

CONTINUOUS PARTIAL ATTENTION AS A PROBLEMATIC TECHNOLOGY USE: A CASE OF EDUCATORS

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Abstract

Continuous Partial Attention is a current concept open to research which, besides multitasking, intensely occupies the agenda of education, communication and cognitive psychology. The purpose of the present study was to determine educators' continuous partial attention. In line with this purpose, the research data were collected from 109 educators in higher education from different age groups and from four different countries with the use of a questionnaire made up of two sections and seven questions. The findings obtained in the study revealed that the educators' Continuous Partial Attention did not significantly differ with respect to their technology use efficacies, their ages or their countries. In addition, it was found out that the educators' Continuous Partial Attention differed statistically significantly depending on the fields they worked in. Based on this, it could be stated that educators working in the field of educational technologies encounter with Continuous Partial Attention more frequently than educators working in other fields. At the end of the study, several suggestions were put forward.

Keywords: Educators, Continuous Partial Attention, multitasking

INTRODUCTION

Continuous Partial Attention (CPA), one of the current concepts open to research regarding interaction with technology, occupies the current agenda of cognitive psychology, communication and education. This concept, first introduced in 1998 by Linda Stone (2007), a former manager of Apple and Microsoft, is considered to be one of the important effects of

today's information technologies on individuals. Stone defines this concept as trying to follow and deal with everything while, in fact, failing to focus on anything. According to Friedman (2001), what CPA means is that the individual replies to his or her e-mails while, at the same time, the phone rings and/or he or she chats with his or her children. As, in such a case, the individual is under a bombardment of interactions, he or she can focus only partially on each of these interactions (Virilio, 2003).

In his book titled *Everything bad is good for you: How popular culture is making us smarter?* Steven Johnson defines CPA saying, "this generally involves synthesizing superficially the data obtained, collecting the related information and going on with the following data flow" (2004, p.59). As can be understood from this definition, Johnson regards CPA as a kind of multitasking. According to Johnson, this situation provides people with a wider network, while, at the same time, it involves the risk of preventing from learning to fish. In other words, the individual has the opportunity to revise a wider range of data in a shorter period of time, while he or she is likely to lack the knowledge of how to establish connections between the data. This could prevent the individual from focusing on a certain field.

In related literature, it is seen that multitasking and CPA are frequently confused or discussed comparatively. In literature, CPA is reported to be a concept related to "multitasking", or also known as dual tasking. The concept of multitasking is a real process that requires simultaneous fulfillment of two or more tasks (talking on the phone and driving) (Appelbaum, Marchionni and Fernandez, 2008). However, CPA is a concept that refers to interaction and communication with everything while failing to focus on anything in real terms. CPA leads to a high level of stress in an individual's brain (Small and Vorgan, 2008a). As a result, the Internet-addicted individual does not have time to respond, to think or make conscious decisions but constantly experiences conflicts and expects to make new friends

with artificial sincerity and to hear the latest news. Soon, this could become an irresistible situation.

According to Stone (2007), CPA and multitasking are two different attention strategies: the former being motivated by the desire for not missing anything and the latter by the desire for being more successful and more effective. In other words, in CPA, the individual permanently watches for an opportunity to meet someone new, to take part in a new activity or to get the latest news by being in constant connection at any time. Similarly, according to Kirsner (2005), CPA is a situation in which the individual places orders via his or her mobile phone in front of the computer while, at the same time, he or she follows the papers presented at an on-going conference. This situation is like being aware of a number of things simultaneously and drawing attention to a newly-received e-mail or to a ringing phone.

In order to emphasize the difference between CPA and multitasking, Small and Vorgan (2008b) pointed out the motivation of multitasking and CPA; accordingly, while the individual tries to improve the effectiveness and productivity in multitasking and has an objective for each task, he or she is in a struggle for getting a chance for a connection at any time when his or her mind is partially stimulated and when this becomes constant. This means being in a partial connection with everything everywhere via CPA. Similarly, Benbunan-Fich (2012) pointed out that CPA occurs due to the desire for not missing anything and that multitasking occurs due to the need for being more prolific and more productive.

