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ANALYSIS OF TECHNOLOGY ADDICTION OF HIGH SCHOOL AND UNIVERSITY STUDENTS USING DATA MINING TECHNIQUES

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ABSTRACT: The rapid evolution of technological devices also makes it increasingly challenging to determine which is the most needed. These devices have become addictive, especially for the young generation. In this study, we have made a survey was composed of 31 questions over total of 240 high school and university students to find out which criterions are related with each other in this survey. We have analyzed survey results using Apriori Algorithm that is one of the data mining techniques to ensure extracting some association rules. In the future, to increase social communication between individuals, based on these rules, a lesson about preventing technology addiction may be prepared than given to the students in high schools and universities to raise awareness.

Key words: Analysis of technology addiction, data mining techniques, WEKA, apriori algorithm

INTRODUCTION

As a term of technology that is the human knowledge make our lives easier, simpler. It involves tools, systems, methods and materials. The use of technology increasing day by day, it has become an indispensable part of our lives. We use technology for education, learning, securing data, business, communication, human relation, transportation, agriculture etc.

Despite using technology to better our lives, it causes some problems like addiction, physically and psychologically destructive consequences. Especially technology starts to become an addiction when take away from the time that normally spend on social life (relaxing, spending time with family or friends etc.) of a person. Increasing need to use the Internet, spending lots of time staying online longer than intended, constantly need to check smart device (mobile phones, tablets, computers etc.) and more similar behaviors are symptoms of technology addiction. Technology addiction covers Internet, social media, game addiction etc.

Ivan Goldberg put forward Internet addiction in 1996 (Goldberg, 1996; Lin, 2002).Young who is a psychological expert in the University of Pittsburgh confirmed the existence of Internet addiction (Young, 1997; Xiaoqian, 2012). Related works about Internet addiction is given (Scherer, 1997; Greenfield, 1999; Morahan-Martin & Schumacher, 2000; Block, 2007; Ceyhan & Ceyhan, 2009; Alaçam, 2012).

Valenzuela et. al. (Valenzuela et. al., 2008) determined highly positive correlation between Facebook usages of 2603 students, social trust, civic and political participation. In 2010 Bahk et. al. (Bahk et. al., 2010) investigated potential factors as digital media addiction, relational orientation and demographic features whether affecting the use of social networks like Facebook, Myspace.

Weinstein made a comparison between game users and non-game users to determine computer and video game addiction (Weinstein, 2010) in 2010. Chang and An's study is related with effects of Internet game addiction on health-related lifestyle of Korean elementary school students (Chang & An, 2011). Xu & Yuan suggested motivation and prevention factors for online game addiction among adolescents (Xu & Yuan, 2012). Şahin & Tuğrul in their study, they aim to define the levels of computer game addiction of the 4th and 5th grade primary school students (Şahin & Tuğrul, 2012). In 2014, Gökçearslan & Durakoğlu aimed to determine the video game

addiction level among various demographic features over 146 students who are 6th, 7th or 8th grades in secondary school in Ankara.

In Turkey, in August 2015, Turkish Statistical Institute published the use of information and communication technology in households and individuals (16-74 age groups) statistics for between the years 2004-2015 except for 2006 (Figure 1).

