

Young Users and the Swipe Logic in Smartphones

di Samuel Fernandes, Rui Rodrigues, Lúcia Oliveira

Introduction

Advances in technology have led to smartphones emergence, a device that rapidly marks its presence in our daily lives (del Rosario, Redmond, Lovell 2015). According to Gibbs (2016) the mobile devices have already surpassed computers in media interaction through browser. The emerging mobile technologies are now more practical, faster and efficient, leading to the consumer's choice. For many young viewers, the smartphone is the first device they use with an internet connection. These are used on a daily basis for various tasks, including payments, consulting information, games, social networks, and therefore computers and other devices are being used less and less to complete these tasks (Bonnington 2015).

New habits started to be adopted as a result of constant interaction with media and people, which has modified the way in which the younger ones interact with each other (Rodrigues, Baldi 2017). What was previously possible only through other screens, is currently more likely to be executed on the mobile phone, such as information browsing, games, movie/video viewing, reservations and online payments (Meeker 2015), but also, according to Varsori, Oliveira, Melro (2017) studies, entertainment, work, spending time, information and so many other agendas can also be included.

Smartphones are easy to use and their global scope is especially appealing to young people. The interactions that

were once complex, are now embodied in devices through interactive services, which are designed for social interaction. We are heading towards a participatory culture that stems from the multiplicity of channels, as a social phenomenon and space of sociability. This leads to new communicative practices where new ways of socialization emerge, generating relationships that are materialized through digital practices of interaction with devices, computer systems, content and users (Amaral, Reis, Lopes 2017).

These advances in technology have led to changes in consumer behavior, as a consequence of new interaction techniques that emerge mainly on touch screens and consequently allow content consumption more efficiently (Auer, 2017). There are currently several types of inputs to perform a particular operation, such as moving a finger, scrolling on a screen or zooming. Between these gestures there is the swipe gesture – touch on the screen followed by a sliding movement (Westerman, Lamiroux, Dreisbach 2011).

The swipe gesture is usually recognized from a technical/gestural point of view, but if we look at it from the logical point of view, swipe can be seen as a binary decision action (Rodrigues, Baldi 2017) based on the rhythm and increase of the viewing speed encouraged by the application interface. It is in this logical context (binary) that swipe can be seen not only as a simplifier of action, through fast slips on the screen, but also as a new influencer that reinforces and reinvents behavioral and thinking habits (Rodrigues, Baldi 2017).

1. *Literature review*

Smartphones have changed the way we look at contents and have also increased our dependence on online media. Nowadays, users consult websites, play games, shop and manage their daily life through their smartphone (Dou, Sundar 2016).

With the appearance of the touch screens, new navigation and interaction logics in mobile devices are born, among

them the swipe logic. The swipe can be technically described as touching the screen, followed by a horizontal, vertical or diagonal slide motion (Westerman *et al.* 2011). However, from a logical point of view, the swipe action can be interpreted as a binary decision action (Rodrigues, Baldi 2017) based on the pace and increase of the visualization speed, encouraged by the application interface. The gesture itself demands specifically a decisive action, easily performed with one finger, often spontaneously and immediately leaving aside some formalities that leave the user more relaxed and available to make the decision. “We should think about swipe logic not only on the level of the users’ physical experiences but also as a UI with built-in psychologically persuasive patterning.” (David & Cambre 2016).

It is in this logical context (binary) that swipe can be seen not only as an action simplifier – through quick slips on the screen, but also as a new influencer that reinforces and reinvents behavioral and user habits (Rodrigues, Baldi 2017). In the specific case of dating applications, where this logic is more visible, swipe also acts as a facilitator (intermediate) given the speed with which the action is performed, thus challenging the intimacy and the most intimate demands of the users, taking advantage of the easy options that this logic (included in these applications) provides (Rodrigues, Baldi 2017).

The increase of interaction techniques available on mobile devices raises some issues, namely, the possible difference in user behavior, taking into account the techniques available to interact with the device. This user involvement is even more significant when referring to mobile devices, since they are easy to carry and users tend to perform many daily tasks with them, or even to use while interacting with other devices or applications.

