

# Multitasking: Digital Natives' Interaction with New Media

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**Abstract.** We aimed to analyze multitasking behaviors of digital natives in Turkey while interacting with new media, within the scope of the following questions: What kind of multitasking behaviors do digital natives exhibit? How does being a multitasker influence digital natives' interaction with new media? We used dominant-less dominant, quantitative-qualitative sequential mixed research method. The target group is teenagers, aged from 13 to 17 as being digital natives. The sample size is 494 in the quantitative part; 10 in the qualitative part. According to the results, the rate of being a multitasker among digital natives is very high. Multitaskers think multitasking is a very natural behavior and they feel very comfortable with it. On the other hand, there are some negative issues regarding multitasking, such as losing attention.

**Keywords:** Digital natives, Multitasking, New media, Cognitive load, Interaction.

## 1 Introduction

By the pioneer developments in computer technologies, especially with the emergence of the Internet, digitalization has started in all the areas in the information age that we live in. Digital culture has become an inseparable part of the information society [1]. A new generation, who was born and has been raised in the world of such a society, appeared. There is plenty of naming for this new generation but in this study we will use Prensky's [2] term: "digital natives". He defines digital natives as "native speakers of the digital language of computers, video games and the Internet". They are the people born after 1980's and surrounded by digital media and other digital technologies.

Digital natives differ in characteristics and express their needs in ways that are different from the previous generations. As stated by Prensky [2], for example, they "like to parallel process and multi-task". Multitasking behavior is influential on individuals' lives in various extents, such as in terms of their interaction with technological tools, especially considering the information age that we live in. In fact, information and communication technologies in the world of digital natives are no more based on traditional media. Manovich [3] said that media turned into new media as a

result of enormous developments, especially in 1990's. Lister et al. [4] listed the properties of new media as digital, interactive, hypertextual, virtual, networked, and simulated. This is the media by which digital natives are surrounded.

The term multitasking originally belongs to computer sciences. It is defined as "the running of two or more programs (sets of instructions) in one computer at the same time" [5]. While the term belongs to computer sciences, however, it has been used by various disciplines other than computer sciences such as media and human sciences as well. When it comes to humans, multitasking is defined as "the ability to conduct two or more tasks at the same time both requiring attention and various advanced cognitive processes" [6].

Multitasking behavior has come into prominence in the last decades. The research done by Rideout et al. [7] shows that in the USA, multitasking proportion among youths aged 8-18 increase gradually; multitasking proportion is 16% for 1999, 26% for 2004, and 29% for 2009. They define multitasking proportion as "the proportion of media time that is spent using more than one medium concurrently". This finding is very important because it implies that the rate of multitasking behavior of young people is raising in parallel to the developments in technology. On the other hand, according to some research, doing or attempting to do more than one task at a time overloads the capacity of the human information processing system [8, 9]. Cognitive overload may be a barrier to some activities, such as learning. In this case, Hem-brooke and Gay [10] say that multitasking may have a negative impact on learning due to cognitive overload. While designing human-computer interfaces, optimum use of working memory should be taken into consideration in order to balance the cognitive load [11]. Therefore, the relation between multitasking and cognitive load for digital natives has a value to be investigated within the context of human-computer interaction.

Then, it becomes more of an issue to examine on multitasking behavior of digital natives; especially in the present days when new media become dominant by the use of Web 2.0 technologies and social media in our lives, and in such a world that multitasking behavior becomes widespread. In this respect, we aimed to analyze multitasking<sup>1</sup> behaviors of digital natives in Turkey while interacting with new media, within the scope of the following questions: What kind of multitasking behaviors do digital natives exhibit? How does being a multitasker influence digital natives' interaction with new media? Research questions related to the former are: Do digital natives exhibit multitasking behaviors? How are multitasking behaviors of digital natives distributed with regard to age, gender, and socio-economic status (SES)? Research questions related to the latter are: Why (or not) do digital natives do more than one activity while online? How do digital natives do more than one activity while online? How do digital natives feel doing more than one activity while online?

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<sup>1</sup> While multitasking is valid for any activity, here, it is addressed to new media usage, focusing on the Internet.

## 2 Method

In the study, we used dominant-less dominant and quantitative-qualitative sequential mixed research method. First, we conducted the less dominant, quantitative part and then the dominant, qualitative part.