	2004	2005	2006 [1]	2007	2008	2009	2010	2011	2012	2013	2014	2015
Girişimlerde Bilişim Teknolojileri Kullanımı ICT Usage in Enterprises												
Bilgisayar Kullanımı - Computer Usage	-	87,8	-	88,7	90,6	90,7	92,3	94,0	93,5	92,0	94,4	95,2
İnternet Erişimi - Internet Access	-	80,4	-	85,4	89,2	88,8	90,9	92,4	92,5	90,8	89,9	92,5
Web Sitesi Sahipliği - Having Website	-	48,2	-	63,1	62,4	58,7	52,5	55,4	58,0	53,8	56,6	65,5
Hanelerde Bilişim Teknolojileri Kullanımı ICT Usage in Households and Individuals												
Bilgisayar Kullanımı (Toplam)- Computer Usage (Total)	23,6	22,9	-	33,4	38,0	40,1	43,2	46,4	48,7	49,9	53,5	54,8
Erkek - Male	31,1	30,0	-	42,7	47,8	50,5	53,4	56,1	59,0	60,2	62,7	64,0
Kadın - Female	16,2	15,9	-	23,7	28,5	30,0	33,2	36,9	38,5	39,8	44,3	45,6
İnternet Kullanımı (Toplam) - Internet Usage (Total)	18,8	17,6	-	30,1	35,9	38,1	41,6	45,0	47,4	48,9	53,8	55,9
Erkek - Male	25,7	24,0	-	39,2	45,4	48,6	51,8	54,9	58,1	59,3	63,5	65,8
Kadın - Female	12,1	11,1	-	20,7	26,6	28,0	31,7	35,3	37,0	38,7	44,1	46,1
Hanelerde İnternet erişimi - Households with access to the Internet	7,0	8,7	-	19,7	25,4	30,0	41,6	42,9	47,2	49,1	60,2	69,5

TÜİK, Girişimlerde Bilişim Teknolojileri Kullanımı Araştırması, Hanelerde Bilişim Teknolojileri Kullanımı Araştırması (16-74 yaş arası bireyler)
TurkStat, Use of Information and Communication Technology (ICT) in Enterprises, Use of Information and Communication Technology (ICT) in Households and Individuals (16-74 age group)
(1) 2006 yılında araştırma yapılmamıştır.
(1)The surveys were not conducted in 2006

Figure 1. Information Society Statistics (%), 2004-2015 (Turkish Statistical Institute, (2015))

According to statistical results (Information and Communication Technology (ICT) Usage Survey on Households and Individuals, 2015; Turkish Statistical Institute, 2015) Internet usage of individuals increased to 55.9%. 96.8% of households have mobile phone (incl. smart phones), 43.2% of households have portable computer (inc. tablets) and 20.9 of households have smart TV. In the first quarter of 2015, 80.9% of Internet users participated in social networks. In the first quarter of 2015, 74.4 per cent of Internet users used mobile or smart phones while 28.9 per cent used portable computer (e.g. laptop, netbook, tablet etc.) to access the Internet away from home or work.

In 2012, Xiaoqian improved a model that uses fuzzy mathematics and three layer back-propagation neural network in Internet addiction decision (Xiaoqian, 2012). Huang et. al. in 2014 used Apriori data mining algorithm to find relations and identify association rules among affective ambivalence, Internet use behavior and Internet addiction. Total of 502 online and paper questionnaires evaluated, as a result they found under highly positive affectivity, most behaviors were entertainment oriented, while under highly negative affectivity, behaviors were mostly about social activities (Huang et. al, 2014).

The most widely used scale for studies related to Internet addiction level is "Internet Addiction Scale" was designed Hahn and Jerusalem in 2001 (Hahn & Jerussalem, 2001). Şahin & Korkmaz adapted the Internet Addiction Scale into Turkish. As a result this scale is a valid and reliable instrument to determine internet addiction levels of individuals regarding in the Turkish culture as well (Şahin & Korkmaz, 2011). In this study we used our own survey.

In this study, with the help of online survey we aimed to determine both which criterions more important while buying/using technological devices (mobile phone, tablet, computer etc.) and technology addiction of young generation using data mining technique which is Apriori Algorithm.

MATERIALS and METHOD

The research was performed in Kocaeli, Turkey. The study sample was consisted of 240 students whose %41.6 were high school students (N_H=100), the rest of the students were university students (N_U=140). The survey consists of 31 questions that were prepared Turkish and given Table 1.