According to Small and Vorgan (2008a), when CPA is maintained, the feelings regarding self-worth and control felt are condemned to be destroyed at some point. One of the reasons is that our brains are not structured in a way to make such an observation in the long term. On the other hand, the concept of multitasking behavior should be considered within its own contexts as a variable developing, at least partially, based on rich information because the

multitasking situations contain a natural adaptation of the person to the rich information environments.

As can be understood from the limited number of studies reported in related literature, CPA is regarded as a concentration problem which is created by current information and communication technologies and which is likely to influence almost every moment of individuals' daily lives. On the other hand, there is no research conducted directly on CPA in literature. According to Appelbaum, Marchionni and Fernandez (2008), "there is no refereed study on continuous partial attention" (p. 1318). In this respect, the present study is thought to be the first step to fill this gap in literature.

Educators have a wide range of preference for the technological tools that provide learning experiences. According to Roberts (2009), although there is a high level of resistance in higher education, technology has now become an indispensable part of daily life. Educators working in close connection with technology not only have the potential to encounter the CPA problem, but also are expert both on technology use in education and on the effects of this use on individuals. In addition, educators have the responsibility for training individuals who can constantly follow the technological developments and who have the ability to access, produce, share and use information effectively (Akkoyunlu and Kurbanoglu, 2003). Educators who are engaged with education technologies as required by their fields of work have a place which could allow examining CPA. Therefore, it is quite important to determine educators' CPA. Thus, the present study could contribute to future studies to be conducted to help both educators and students cope with CPA.

Purpose of Study

The main purpose of the present study was to determine educators' continuous partial attention. For this purpose, the following research questions were directed:

1. To what extent do educators encounter distraction with continuous partial attention (CPA)?
2. Is there a significant relationship between educators' continuous partial attention and
 - a. their countries,
 - b. their ages,
 - c. their fields and
 - d. their technology use efficacies?

METHOD

This part introduces the participants of the study, the data collection tool used for research and analysis of the research data. In the study designed with the survey method, quantitative data were used.

Participants

In order to determine the participants of the study, the purposeful sampling method was applied. It was thought that the educators selected for the examination of their CPA, which is a concept related to technology use, were relegated to those who used the Internet. The questionnaire form developed was transferred into electronic format. The electronic questionnaire form was sent to seven e-mail accounts created in different fields of education across 20 countries. In total 140 educators responded to the survey. Because of the missing data 31 responses were eliminated. As a result, 109 valid returns were utilized for the questionnaire delivered to educators. The questionnaire was made up of two sections and seven questions. There were four questions related to the demographic backgrounds of the participants in the first section and three 5-point Likert-type questions regarding CPA in the second section.

The participants of the study were 109 higher education educators from four different countries and from different age groups. Of all the participants, 42 of them were from USA, 63 from Turkey, two from Canada and two from Iran. The age, technology usage efficacy and profession demographic backgrounds of the participants are presented in Table 1 below.

Table 1. Demographic Backgrounds of the Participants

	Frequency (f)	Percentage (%)
<i>Age</i>		
20-50	64	58.7
50and over	45	41.3
<i>Technology Use Efficacy</i>		
Inefficient	21	19.2
Average	14	12.8
Efficient	74	67.9
<i>Profession</i>		
Educational Technologies	64	58.7
Other Fields (Science, foreign languages, mathematics, special education and so on.)	45	41.3

As can be seen in Table 1, the ages of 58.7% of the participants ranged between 20and 50. This demonstrates that most of the participating educators belonged to the middle-age group. According to the views of the participating educators, they had quite a high level of technology use efficacies. Of all the educators, 67.9% of them considered themselves to be “efficient” in terms of technology use efficacy. When the professions of the educators participating in the study were taken into consideration, it was seen that 58.7% of them

worked in the field of Educational Technologies and 41.3% of them in the others fields of education (science, foreign language, mathematics, special education and others).