### 2.1 Participants

The target group is teenagers, aged from 13 to 17 as being digital natives. The universe of the study is teenagers of 13-17 years old in Turkey; study universe is teenagers of 13-17 years old in Istanbul. In the quantitative part, study sample was determined by disproportional group sampling method; and stratified according to age, gender, and socio-economic status (SES). Total size of participants is 494 (age 13: 103, age 14: 101, age 15: 82, age 16: 101, and age 17: 107; females: 240 and males: 254; low-SES: 267 and high-SES: 227) [12]. In the dominant qualitative part, the focus group consists of 10 participants selected by extreme or deviant case sampling of purposive sampling methods, with regard to being a multitasker or not. We chose the participants of the qualitative part based on the findings about being a multitasker, from the first part. Half of these participants are multitaskers, and the other half are non-multitaskers. Also, we took into consideration that there were one multitasker and one non-multitasker at each age.

### 2.2 Design

We used descriptive model in the quantitative part; and case study model in the qualitative part.

### 2.3 Materials

In the quantitative part, a questionnaire was used as the data collection tool in order to determine the multitasking behaviors of digital natives as well as their demographic information [12]. In the qualitative part, focus group interviews were carried out in order to have detailed information about multitasking behaviors of digital natives, by using semi-structured interview questions.

### 2.4 Analysis

Findings from the quantitative part were analyzed by using percentage frequency distributions. Findings from the qualitative part were analyzed using descriptive analysis method. Before descriptive analysis, interviews were transcribed into text. Then, descriptive analysis was performed through four stages. At the first stage, a thematic framework was constructed. At the second stage, transcripts were annotated and organized for each theme. At this stage, participants were labeled with their age and multitasking behavior, such as 13-M where 13 stands for the age and M stands for being a

multitasker or 13-nonM where 13 stands for the age and nonM stands for being a non-multitasker. At the third stage, findings were obtained. At the last stage, findings were discussed and interpreted.

### 3 Results

In order to answer research questions, data from both quantitative and qualitative parts were analyzed. The results are given below, respectively.

#### 3.1 What Kind of Multitasking Behaviors Digital Natives Exhibit

In the quantitative part, we tried to answer the following research questions within the scope of the question of “What kind of multitasking behaviors do digital natives exhibit?”:

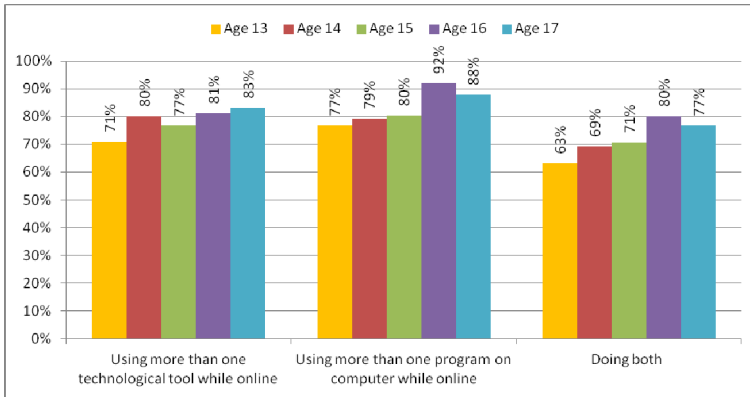
- Do digital natives exhibit multitasking behaviors?
- How are multitasking behaviors of digital natives distributed with regard to age, gender, and socio-economic status (SES)?

Multitasking behavior of digital natives were analyzed in terms of: (1) Using more than one technological tool while online, (2) Using more than one program on computer while online. The former was asked as “Do you do more than one activity at the same time while you are online? For example watching TV, listening to music, or talking on the cell phone while searching the Web for your homework...” The latter was asked as “Do you do more than one activity on the computer at the same time while you are online? For example checking your e-mails, posting to your Facebook profile, or doing chat while searching the Web for your homework...” The purpose of emphasizing “while searching the Web for your homework” in the example given in the questions is to mention an activity that is not automatic, but requires attention. Table 1 shows the distribution of affirmative answers addressing to these cases.