Table 1. Used Survey in This Study

Eğitim Düzeyiniz?(*Level of Education?*)	Medeni Durumunuz? (*Marital Status?*)	Cinsiyetiniz? (*What is your gender?*)	Aylık Geliriniz? (*Total Monthly Income?*)
Lise (*High School*) Universite (*University*)	Evli (*Married*) Bekar (*Single*)	Kadın (*Female*) Erkek (*Male*)	0-1000 TL (*Turkish Lira*) 1000-2000 TL 2000-3000 TL 3000 TL +
Telefon Markanız Nedir? (*What is your mobile phone brand?*) Iphone-Apple Samsung LG HTC NOKİA	**Telefonunuzu Günde Kaç Saat Kullanıyorsunuz?** (*How many hours a day do you use your mobile phone?*) Gerektikçe (*As Needed*) 0-3 saat (*Hours*) 3-6 saat 6-12 saat 12+	**Sahip Olduğunuz Telefonun Fiyat Aralığı?** (*How much your mobile phone?*) 0-500 TL 500-1000 TL 1000-2000 TL 2000 TL +	**Cep Telefonu Alırken Hangisi Önemlidir?** (*Which of these more important while buying a mobile phone?*) Enerji tasarruflu olması (*Energy Efficient*) Fiyatı (*Price*) Markası (*Brand*) Son Teknoloji Olması (*Latest Technology*) Kullanışlılık (*Usability*)
Cep Telefonunuz İle En Sık Ne Yapıyorsunuz? (*What do you do most frequently with your mobile phone?*) Mesajlaşma/Konuşma (*Messaging/Speech*) Kamera (*Camera*) İnternet (*Internet*) Navigasyon (*Navigation*) Oyun (*Game*)	**)- Cep Telefonunuzda En Sık Kullandığınız Sosyal Medya Uygulaması?** (*Which of these is the most frequently used in your mobile phone as Social Media App?*) WhatsApp Gmail/Outlook Twitter Facebook Instagram/Pinterest LinkedIn	**- Cep Telefonunuzu Ne Zaman Değiştirirsiniz?** (*When do you get a new mobile phone?*) Bozulduğunda (*Break down*) Yeni Teknoloji Çıktığında (*The Emergence of New Technology*) İhtiyaçların Karşılamaması (*Failing to meet the needs*) Popülerlik/Modaya uyum sağlamak (*Popularity/Adapt to fashion trends*)	**2- Cep Telefonunuzun İşletim Sistemi Nedir?** (*What is your mobile operating system?*) IOS (IPhone/Apple) Android Windows Phone
3- Cep Telefonunu Ekranınızı Nasıl Koruyorsunuz? (*How do you protect your mobile phone screen?*) Jelatin (*Plastic Screen Protector*) Tamperli cam (*Tempered Glass Screen*) Sadece Kılıf (*Only Phone Case*) Kullanmıyorum (*I don't use*)	**- Cep Telefonunuzdaki Aksesuarları Değiştirme Süreniz Nedir?** (*How often do you change your phone accessorizes?*) Her gün (*Everyday*) Sıkıldıkça (*When bored*) Eskidikçe/Kırıldıkça (*Become old/Breaking*)	**5- Sarj Deposu Kullanıyor musunuz?** (*Do you use powerbank?*) Evet (*Yes*) Hayır (*No*)	**6- Tablet Kullanıyor musunuz?** (*Do you use tablet?*) Evet (*Yes*) Hayır (*No*)
7- Cep Telefonu/Bilgisayar Alırken Rengi sizin için Önemli Midir? (*Is color important factor while buying a computer/mobile phone?*) Evet (*Yes*) Kısmen (*Partially*) Hayır (*No*)	**8- Cep Telefonunuz/Bilgisayarınız Bozulduğunda Yenisini Ne Zaman Alırsınız?** (*When do you sell new mobile phone/computer that is break down?*) Bozulacağını anladığımda hemen yenisini alırım (*I understand that is broken down than get a new one immediately*) İlk iki gün içinde (*Within the first two days*) Bir hafta içinde (*In a week*) Elime yeterli para geçtiğinde (*When I have enough money in hand*)	**0- Aylık İnternet Kullanımınız?** (*What is your monthly Internet usage?*) 250 MB (*Megabyte*) 1-2 GB (*Gigabyte*) 2-4 GB 4+ GB Sınırsız (*Unlimited*)	**0- Sahip Olduğunuz Bilgisayarın Fiyat Aralığı Nedir?** (*What is the range of your computer's price?*) 0-1000 TL 1000-2000 TL 2000-3000 TL 3000+ TL
- Bilgisayar Alırken Ürünün Hangi Özelliği Diğerlerine Göre Daha Önemlidir? (*Which of these more important while buying a computer?*) Enerji tasarruflu olması	**2- Bilgisayarınızı Ne Zaman Değiştirirsiniz?** (*When do you get a new computer?*) Bozulması (*Break down*) Yeni Teknolojilerin Çıkması (*The Emergence of New*	**3- Bilgisayarınızın İşletim Sistemi Nedir?** (*What is your computer operating system?*) Windows Mac OS –OS X Linux/Unix	**4- Beyaz Eşya Alırken Akıllı Olmasını Tercih Eder Misiniz?** (*Do you choose to buy smart white goods?*) Evet (*Yes*) Hayır (*No*)

