

Mobile Game Usability Practices in Arab Game Companies



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Abstract: *The mobile game industry is expanding rapidly in the Arab world. More companies are entering the market to develop mobile games for Arabic users. As the competition is increasing among these companies, a need to develop usable Arabic mobile games has raised as well. This paper investigates the mobile game usability practices in Arab game companies. In particular, it aims at studying the perception of mobile game usability to Arab game companies along its importance and utilized methods with a focus on heuristic evaluation. The investigation is based on surveying game companies in six Arab countries. Results have shown that the majority of surveyed companies conduct usability practices at different levels of engagement. Some companies use multiple methods of usability testing in multiple stages of the lifecycle, whereas others use less method and in late stages. Moreover, it has been found that the size of the company as well as the organization (in-house or outsourced) who conducts usability testing have an impact on the perception of game usability, its importance, and the selection of methods and tools used to conduct the testing. In addition, results have shown that heuristic evaluation is not a common practice among Arab game companies.*

Keywords: *Mobile game usability, heuristic evaluation, user experience.*

I. INTRODUCTION

The total number of people who speak Arabic increased, making it the fifth spoken language in the World [1]. Arabic is one of the six official languages of the United Nations. Moreover, the growth of playing games is rapidly increasing in the Middle East and North Africa (MENA) region in general and the Arab countries in particular [2]. Games are not only being played for entertainment, but also for educational purposes [3]. They are becoming part of everyone's daily life or routine. Recent statistics have shown that the population of online gamers have reached 587 million in the MENA region in 2017, with an estimated rate of 20% year-over-year growth [2]. Moreover, 13 Arab countries were featured in the top 100 games markets on their revenue estimates for 2018 [4].

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Accordingly, the online population of these 13 countries has reached around 170 million, with an estimated game market revenue of around 2 billion US dollars [4]. This has raised the need among game companies to develop games of high quality that can cope with the high demand and competition in the market. The focus of companies used to be on making games fun and entertaining. Although these two factors are essential to produce selling games [5], other factors have to be considered nowadays to produce competitive mobile games, such as game playability [6] [7] and usability [8] [9], which, for some scholars, are one item [6].

Game usability has not been well explored in the Arab world. This study aims at investigating the usability practices in Arab game companies. The focus of the study is to survey Arab game companies to answer four research questions: (i) how important is mobile game usability to the Arab game companies, (ii) how the Arab game companies perceive and define mobile game usability, (iii) what usability methods and tools are used in the Arab game industry to improve mobile game usability, and (iv) to what extent heuristic evaluation is used in the Arab game companies. The results of this study should help Arab game companies among other interested practitioners in understanding the current status and practices of mobile game usability in the Arab world. In addition, results should provide each of the Arab game companies with the data needed to evaluate its usability practices in comparison with other similar companies. As a result, this should raise the awareness and knowledge of mobile game usability among Arab game companies. Furthermore, this study is expected to provide an empirical basis for mobile game usability practice in the Arab world and a good source for interested practitioners outside it.

This paper, in its remaining part, is organized as the following: Section 2 provides an overview of the concept of mobile game usability as well as the related work in this domain, Section 3 introduces the research methodology used in investigating the mobile game usability in Arab game companies, Section 4 presents the outcome of the study, and Section 5 discusses the results. Section 6 concludes the paper and presents several directions of future work.

II. USABILITY IN MOBILE GAMES

A. Usability

Several scholars and organizations have been defining the term usability from several perspectives.

One of the common definitions of usability was put forward by the International Organization for Standardization (ISO): “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.” [10]. As the definition implies, the focus of usability tests has been on measuring the effectiveness, efficiency and user satisfaction of a software product. Nielsen defined usability on five quality components: learnability, efficiency, memorability, errors, and satisfaction [11]. Moreover, several methods of usability have been introduced and compared in the last two decades [12] [13], which includes: heuristic evaluation, cognitive walkthrough, questionnaires, focus groups, user testing, feature inspection, consistency inspection, formal usability, think aloud, among other less common ones.

B. Mobile Game Usability

As more mobile games are being developed worldwide, the need for mobile game usability is increasing to provide usable games to players [14] [15]. Mobile game usability studies the interaction between players and mobile games in the context of play [16]. Recently, several mobile game usability techniques have been recognized and investigated [8], such as game user research (user testing), heuristic evaluation for games, cognitive walkthrough, playability evaluation (playtesting), and focus groups.

Mobile game usability consists of the game interface, mechanics, and play [14]. Gameplay and playability have been considered the most important elements of mobile game usability [14]. However, some practitioners identify usability to be part of playability [17]. In fact, interested practitioners have provided several definitions of game usability [8] [14] [17] [18] [19]. All these definition agree to include the user interface, gameplay, and game type or genre in game usability. Some researchers emphasized that game mechanics is part of the mobile game usability [14] [17]. Others include game learnability [20], playability [17], and enjoyment [21] to the definition.

