, it can be stated that this result is undeniable. The growth of this deficit can be an obstacle to our confident progress in both the globalizing world. For this, first of all, the problem solving skills of the adults and children of the future adults should be developed with technology.

When the skill levels and the current situation in the general practice are examined, it is thought that the average for both TIPS and other skills areas is low and age distributions are considered to be caused by problems in basic education. Yildiz et al. (2018) stated that the results of PIAAC require rethinking the basic education problems at the national level in terms of both formal education and non-formal education, and within this thinking process, it is necessary to restructure basic education based on the country's long and comprehensive education experience and accumulation.

According to the results of the research, studies can be conducted for adult education in order to increase the technological use of individuals, especially in business life. In addition, different application processes for technology education can be adapted to education programs and development can be provided. In addition, different variables for PIAAC implementation can be examined.

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