| (Energy Efficient) Fiyatı (*Price*) Markası (*Brand*) Son Teknoloji Olması (*Latest Technology*) Kullanışlılık (*Usability*)	Technology) İhtiyaçlarımı Karşılamaması (*Failing to meet the needs*) Popülerlik/Modaya uyum sağlamak (*Popularity/Adapt to fashion trends*)		Fark Etmez (*Doesn't matter*)
5- Akıllı Beyaz Eşya Kullanıyor Musunuz? (*Do you use smart white goods?***)** Evet (*Yes*) Hayır (*No*)	**6- Akıllı Beyaz Eşyalarınızdan Memnun Musunuz? (***Are you satisfied from smart white goods if you use?***)** Evet (*Yes*) Hayır (*No*) Kullanmıyorum (*I don't use*)	**7- Giyilebilir Teknoloji Kullanıyor Musunuz? (***Do you use wearable technology?***)** Evet (*Yes*) Hayır (*No*)	**8- Hangi giyilebilir teknolojiyi kullanıyorsunuz? (***Which wearable technology do you use?***)** Bluetooth Kulaklık (*Bluetooth Headphone*) Akıllı saat (*Smart Watch*) Sosyal Medya Bilekliği (*(Social Media)Smart Wristband*) Akıllı Gözlük (*Smart Glasses*) Hiçbiri (*None of them*)
9- Aşağıdakilerden Hangisini Daha Sık Değiştiriyorsunuz? (*Which of these you change more often?***)** Cep Telefonu (*Mobile Phone*) Bilgisayar (*Computer*)	**10- Hediye Edilmek İstense Hangisine Sahip Olmak İsterdiniz? (***If you have a gift, which would like to have?***)** Akıllı Telefon (*Smart Phone*) Bilgisayar (*Computer*) Tablet (*Tablet*) Akıllı Beyaz Eşya (*Smart white good*)	**11- Yeni Bir Teknoloji Piyasaya Sunulduğunda Hemen Satın Alır Mısınız? (***Do you buy a new generation device when it released?***)** Evet (*Yes*) Gerektiğinde (*When it is necessary*) Hayır (*No*)	
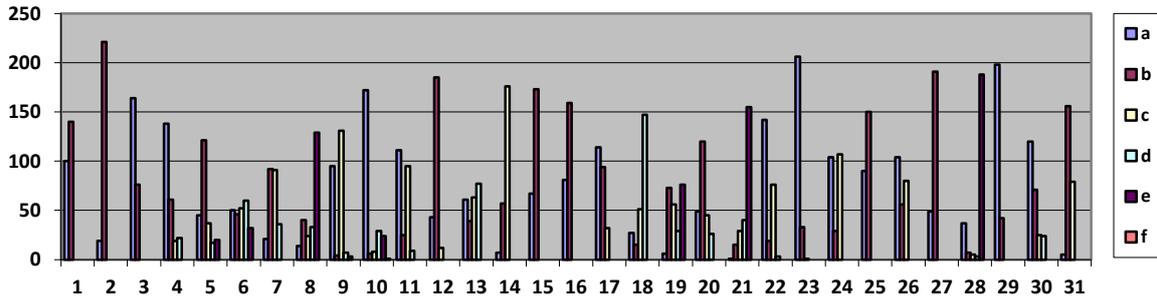
Figure 2. Student Answer Distribution Graph for Each Question in Survey