**Table 1.** Distribution of multitasking behaviors

	f (N=494)	%
Using more than one technological tool while online (a)	388	79%
Using more than one program on computer while online (b)	412	83%
Doing both	356	72%
Doing at least one of “a” or “b”	444	90%
Doing neither	50	10%

From Table 1, we see that the rate of digital natives who use more than one technological tool while online is 79%; that of digital natives who use more than one program on computer while online is 83%; that of digital natives who behave in both ways is 72%. It can easily be seen that the rate of digital natives who behave at least one of these ways is 90%; and that of digital natives who behave in neither one of these ways is 10%.

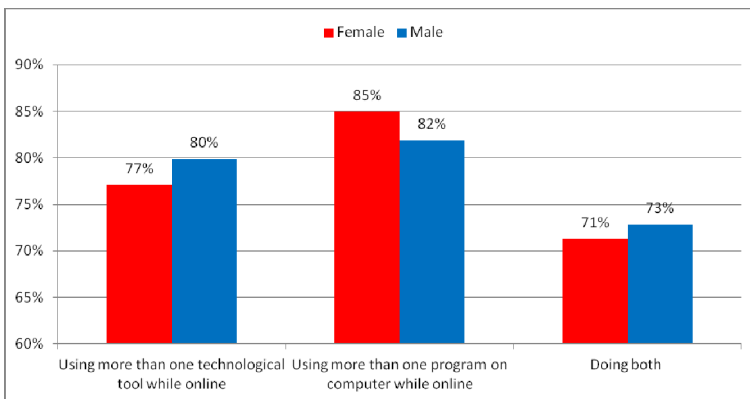


**Fig. 1.** Distribution of multitasking behaviors with regard to age

The distribution in Figure 1 is obtained by analyzing multitasking behavior of digital natives with regard to age.

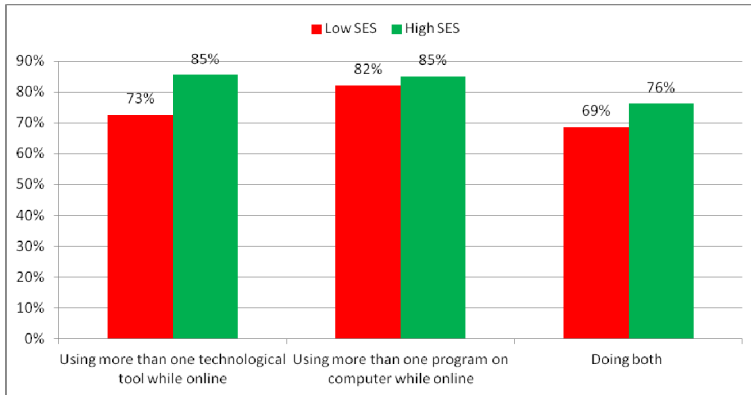
As we see from Figure 1, the rates of multitasking behavior for each age group are almost the same and close to each other. The highest rate among digital natives who use more than one technological tool while online belongs to 17 year olds (83%). The highest rate among digital natives who use more than one program on computer while online belongs to 16 year olds (92%). The highest rate among digital natives who behave in both ways belongs also to 16 year olds (80%).

The distribution in Figure 2 is obtained by analyzing multitasking behavior of digital natives with regard to gender.



**Fig. 2.** Distribution of multitasking behaviors with regard to gender

As we see from Figure 2, the rates of multitasking behavior for females and males are close to each other. The rate of using more than one technological tool while online is higher among males (80%) than females (77%). The rate of using more than one program on computer while online is higher among females (85%) than males (82%). The rate of behaving in both ways is higher among males (73%) than females (71%).



**Fig. 3.** Distribution of multitasking behaviors with regard to SES

The distribution in Figure 3 is obtained by analyzing multitasking behavior of digital natives with regard to SES.

As we see from Figure 3, the rates of multitasking behavior among digital natives from high-SES are higher than those from low-SES. The rate of using more than one technological tool while online is higher among high-SES (85%) than low-SES (73%). The rate of using more than one program on computer while online is higher among high-SES (85%) than low-SES (82%); but those rates are close to each other. The rate of behaving in both ways is higher among high-SES (76%) than low-SES (69%).