A study by Xue Dou and S. Shyam Sundar (2016) reveals that by adding swipe logic to mobile websites, we are adding variety to the user’s interaction with that site, which has the potential to positively increase the user experience. Increasing the level of user engagement in sites that use swipe logic

makes the user more interested, including promoting content exploration. The positive effects derive from the control that is given to the user through the swipe technique compared to other methods of interaction. This flexibility makes users feel control over the site / application. In addition, the swipe gesture is more fluid, more intuitive and easier to use, which contributes to increased user satisfaction when browsing the site / application (Dou, Sundar 2016).

2. Research hypothesis and goals

This study has as main purpose to clarify if the swipe gestures in smartphones have implications in the interaction with smartphones and media by young people (18-24 years old). Considering the goal of this study and all its considerations, the following research question is presented:

What implications may the swipe logic in smartphones have with media interaction by young people?

Considering the purpose of the study and literature review, research hypothesis were idealized. Hypothesis is a probable answer to the central research question. The organization of the research around hypothesis, points the researcher the path to look for, providing a guideline for research and providing criteria for the data collection that will later be confronted with the hypothesis defined (Quivy, Campenhoudt 1998).

Hypothesis 1

“The swipe influences the user’s decision making”

This hypothesis arises from the article *Screened intimacies: Tinder and the swipe logic* (David, Cambre 2016), where the two authors define swipe logic as being binary (Yes/No), but also as a logic that “makes you more likely to change

your behavior”. Rodrigues and Baldi (2017) also affirm that the swipe logic can have an impact on the choices and interactions made by the users, and also can be associated with possible cognitive and behavioral changes in the choice and interaction with the media. Through the reading of these and other articles that refer to the possible change of user’s behavior with the use of this logic, it is then the aim of this study to help to understand if these assumptions are confirmed.

Hypothesis 2

“Swipe-based interaction allows the user to get a faster and more efficient interaction”

This hypothesis arises from the reading of several articles that make comparisons between the traditional mode of navigation and another based on swipe. Beltran, Huang, Abouzied and Nandi (2017) has concluded in their study “that BINGO provides a good balance between the revision speed that SWP provides and the search precision that KWD provides”. The authors also add that “users review documents with SWP the fastest”, and “users spend significantly more time in between interactions when using KWD compared with BINGO and SWP. The slight increase in revision time when using BINGO compared to SWP is also significant”. Taking as a starting point this and other authors that make comparisons between the swipe logic and other interaction methods, it is also the purpose of this study to understand if the use of swipe allows users to achieve a more efficient interaction.

Hypothesis 3

“New input methods, such as the swipe, increase media interaction in smartphones”

This hypothesis is based on the article “Internet Trends 2015-Code Conference” (Meeker 2015) and intends to confirm that technological evolution allows the user to interact

in a quicker simpler and more effective way that before was not possible on smartphones.

3. Method

3.1. Sample and Study Object

This research had as participants young users with ages between 18 and 24, students of the Department of Communication and Art of the University of Aveiro, who have smartphone applications that use swipe logic.

There were selected 34 students to participate in this study. In order to select the 34 participants we considered the results of a questionnaire survey and we selected the respondents that could give us the biggest number of tests. We chose these 34 participants because all them had chosen 3 applications that, together, translated into a greater number of tests. The applications tested were the native application of messaging, Gmail and Whatsapp. The 34 participants use regularly these 3 applications and 29 are Android users, and the others 5 are iOS users. There were not Windows Phone users considered to this test. Regarding the gender, 16 participants were male and 18 female, of which 13 male participants were Android users and 3 iOS, and regarding female gender, 16 are Android and 2 iOS.

3.2. Tools

In this study, questionnaire surveys were used to collect sociodemographic data of participants: list which smartphones the participants have, what types of applications they have installed, how often they use them, what type of content they interact with.

After the test with the eye tracker, was also carried out another questionnaire survey where usability issues were addressed, also using the SUS questionnaire.

Eye tracking was useful for monitoring participants' interaction with their smartphone. It has been sought to know how the user interacts with the applications, what areas of the screen he looks at the most, what areas he ignores, and why. Metrics were also collected that allowed comparisons such as the time spent to perform tasks (differences between operating systems), efficiency of swipe logic in relation to other alternative logics, and also for the production of heat maps, which provide a graphical analysis of where the participants focused their attention during the proposed tasks.