Data Collection Tool and Data Collection Process

As the data collection tool in the study, the questionnaire of “Continuous Partial Attention” developed within the scope of the study was used. The questionnaire was made up of two sections and seven questions. There were four questions related to the demographic backgrounds of the participants in the first section and three 5-point Likert-type questions regarding CPA in the second section.

For the development of the items in the questionnaire, studies reported in related literature and experts’ views were used. First, for the face and content validity of the questionnaire developed in line with the related literature, it was presented to two academicians expert in the field of Educational Technologies, and the items were revised and corrected based on the experts’ recommendations. The Continuous Partial Attention Questionnaire was developed in two languages: Turkish and English. For the translated version of the questionnaire, an educator from the Department of English Language Teaching was asked for help. In the second section of the questionnaire, the translated and original versions of three questions regarding CPA are presented in Table 2 below.

Table 2: *Translated and Original Versions of Three Questions Regarding CPA*

English Items	Turkish Items
I constantly follow and get engaged with technology (While following the news on TV, at the same time, reply to my e-mails, chat with my friends and answer the phone).	Teknolojiylesürekli birizlemeve uğraşçerisindeyim. (TV'den haberleritakip ederken birtaraftan e-maillericevaplama birtaraftanarkadaşlaşohbetisürdürmeve gelentelefonacevap vermedurumu).

I want to stay in constant connection at any time not to miss anything (I constantly wait for an opportunity to get the latest news, meet someone new or join a new event).

I pay partial attention to what I'm doing while following and getting engaged with technology (while trying to communicate and interact with everything, I fail to focus on anything in real sense).

Hiçbirşeykaçırmamak için herhangibir zamandasürekli bağlantı halinde olmak istiyorum. (Yeni bir haberi almak, yeni biriyle tanışmak ve yaygın bir etkinlikte katılmak için sürekli bir kolla/beklenti içinde olmadurumu).

Teknolojiyle sürekli birizleme ve uğraşırken işimde iken gerçekte yaptığım şeyleri dikkatimi tam veremiyorum. (Her şeyle iletişim, etkileşim halinde olmak isterken gerçekte anlamda hiçbir şey odaklanamadurumu).

In order to reinforce the comprehensibility of the questionnaire items, a pilot study was conducted with three teachers, one teacher of Information Technologies, one teacher of Turkish Language and one teacher of English Language. With the pilot application, the questionnaire items were revised, and the survey validated.

For the collection of the research data, the e-mail lists that the educators used for sharing were used. Three international e-mail lists and four national e-mail lists, seven in total, which were used in such fields as “Educational Technologies”, “Science”, “Elementary School Teaching”, “Special Education” and “Mathematics Education”, were used. The online Continuous Partial Attention Questionnaire was transferred into Google documents and delivered to the participating educators via the e-mail lists.