Student answer distribution graph is given in Figure 2.

Apriori Algorithm

The simplest definition of data mining is obtaining and analyzing meaningful, relevant, significant knowledge from data. It provides to extract four types of relationships these are classes, clusters, associations and sequential patterns.

Association rules technique that is introduced in 1993 by Agrawal et. al. (Agrawal et. al., 1993) is based two important parameters which are minimum support threshold and minimum confidence threshold given below Figure 3 (a) and (b).

$I = \{i_1, i_2, …, i_n\}$ is a set of item in the each transaction **T**,
$T = \{I_1, I_2, I_3, …, I_m\}$ is a set of transaction **T**,
$D = \{T_1, T_2, T_3,…, T_m\}$ is database which includes a set of transaction **T**,
This **X ⇒ Y** rule is an implication form of an association rules, where $X \subset I$ and $Y \subset I$ then $X \cap Y = \emptyset$. **X** is called as the antecedent item of the association rules (left-hand-side or LHS) while Y is called consequent item (right-hand-side or RHS). The minimum support threshold value discovers the frequent itemsets in database **D** and minimum confidence of **X ⇒ Y** rule is percentage of the entire transactions number in the database that contains X and also contains Y (Khamphakdee et. al, 2014).

$$Support(X) = \frac{\text{Support count of } (X)}{\text{Total number of transection in D}} \qquad Confidence(X \Rightarrow Y) = \frac{Support\ (X \Rightarrow Y)}{Support\ (X)}$$

**Figure 3. (a) Formula of Minimum Support Value   (b) Formula of Minimum Confidence Value
(Khamphakdee et. al, 2014)**

Apriori that is a seminal algorithm for finding frequent itemsets for association rules using candidate generation, proposed by Agrawal & Srikant in 1994 (Agrawal & Srikant, 1994). It is characterized as a level-wise complete search algorithm using anti-monotonicity of itemsets, "if an itemset is not frequent, any of its superset is never frequent" (Wu et. al., 2008).

Algorithm steps of the Apriori algorithm (Wu et. al., 2008):
1- **k** is the size of itemsets, $\mathbf{F_k}$ is the size of the set of frequent itemsets and $\mathbf{C_k}$ is candidate itemset of size k.
2- Scan the database with Apriori. It searches for frequent itemsets of size 1 by accumulating the count for each item collect them to satisfy the minimum support requirement.
3- Following three sub steps are iterated than extracted all the frequent itemsets.
    1. Generate $\mathbf{C_{k+1}}$, candidates of frequent itemsets of size **k+1**, from the frequent itemsets of size **k**.
    2. Scan the database and calculate the support of each candidate of frequent itemsets.
    3. Add those itemsets that satisfies the minimum support requirement to $\mathbf{F_{k+1}}$.
To generate $\mathbf{C_{k+1}}$ from $\mathbf{F_k}$ join step and prune step are used. In the join step; $\mathbf{C_{k+1}}$ is generated by joining $\mathbf{F_k}$ with itself. In the prune step, any k-itemset that is not frequent can't be a subset of a frequent k+1-itemset.