To organize the face-to-face test with the participants, a task script was created, which was read aloud to the participant while interacting with the smartphone. While participants were testing on the eye tracker, their comments and actions were recorded. This observation grid was elaborated taking into account the comments of the participants during the test, think aloud protocol was also used, which means, participants were asked to verbalize everything that they were thinking at the moment they were interacting with the device.

3.3. Procedure

The data collection began with a questionnaire survey directed to students of the Department of Communication and Art of the University of Aveiro. In this pre-questionnaire, data such as the gender of the respondent, smartphone and operating system were collected, the respondents were also presented with a list of applications using the swipe logic, where they had to choose the ones they use on their smartphone, and also questioned the availability of the respondent to participate in the later phase of the study. The purpose of this first survey was to pre-screen the potential participants. The questions asked were to select a gender-balanced sample and also to select 3 applications out of 8 listed for the later phase of the study, based on the choices and availability shown by the respondents. The dissemination of this survey was made mostly by social networks, in the classroom and in the Moo-

dle of the curricular unit of Cyberculture of the degree in New Technologies of Communication of the University of Aveiro, with the aid of Prof. Lília Oliveira.

We selected 34 of the 65 respondents available to follow up the study. In order to select the 34 respondents, we considered the 3 applications that, together, translated into a greater number of participants.

The next phase of the study is an evaluation using the eye tracking technology. In this study eye tracking will be used to monitor participants' interaction with the smartphone.

After the test with the eye tracker was also carried a questionnaire survey where we address usability issues, and where we also use the SUS method.

4. Result and discussion

In the first task, participants were asked to delete a conversation from the native message application. 79,4% of participants did not perform this action using a swipe logic, while the remaining 20,6% chose to use a swipe movement.

<i>Use of the swipe logic – Native application for messaging</i>		
Yes	<i>Android</i>	6,9% (2/29)
	<i>iOS</i>	100% (5/5)
	Total	20,6% (7/34)
No	<i>Android</i>	93,1% (27/29)
	<i>iOS</i>	0% (0/34)
	Total	79,4% (27/34)

Table 1 – Use of the swipe logic (Native application for messaging).

In the second task the participants were asked to delete an email from Gmail. 73,5% of the participants did not perform this action using a swipe logic, while the remaining 26,5% chose to use a swipe movement.

<i>Use of the swipe logic – Gmail</i>		
Yes	<i>Android</i>	17,2% (5/29)
	<i>iOS</i>	80% (4/5)
	Total	26,5% (9/34)
No	<i>Android</i>	82,8% (24/29)
	<i>iOS</i>	20% (1/5)
	Total	73,5% (25/34)

Table 2 – Use of the swipe logic (Gmail).

In the third task the participants were asked to delete a conversation from Whatsapp. 82,4% of participants did not perform this action using swipe logic, while the remaining 17,6% chose to use a swipe movement.

<i>Use of the swipe logic – Whatsapp</i>		
Sim	<i>Android</i>	3,4% (1/29)
	<i>iOS</i>	100% (5/5)
	Total	17,6% (6/34)
Não	<i>Android</i>	96,6% (28/29)
	<i>iOS</i>	0% (0/5)
	Total	82,4% (28/29)

Table 3 – Use of the swipe logic (Whatsapp)

After this test participants were asked to carry out a new questionnaire where they had the opportunity to give their opinion on the swipe logic. The first questions asked to the participants concerned the tasks they preferred to use a methodology based on swipe logic or an alternative logic, in aspects such as simplicity and efficiency.

For the task of deleting a message in the native application, 38,2% of participants indicated that they prefer the swipe, in terms of simplicity, while 47,1% said they preferred an alternative method, 14,7% opted not to choose any of the options. At the efficiency level, 41,2% of the participants chose the swipe logic while another 41,2% opted to choose a different method, 17,6% indicated that they did not prefer any of the alternatives. For the task of deleting an email (Gmail), and in the simplicity level, 61,8% of the participants preferred to use an approach based on swipe logic, while 38,2% of the questioned opted for other method. At the efficiency level the results were the same. For the task of deleting a conversation (WhatsApp), and at the level of simplicity, 35,3% of participants said they preferred one approach using the swipe logic, while 41,2% opted for another method. At efficiency level 32,4% preferred the swipe method, 44,1% chose another method. In both variables 2,5% of the participants preferred not to opt for any method. IOS users were requested to perform another task, which marked the message as Read/Unread, and 80% of iOS participants opted for the swipe logic to carry out this action and expressing this same opinion in terms of simplicity and efficiency.