### 3.2 How Being a Multitasker Influences Digital Natives' Interaction with New Media

In the qualitative part, we tried to answer the following research questions within the scope of the question of "How does being a multitasker influence digital natives' interaction with new media?":

- Why (or not) do digital natives do more than one activity while online?
- How do digital natives do more than one activity while online?
- How do digital natives feel doing more than one activity while online?

Thematic framework was developed in parallel to these research questions, respectively: (1) Reasons for being a multitasker (or non-multitasker), (2) Multitasking style, (3) Feelings while multitasking.

The first theme is "reasons for being a multitasker (or non-multitasker)". The theme was analyzed within the scope of participants' answers to the following questions: "You reported that you (don't) use more than one technological tool while online, why?" "You reported that you (don't) use more than one program on computer while online, why?" According to the results, multitasker participants agreed that multitasking is a *natural behavior* of them. For example, the participant coded as 13-M stated "I don't do otherwise" about using more than one technological tool at the

same time. Similarly, 15-M said “in general, I already behave like that” about using more than one program on computer at the same time. On the other hand, non-multitasker participants have a common feature: *not having enough opportunity to get experience* in multitasking. One of the reasons behind this is to use new media rarely or never. For example, the participant coded as 13-nonM stated “We have no computer. I don’t use the Internet much.” Another reason is not to have access to more than one technological tool to use simultaneously. For example, 16-nonM said “There is no TV in the room which I do my homework, there is a desktop computer only.” There is another common feature of non-multitaskers: *prejudice* against possible negative effects of being a multitasker. When they think of multitasking, especially while doing homework, they assert their concern for losing attention or concentration, or wasting time; thus having lower points at school. For example, 15-nonM stated “I don’t do multitasking since I think I can lose my concentration.” Similarly, 14-nonM said that “I don’t use the Internet. I don’t have any Facebook account because I don’t want to get lower points at school.”

The second theme is “multitasking style”. The theme was analyzed within the scope of participants’ answers to the following questions: “You reported that you use more than one technological tool while online, how?” “You reported that you use more than one program on computer while online, how?” Naturally, we asked these questions only to multitasker participants. When we examine on the records for these questions, we saw that this theme should be analyzed under two conditions: (1) at least one of the tasks, such as doing homework, requires attention (2) that doesn’t require much attention. Although there is no big problem with the second case to mention, the first case needs to be examined. Results show that some multitaskers have developed some strategies in order to diminish the possible negative effects. For example, 14-M stated “I don’t bother, if all the programs I was using are related to my homework.” about using more than one program on computer at the same time. 13-M stated “While I am doing homework, I rather listen to music.” about using more than one program on computer and/or more than one technological tool at the same time. In other words, 13-M prefers such an activity that requires less attention while he is doing homework at the same time. 16-M said “While doing homework, if the other programs related to my homework are open on my computer, there is no problem. But if they are not related to my homework, then I work with them in a sequence.” On the other hand, one of the multitaskers, 15-M, has trouble because of losing concentration or has some concerns about wasting time with multitasking. 15-M stated “I don’t use any other technological tool while I am doing my homework since I lose my concentration. I use more than one program while online but it is such a waste time. Those times I am worrying about my school life.”

The third theme is “feelings while multitasking”. The theme was analyzed within the scope of participants’ answers to the following questions: “How do you feel when you are using more than one technological tool while online, especially while studying?” “How do you feel when you are using more than one program on computer while online, especially while studying?” We asked these questions only to multitasker participants as well. According to the results, we saw that all the multitasker participants’ views about multitasking behavior were in a positive way. For example, 17-M

said “I am feeling very comfortable while doing it.” 14-M said “It is funny to multitask. Indeed, the Internet is not fast enough for me. If it would be faster multitasking would be funnier.” One of them, 13-M, even said “I love to behave like that so much.”