Data Analysis

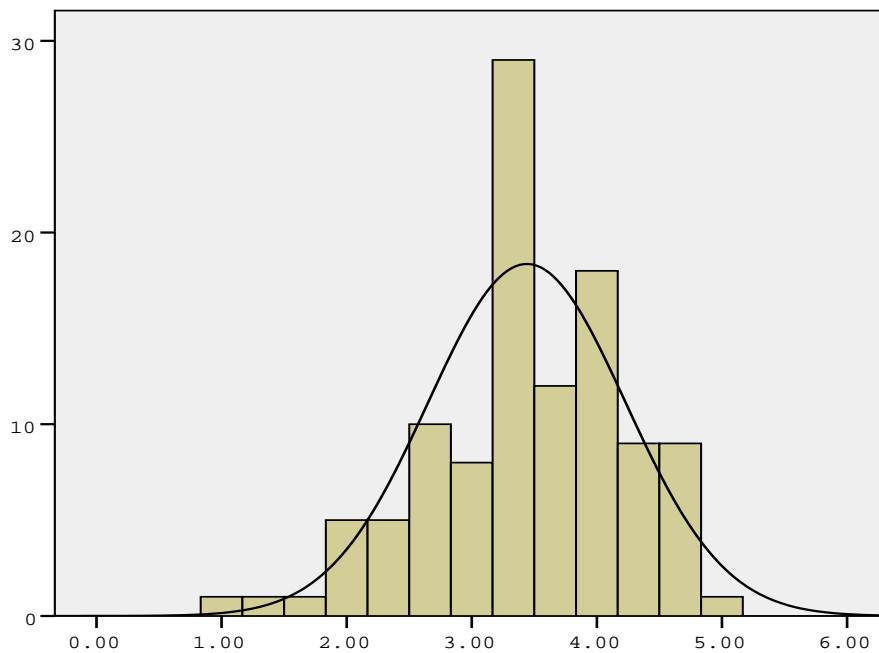
For the analysis of the data collected in the study, qualitative and quantitative analysis techniques were used. After the Kolmogorov-Smirnov Z normality test it was seen that the data collected were significantly differed from normal distribution [$D(109)=1.812$, $p<.05$]. Therefore, Kruskal-Wallis H test was applied instead of a one-way ANOVA, and the

Mann-Whitney U test was run instead of independent samples two-sample t-test. Thus, in the second section of the questionnaire, for the analysis of the scores obtained related to the items regarding CPA, the Kruskal-Wallis H test and the Mann-Whitney U test were applied. Descriptive statistics like mean, standard deviation and frequency was used to determine what extent educators encounter distraction with continuous partial attention (CPA). A Mann-Whitney U test and Kruskal-Wallis H test were run to examine relationship between educators' continuous partial attention and their countries, their ages, their fields and their technology use efficacies. For the analysis of the quantitative data collected in the study, the SPSS 15.0 package software was used.

FINDINGS

In this section, the findings were obtained and summarized under two headings according to the research questions directed in the study. Data were collected to determine whether the data collected met the parametric test conditions. The first condition related to the application of the parametric tests, whether the data had normal distribution or not, was examined. The means of the scores assigned to the three items found in the second section of the questionnaire regarding CPA were taken as CPA scores. Figure 1 below demonstrates the normal distribution chart regarding the CPA scores.

Figure 1. Normal Distribution Chart



As can be understood from the normal distribution chart and the normal distribution curve, the data collected within the scope of the study had a left-skewed distribution compared to normal distribution. As presented in Table 3 below, when the data set was examined, because the kurtosis was higher than three and because the leptokurtosis and kurtosis were negative, the measures had a left-skewed distribution.

Table 3: *Descriptive Statistics*

N	Mean	Standard deviation	Kurtosis	Skewness	Min	Max
109	3.42	.84	.152	-.652	1	5

In order to test whether the data had a normal distribution or not, the Kolmogorov-Smirnov Z Test was applied. As a result of this test, it was seen that the data with a mean of 3.42 and a standard deviation of .84 significantly differed from normal distribution [$D_{(109)}=1.812$, $p<.05$]. As the data did not have a normal distribution, the first one of the parametric test conditions was not achieved. Therefore, for the analysis of the data collected, non-parametric tests were used. In this way, for the analysis of the data, the Kruskal-Wallis H test was applied

instead of one-way ANOVA, and the Mann-Whitney U test was run instead of independent samples two-sample t-test.

To what extent do educators encounter CPA?

In order to evaluate the educators' approaches to CPA, various statistical methods were applied. For this purpose, first, the educators' mean scores regarding CPA were examined.

Table 4 below presents the mean scores for each item.