The participants also had the opportunity to give their opinion on the swipe logic. The questioned were confronted with 6 statements regarding swipe logic. For each statement, the subjects were asked to answer, on a scale of 1 to 5, where 1 meant "I strongly disagree" and 5 corresponded to "I strongly agree". For the statement "I consider the gesture of swipe complex" 61,8% answered "1- I strongly disagree", 20,6% responded with the value 2, and 17,6% answered

with the value 3. These results show that the participants did not consider the swipe gesture complex. The statement “I do not know what actions arise from the swipe movement before doing it” was one of the most varied in terms of response, obtaining 8,8% of the answers in the value 1, 17,6% of the answers in the value 2, 32,4% answers in the value 3 and in the value 4, and 8,8% answers in the value 5. Nevertheless, most of the options fell to values of 3 or higher, which shows that most users were unaware of the actions that arise from the swipe movement until they do so. For the statement “It may take some time until I get used to the Swipe movement” 32,4% of respondents answered “1 – Strongly disagree”, 17,6% answered 2, another 17,6% responds 3, 23,5% in 4, and 8,8% in “5- I fully agree”, these results favor, albeit slightly, the swipe movement, given that 50% of the questioned subjects focused their answers on values 1 and 2. For the statement “It is a difficult gesture to discover in the smartphone”, 32,4% of inquired answered “1- Strongly disagree”, 38,2% answered 2, 14,7% answered 3, 11,8% chose option 4, and only 2,9% chose the option 5. For the statement “Once I start using the swipe gesture I end up hooking myself”, 5,9% of the participants chose the option “1- Full disagree”, 8,8% of participants chose option 2, 17,6% of participants chose option 3, 44,1% of participants chose option 4, while 23,5% of participants chose option 5 -, this demonstrates that participants can become addicted to the swipe gesture once they start using it. For the statement “The swipe gesture is fun” 2,9% of the participants chose the option “1- Strongly disagree” and another 2,9% of the participants chose option 2, 26,5% of the participants chose option 3, 41,2% of the participants chose the option 4, while 26,5% chose option 5. These results demonstrate that the subjects found the gesture swipe fun. For the last statement “The swipe gesture is fast”, 11,8% of the participants chose option 4, while 88,2% of the participants chose the “5- Strongly agree” option. The results show that the majority of the inquired consider the swipe a gesture of rapid execution.

Conclusion and future work

Every day we are confronted with technological innovations that aim to make our day-to-day life more efficient. Smartphones are no exception, being one of the most used technological devices today, surpassing already the usual desktop, or portable computer (del Rosario *et al.* 2015). These devices are constantly being updated to improve user experience and user satisfaction. Some of these innovations consist of the way users interact with smartphones, and with the emergence of touch screens, new techniques and logics of interaction are included, including swipe logic (Westerman *et al.* 2011). This study aimed to understand if young people know this method of interaction, make use of it in the applications they have installed and if it can be more efficient than other logics in content consumption.

Considering the hypotheses defined at the beginning of this study it is possible to withdraw the following conclusions.

Hypothesis 1 – “The swipe influences the decision-making of the user”, it is verified that the hypothesis is confirmed taking into account the responses of the respondents in which 50% indicate that “Yes”, and 29,4% refer “In some cases”. Through these answers it is possible to confirm that the participants in this study feel that an interaction based on swipe logic influences them, somehow, in the moment of interaction with the media. According to Rodrigues and Baldi (2017), they do not refer “to the logic of swipe for a purely technical and operational competence, but also associated with possible cognitive and behavioral changes in the choice and interaction with the contents”, and also add that “swipe logic can have an impact on the choices and interactions made by users”.

Regarding hypothesis 2 – “The swipe-based interaction allows the user to get a faster and more efficient interaction”. To verify this hypothesis, tests were performed using the Eye tracker, in which participants had to perform a set of tasks. In the first instance the participants performed the tasks wi-

thout any conditioning, that is, in the most spontaneous way possible. For the first task (Delete a message), 20,6% of the participants used the swipe logic to perform this task while the remaining 79,4% opted for other methods. However, after the test 38,2% of respondents indicated swipe as a simpler method, and 41,2% reported that it is more effective. This translates into an increase of 17,6% in simplicity and 20,6% in efficiency, of respondents who until the test were not aware of the operation of the swipe logic in this application, but after the test indicated they prefer an interaction based in the swipe logic. These results are in agreement with several authors mentioned in the literature review, namely Beltran (Beltran *et al.* 2017) which concludes: “Swiping through reason bins can be more effective than manual query construction with keywords”, and also: “Relying on swipes as the main mode of user query specification minimizes the time of each revision”.