The Apriori algorithm pseudo-code is in the following Figure 4.

```
for (k=1; Lₖ≠Ø; k++) //L ₁ = {frequent items};
do begin
generate new candidates Cₖ₊₁ from Fₖ //with function consists of join and prune steps
for each transaction t ϵ database
count of all candidates contained in t //candidatecount
Fₖ₊₁ =candidates in Cₖ₊₁ with minimum support (candidatecount ≥ minimum support)
end
return Uₖ Fₖ;
```

Figure 4. Apriori Algorithm Pseudo-Code

RESULTS

In this study the answers given by students used as a dataset. Each question was determined as an attribute and attribute names given in the Figure 5. Namely 240 samples have a total of 31 attribute is converted to file format .arff in order to use Waikato Environment for Knowledge Analysis (WEKA) (WEKA, 2016). Than used Apriori Algorithm to find association rules among survey answers. Found best 10 association rules separately given for university and high school students in Table 2.

Table 2. Found Best 10 Association Rules Separately for University and High School Students Using Apriori Algorithm in WEKA

University / High School Student Answers	Minimum Confidence and Minimum Support Percentage	Association Rules
For University Students	Minimum support: 0.6 Minimum metric <confidence>: 0.9	1. BILG_OZELLIK=c GIY_TEK=a 84 ==> HANGI_GIY_TEK=b 84 conf:(1) means that : confidence is 100%
		2. SARJ_DEPOSU=a HANGI_GIY_TEK=a 94 ==> GIY_TEK=a 92 conf:(0.98)
		3. BILG_OZELLIK=a HANGI_GIY_TEK=e 86 ==> GIY_TEK=b 84 conf:(0.98)
		4. ABE_KULLANIMI=b HANGI_GIY_TEK=e 86 ==> GIY_TEK=b 84 conf:(0.98)
		5. ABE_KULLANIMI=b GIY_TEK=b 86 ==> HANGI_GIY_TEK=e 84 conf:(0.98)
		6. KORUYUCU_SURE=a GIY_TEK=a EN_SIK_DEGISTIRILEN=a 86 ==> HANGI_GIY_TEK=b 84 conf:(0.98)
		7. BILG_ISL_SIST=a HANGI_GIY_TEK=e 103 ==> GIY_TEK=b 100 conf:(0.97)
		8. KORUYUCU_SURE=a HANGI_GIY_TEK=e 102 ==> GIY_TEK=a 99 conf:(0.97)

	9. GIY_TEK=a EN_SIK_DEGISTIRILEN=a 100 ==> HANGI_GIY_TEK=b 97 conf:(0.97)
	10. YENISINI_ALMA_SURESI=a 120 ==> GIY_TEK=e 116 conf:(0.97)
For High School Students	Minimum support: 0.65 Minimum metric <confidence>: 0.9

The right column continues with rules for High School Students:

1. CINSIYET=a 78 ==> MEDENI_HAL=b 78   conf:(1)

2. SIK_UYGULAMA=a 69 ==> MEDENI_HAL=b 69   conf:(1)

3. CINSIYET=a BILG_ISL_SIST=a 67 ==> MEDENI_HAL=b 67 conf:(1)

4. BILG_ISL_SIST=a 85 ==> MEDENI_HAL=b 84   conf:(0.99)

5. EN_SIK_DEGISTIRILEN=a 81 ==> MEDENI_HAL=b 80   conf:(0.99)

6. TEL_ISL_SIST=a 80 ==> MEDENI_HAL=b 79   conf:(0.99)

7. YENISINI_ALMA_SURESI=a 72 ==> MEDENI_HAL=b 71 conf:(0.99)

8. BILG_ISL_SIST=a EN_SIK_DEGISTIRILEN=a 71 ==> MEDENI_HAL=b 70   conf:(0.99)

9. GIY_TEK=b 70 ==> MEDENI_HAL=b 69   conf:(0.99)

10. AYLIK_GELIR=a 69 ==> MEDENI_HAL=b 68   conf:(0.99)

1	EGITIM	16	TABLET
2	MEDENI_HAL	17	RENK
3	CINSIYET	18	YENISINI_ALMA_SURESI
4	AYLIK_GELIR	19	INT_KULLANIMI
5	TEL_MARKA	20	BILG_FIYAT_ARALIGI
6	KULLANIM_SURE	21	BILG_OZELLIK
7	TEL_FIYAT_ARALIGI	22	BILG_DEGISTIRME_SEBEBI
8	TEL_OZELLYK	23	BILG_ISL_SIST
9	EN_COK_YAPILAN	24	BE_AKILLI_TERCIHI
10	SIK_UYGULAMA	25	ABE_KULLANIMI
11	TEL_DEGISTIRME_SEBEBI	26	ABE_MEMNUNLUGU
12	TEL_ISL_SIST	27	GIY_TEK
13	KORUYUCU	28	HANGI_GIY_TEK
14	KORUYUCU_SURE	29	EN_SIK_DEGISTIRILEN
15	SARJ_DEPOSU	30	HEDIYE
		31	YENI_TEK

Figure 5. Attribute Name of Each Question

According to Table 2 for example found first association rule for university students means that *"Students who think that brand is most important factor while buying a computer and use wearable technology, 100% of these students have smart watch"* under the given minimum support and confidence metric. The second rule is *"Students who use power bank and use Bluetooth headphone as wearable technology, 98% of all of them has a wearable technology"*. Found first association rule for high school students means that *"Students who are female, 100% of them is single"*, second rule is *"Students who use WhatsApp mostly, 100% of them is single"*. Best 10 association rules for both of high school and university students are given Table 3 with 70% minimum support and 90% minimum confidence percentage.

Table 3. Found Best 10 Association Rules for Both of High School and University Students Using Apriori Algorithm in WEKA

Minimum Confidence and Minimum Support Percentage	Association Rules
Minimum support: 0.7 Minimum metric <confidence>: 0.9	**1.** KORUYUCU_SURE=a HANGI_GIY_TEK=a 148 ==> GIY_TEK=a 144 conf:(0.97) **2.** SARJ_DEPOSU=b HANGI_GIY_TEK=c 147 ==> GIY_TEK=b 143 conf:(0.97) **3.** AYLIK_GELIR=a 138 ==> MEDENI_HAL=a 134 conf:(0.97) **4.** SARJ_DEPOSU=b GIY_TEK=b 149 ==> HANGI_GIY_TEK=e 143 conf:(0.96) **5**. TEL_ISL_SIST=a HANGI_GIY_TEK=e 147 ==> GIY_TEK=b 141 conf:(0.96) **6.** HANGI_GIY_TEK=e 186 ==> GIY_TEK=b 180 conf:(0.96) **7.** BILG_ISL_SIST=a HANGI_GIY_TEK=e EN_SIK_DEGISTIRILEN=a 138 ==> GIY_TEK=b 132 conf:(0.96) **8**. CINSIYET=a BILG_ISL_SIST=a 138 ==> MEDENI_HAL=b 132 conf:(0.96) **9.** EN_SIK_DEGISTIRILEN=a HEDIYE=a 130 ==> MEDENI_HAL=a 124 conf:(0.96) **10.** KORUYUCU_SURE=a BILG_OZELLIK=a HANGI_GIY_TEK=a 72 ==> GIY_TEK=a 66 conf:(0.96)

CONCLUSION

In this study, we have analyzed survey results using Apriori Algorithm that is one of the data mining techniques to ensure extracting some association rules. According to analyze results of the best 250 association rules with minimum confidence value is 0.9 and minimum support value is 0.3, %98 of high school students use their mobile phone more than 12 hours in a day to speech and messaging using WhatsApp. Both of university and high school students, who are single, %98 of them care price while buying a mobile phone. University students who use wearable technology %95 of them use computer has Windows operating system.

Different countries give some courses in schools to overcome different addictions and problems like Internet addiction, social media addiction. In Turkey using this type of surveys different addiction (technology, Internet, social media etc.) levels can be detected than should be composed new lesson plans that contains to raise awareness students with variety of important information about them.

In the future this survey research can be applied to more individuals so more meaningful rules can be obtained and these results can be analyzed with more datamining techniques.

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