Table 4: *Mean Scores for Each Item*

Items	Mean (X)
1. I constantly follow and get engaged with technology.	3.58
2. I want to stay in constant connection at any time not to miss anything.	3.41
3. I pay partial attention to what I'm doing while following and getting engaged with technology.	3.26
Mean	3.42

As can be seen in Table 4, the mean scores for each item were quite close to one another. According to the educators' scorings, the highest mean score (3.58) belonged to the first item and the lowest mean score (3.26) to the third item. Depending on this finding, it could be stated that all the participating educators experienced CPA ($X=3.42$). In order to examine the educators' mean scores for the three items regarding continuous partial attention with respect to their demographic backgrounds, Table 5 below was prepared.

Table 5: *Participants' CPA Scores with Respect to their Demographic Backgrounds*

Variables	Mean (X)	Standard Deviation (SD)
<i>Age</i>		
20-50	3.40	.82
50 and over	3.45	.86
<i>Technology Use Efficacy</i>		
Inefficient	3.57	.81
Average	3.42	.85
Efficient	3.19	.86
<i>Profession</i>		
Educational Technologies	3.68	.62
Other Fields (Elementary School Teaching, Science, Foreign Language, Mathematics, Special Education and so on)	3.05	.97
<i>Country</i>		
USA	3.30	.86
Turkey	3.49	.81

As demonstrated in Table 5, the educators who considered themselves to be efficient in terms of technology use had higher CPA scores than those who considered themselves to be inefficient. In addition, it was striking that the educators working in the field of Educational Technologies had higher scores of continuous attention than those working in other fields.

This demonstrates that the educators working in the field of Educational Technologies encountered with the CPA problem more frequently.

Is there a significant relationship between the educators' CPA and their countries, ages, fields and their technology use efficacies?

In order to determine whether the educators' CPA differed with respect to their fields and their countries, the Mann-Whitney U test was applied. Due to the low number of the educators participating in the study from other countries except for USA and Turkey, these two countries were selected as independent samples. Table 6 below presents the results of the Mann-Whitney U test.

Table 6: *The Mann-Whitney U Test Results with Respect to the Variables of Country and Profession*

Variable	Groups	n	Mean Rank	M-Whitney U	Z	p
Country	USA	42	49.52	1177	-.964	.333
	Turkey	63	55.32			
Field	Educational	64	63.39	903	-3.34	.001
	Technologies					
	Other	45	43.07			
Age	20-49	64	53.73	1359	-.505	.614
	50 and over	45	56.80			

As can be seen in Table 6, there was no significant difference between the educators' CPA and their ages or countries. This result demonstrates that there was no significant relationship between the educators' CPA and their ages or countries. However, when the educators' CPAs were examined with respect to their fields of work, a statistically significant difference was

found ($p < .05$). Depending on this finding, it could be stated that the educators working in the field of Educational Technologies encountered CPA more frequently than those working in other fields. The reason for this could be the fact that educators working in the field of Educational Technologies use technology more frequently as required by their field.

In order to determine whether the educators' CPA differed depending on their technology use efficacies, the Kruskal Wallis H test was used. Table 7 below presents the Kruskal Wallis H test results with respect to the technology use efficacies of the participating educators.

Table 7: *Kruskal Wallis H Test Results with Respect to the Variable of Technology Use Efficacy*

Variable	Groups	n	Mean Rank	Chi-Square	p
Technology Use Efficacy	Inefficient	21	58,55	1177	,455
	Efficient	72	54,35		
	Average	14	45,39		

According to the results presented in Table 7, it is seen that the educators' CPA did not significantly differ with respect to their technology use efficacies ($p > .05$). In other words, this finding demonstrates that there was no significant relationship between the educators' CPA and their technology use efficacies. The reason for this could be the fact that individuals who can use technology well consider themselves efficient in technology use.

CONCLUSION

The present study aimed at finding answers to two research questions regarding educators' CPA. The first research question was related to the extent to which the educators encountered CPA, and the second one was directed to determine whether the educators' CPA significantly differed depending on such independent variables as their countries, ages, fields of work and

their technology use efficacies. A total of 109 educators from four different countries participated in the present study conducted to determine the educators' CPA. The study focused on the extent to which the participating educators encountered with CPA and on whether their CPA differed with respect to their countries, ages, fields of work and their technology use efficacies. As the quantitative data collected did not have normal distribution, the Kruskal-Wallis H and Mann-Whitney U non-parametric tests were applied.