<i>Task 1</i>		
Android		iOS
Swipe	Other method	Swipe
3,87s	4,90s	3,72s
<i>Task 2</i>		
Android		iOS
Swipe	Other method	Swipe
2,20s	4,66s	2,37s
<i>Task 3</i>		
Android		iOS
Other method		Swipe
4,51s		2,53s

Table 4 – Time (Seconds) that participants took to complete the tasks (Average).

In order to help confirm this hypothesis, it is also shown in Table 4, which shows the time in seconds that the participants took to complete the tasks, and also that actions performed using swipe logic are completed in a shorter time. Calculating an average of the shares tested in this study using swipe logic and another with actions performed using another method, a difference of 1,72 seconds between the means is observed, resulting in a difference of 37,36% speed of execution of the task favorable to swipe logic.

Hypothesis 3 – “New input methods, such as the swipe, boost media interaction in smartphones”

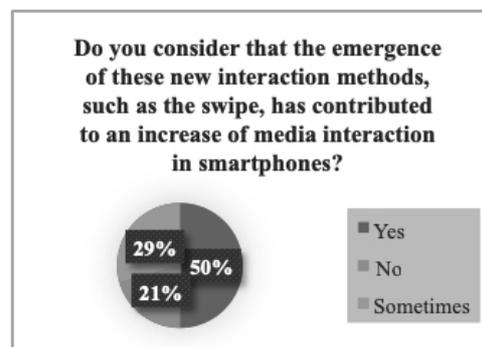


Figure 1 – Answers to one of the questions that helps to understand hypothesis 3.

Analyzing Figure 1, mainly the question “Do you consider that the emergence of these new interaction methods, such as the swipe, has contributed to an increase of media interaction in smartphones?”. It is possible to verify that 52,9% of the respondents answered “Yes”, 35,3 % answered “In some cases” and 11,8% answered “No”. Taking into account these results it is possible to conclude that this hypothesis is verified. One can also consider the conclusions drawn in hypothesis 2, where it was found that using a swipe logic it is possible to conclude a certain action in a shorter time. Given this analysis, if the user can finish the task in a shorter time, he can therefore gain more time to apply in other tasks so he can take more advantage of them. These results are in agreement with Dou, Sundar (2016) that refer “addition

of swiping interaction technique increased not only the interest level aspect of user engagement but also the control aspect". According to Rodrigues, Baldi (2017), "the rapid development of mobile technologies and devices, as well as the use of mobile devices, associated with the growing use of dating applications, have contributed to new information-communication behaviors, boosted mainly by the features supported by these applications".

Once finished the analysis and comprehension of the obtained results, it can be affirmed that these answer the main research question. It is important to highlight the eye tracker which allowed to record the tests and subsequently generate data that greatly helped in the analysis and understanding of the results. The observation grid used during the tests allowed participants observations to be recorded during the test, which helped to understand the knowledge that the respondents have in relation to this topic. As well as the questionnaire surveys that were carried out before and after the main test (with the Eye tracker), which contributed to a first phase selection of the participants for the test, and successively to understand the participants opinion regarding this logic. The main limitation of this study resided in the difference between android users and iOS, considering that this investigation counted on 29 Android users and 5 iOS users. This difference was due to the low eligibility of the respondents of this operating system in the pre-questionnaire to proceed with the study, since they did not have installed the applications that were proposed to the investigation. It should also be noted that only 11 respondents from the iOS operating system responded to the pre-questionnaire and were available to collaborate in the later phase of the study.

It is concluded, in response to the central question of investigation, and taking into account all the observed results, that an interaction based on the swipe logic, has implications in terms of the time spent to perform a certain task, thus being more effective than other alternative methods but also at the level of the user's own decision, given that being a fas-

ter and impulsive gesture can sometimes lead the user to take options different from those that would take other logics.

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