## 4 Discussion

The rate of multitasking behavior among digital natives in Turkey is very high. Although the rates of those regarding to age, gender, and SES differ, it can easily be seen that all those rates are very high as well. In other words, it is common among digital natives to use more than one technological tool or more than one program on computer simultaneously while online. Similarly, as a result of their study with people aged from 14 to 65+ in Britain, Helsper and Enyon [13] found that multitasking behavior was observed with the significantly highest rate at 14-17 age range (87%) among all the age ranges. Also, Rideout et al. [7] found that only 13% of 13-18 aged youths were not computer multitasker in the USA in 2009. Computer multitasker means who “use a totally different medium while he/she is also using the computer –for example, watching TV, reading, or text messaging”. Another 40% of that age group said they use another medium or text message most of the time while they are using computer; another 26% said they do so some of the time; another 17% said they do so a little of the time. In the project of Media Habits of MENA (Middle Eastern and North African) Youth, participants aged 13-28 stated their choices about other activities they usually engaged in while watching TV, as follows: 53% send and receive cell phone text messages, 50% talk on the phone, 41% send and receive email, 39% listen to music, 36% browse online, 35% do their homework or work, 19% play video games, and 17% read [14]. All those findings together with the findings of this study show that multitasking behavior among digital natives are very widespread all over the world.

In case of the effects of multitasking behavior on digital natives, we saw that multitasking digital natives think that multitasking is a very natural behavior and they feel very comfortable with it. Non-multitaskers, however, think in a negative way about multitasking behavior. The main two reasons behind this are: not having enough experience in multitasking, and having prejudice against multitasking as it causes to lose concentration. These are very reasonable. It can be expected to make prejudice about a behavior related to using new media for one who doesn't have enough opportunities to have access and use new media. Indeed, we saw that the common point of non-multitaskers is that they all use new media few and far between when we examine the records of those participants [12]. The rate of using computer or Internet among them is at most weekly; the rate of using mobile phone is at most weekly (except one who uses daily); no one possesses tablet computer; no one have personal web site or blog; only one of them has a Facebook account but he uses it rarely. Thus we cannot expect them to get experience in multitasking. On the other hand, one of the multitaskers thinks that multitasking behavior may have a negative effect on their academic success since it can lead to lose concentration. Therefore, there appears a



relation between multitasking and concentration obviously. Correspondingly, there are some research which state that attempting to do more than one task at a time overloads the capacity of the human information processing system [8, 9]. Additionally, we cannot be sure that the strategies, which were developed by some multitaskers to diminish the possible negative effects of multitasking, are really effective.

## 5 Conclusion

It becomes important to examine on behaviors of digital natives interactions with new media, especially in the present days when new media has become dominant in our lives and in such a world that multitasking behavior becomes widespread. From this point, we conducted this research which is about multitasking behaviors of digital natives in Turkey.

According to the results, it is observed that the rate of being a multitasker among digital natives in Turkey is very high. Also, according to the detailed analysis with regard to age, gender, and SES, those rates are very high and close to each other. According to multitaskers, multitasking is a very natural behavior and they feel very comfortable while doing it. On the other hand, non-multitasker participants have a common feature that they didn't have enough opportunity to get experience in multitasking. Although all the multitasker participants said they were doing more than one activity at the same time when online, we observed that their multitasking behavior may differ if at least one of the tasks requires much attention. In that case, some multitaskers pay special attention deciding on which activity to do simultaneously; some prefer doing activities in a sequence. Losing concentration is a very common obstacle, for both multitasker and non-multitasker digital natives, to do multitasking.

New media offer more than one possibilities to interact with simultaneously, i.e. multitasking. As new media bring new interaction ways, human behaviors change as well. Besides, human factors change as digital natives have different characteristics. Although human is the most complicated aspect of human-computer interaction, there are some cooperative disciplines such as psychology and cognitive sciences to deal with such a complicated factor [11]. Therefore, we suggest that there should be more interdisciplinary investigations especially on cognitive load while executing multiple tasks. Because the findings of this study relay on the self-reporting of participants on both questionnaire and interviews, there is the need for empirical data in order to get deeper findings to discuss about positive and negative issues on multitasking. Thus it could be possible to apply knowledge from cognitive neuroscience to achieve more effective human-computer interaction designs for the digital natives. Human-computer interaction offers more design opportunities, while there is a tendency to user-centered designs [15]. It becomes more of an issue that human-computer interaction designers and user experience designers should use the opportunity to reduce cognitive load.

In conclusion, the results provide valuable information for getting to know digital natives in Turkey by presenting the nature of their multitasking behaviors. Therefore, the study is worth in terms of providing information to apply on the related fields as well as providing some starting points for future research.

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