When the demographic backgrounds of the educators were examined, it was seen that the educators belonged to the middle-age group; that more than half of them worked in the field of educational technologies; and that most of them considered themselves to be efficient in technology use. It was found out that these participants assigned scores with a mean of 3.42 to the three 5-point Likert-type items reflecting CPA. In addition, the item most supported by the participants with a mean score of 3.58 was the item of "I constantly follow and get engaged with technology". Depending on these findings, it could be stated that the participants were intensely engaged with technology and that this engagement could result in CPA.

In order to determine whether there was a significant relationship between the educators' CPA and their demographic backgrounds, the Kruskal-Wallis H test was applied instead of ANOVA, and the Mann-Whitney U test was run instead of independent two-sample t-test. The findings obtained revealed that the educators' CPA did not significantly differ depending on their technology use efficacies, their ages or their countries. In addition, it was seen that the educators' CPA statistically differed significantly with respect to their fields of work. Accordingly, the educators working in the field of educational technologies encountered CPA more frequently than those working in other fields. In this respect, it could be stated that educators more intensely engaged with technology encountered the attention problem more frequently.

Based on the findings obtained, it could be concluded that, considering the limitations in the study, there is no significant relationship between educators' CPA and their technology use efficacies, their ages or their countries. In addition, it was seen that the educators' CPA differed with respect to their fields of work. This result is thought to occur as educators working in the field of information technologies are in more interaction with technology. In the light of these results, in order to help educators in the field of educational technologies cope with the CPA problem, in-service training for appropriate use of technology could be provided. In this way, not only education technologists, but also the students these education technologists will guide regarding technology use could avoid the negative influence of CPA. Because educators in the field of educational technology also are assumed to be role models in the appropriate use of technology, for this reason, educators in educational technology should have knowledge and experiences about different technology usage aspects besides the appropriate use of technology as instructional environments. These are;

- appropriate use of technology in terms of health (ergonomics, internet addiction, games, etc.),
- appropriate use of technology in terms of legal points (cyber crimes, etc.) and
- appropriate use of technology in terms of social-cultural aspects (misuse of social media, virtual love, cyber-bullying etc.).

In future studies, teachers and students' CPA could be examined using qualitative research methods; to better determine CPA, a scale-development study could also be designed employing more participants. For educators in the field of educational technology a study could be conducted related to determination of CPA status; there could be ways of decreasing the effects of CPA, determination the effects of CPA, collecting views of educators on the effects of CPA, and a determination of the relationship between CPA and other variables like multitasking, cognitive overload or disorientation.

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Appendix

CONTINUOUS PARTIAL ATTENTION

Dear Participant,

This questionnaire was prepared in order to determine your views on the use of technology. The questionnaire consists of two parts, and 7 items. The first part of the questionnaire consist four questions related to demographic backgrounds. The second part of the questionnaire consist three 5-point Likert-type questions regarding continuous partial attention. Complete and accurate answers to questions have vital importance for the success of the research.

Thank you for your contributions!

Dr. Mehmet First

* Required

Section I: Demographic Backgrounds

For each question, select the best option reflects your situation.

Country? *

Profession? *

Age? *

- 20-50
 50 and over

Technology use efficacies? *

- Inefficient
 Average
 Efficient

Section II: Continuous Partial attention

For each question, select the best option reflects your view.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I constantly follow and get engaged with technology (While following the news on TV, at the same time, reply to my e-mails, chat with my friends and answer the phone).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want to stay in constant connection at any time not to miss anything (I constantly wait for an opportunity to get the latest news, meet someone new or join a new event).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I pay partial attention to what I'm doing while following and getting engaged with technology (while trying to communicate and interact with everything, I fail to focus on anything in real sense).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>