Lists of usability heuristics have been developed to specifically evaluate games in general and mobile games in particular. These lists include the list of Desurive, Caplan and Toth [17], Nokia Heuristics [19], Pinelle, Wong and Stachs [20], Mellisa Federoffs [22], among other, less common, ones. The lists have been spread into categories, such as game graphical user interface, game mechanics, gameplay, playability, game story, mobility, control mapping, level design, game engagement, and fun.

C. Related Work

Investigating the practices of usability in computer companies in general and game ones in particular has been the interest for many researchers. In [23], for example, the authors surveyed 78 companies to answer two main questions related to the importance of usability as well as the degree of which software development methods and usability are perceived by practitioners as being integrated. A similar study was conducted in 2003 and published in [24], in which authors surveyed a range of issues in the Korean IT development environments that include usability, its assessment, and its most widely used methods and tools.

Another survey was conducted and presented in [25] where 12 individuals were interviewed about their views on usability education and research. More recent and similar surveys have been conducted as well, such as the ones presented in [26] [27] [28].

Game usability has been investigated by interested researchers as well. In [29] and [30], the authors investigated the views of the Northern European game companies on the concept of game usability. Their investigation was based on two surveys and analyzed based on the company unit. A similar, more recent, approach was also applied in [31], in which the survey studied game usability practices in North American game companies. Moreover, the authors in [32] investigated the role of user perceived game usability in the process of information retention of the learning process.

III. RESEARCH METHODOLOGY

Similar to the approach presented in [29] [30], in our research methodology we focused on studying (i) how important is mobile game usability to the Arab game companies, (ii) how the Arab game companies perceive and define mobile game usability, (iii) what usability methods and tools are used in the Arab game industry to improve game usability, and (iv) to what extent heuristic evaluation is used in the Arab game companies. The method was based on conducting a survey to answer these questions in the Arab world. A list of game developing companies in the Arab world was compiled, which included 73 companies and mobile game developers. The list was then reviewed and shortened to include companies and developers who have published at least five Arabic mobile games. The resulted list included 58 companies and game developers from Jordan, United Arab Emirates, Saudi Arabia, Egypt, Lebanon, and Morocco. An invitation to participate in the survey was sent either by an e-mail or through Facebook that included a link to the survey and a brief explanation of the purpose of conducting it. Companies and developers who were contacted but did not participate in the survey were reminded by another email or, in some cases, by a phone call. The survey was designed based on the one introduced in [30] with some few modifications towards the Arabic language and culture. The survey consisted of 45 questions including multiple choice, Likert-scale, as well as open-ended questions in five sections: usability methods, usability tools, definition and perception of game usability, use of heuristic evaluation, and the profile of the respondent.

IV. RESULTS

Out of the 73 companies and developers that were contacted once or twice, a total of 38 responds were received, resulting in a response rate of 52%. The responses came from individuals of several roles in mobile game development including senior developers (16%), game testers (24%), project managers and producers (32%), UI/UX designers and managers (21%), among others (8%). The median experience of all participants in mobile game development was eight years.



The size of the respondents' companies ranged from less than 10 employees to 50 employees. 87% of the companies had less than 30 employees.

We considered game developers to be a small-sized company with 1-5 employees. The majority of the responding companies develop games for mobile devices (89%). Moreover, puzzle, racing, and arcade (62%) were selected to be the most made game genres in these companies.

A. Importance of Usability Research in Games

Although 97% of all responding participants found usability in games to be important or very important, only 30 Arab game companies (79% of all respondents) conduct any form of usability testing or research during their mobile game development lifecycle.

As shown in Table I, bigger companies (in terms of number of employees) tend to conduct usability research more than the smaller ones. 100% of companies with less than five employees do not conduct any form of usability, whereas this percentage goes down to 50% and 27% for companies of 6-10 employees and 11-20 employees respectively.

Reasons for not conducting usability varied between companies. Mostly, being too expensive and not having the expertise were the two main reasons of not conducting usability.

Other such reasons include too time consuming and only one respondent believed that usability is not important for game development. However, out of the eight companies who report that they do not conduct usability, seven (88%) believed they are going to do usability research in the future.

Table I: Usability Practice in Arab Game Companies

Company Size (number of employees)	Respondents	Conducting Usability	Not Conducting Usability
1-5	2	0	2
6-10	6	3	3
11-20	11	8	3
21-30	14	14	0
31-50	4	4	0
50+	1	1	0

B. Usability Methods in Arab Game Companies

Figure 1 shows the number of responses to each item of the usability methods and techniques that the 30 Arab game companies use to conduct usability research. 93% of all respondents apply usability/user testing, whereas only 10% reported to use cognitive walkthrough. Playtesting (83%) and focus groups (57%) appear to be commonly used as well among Arab game companies. However, only 7 companies (23%) use heuristic evaluation.

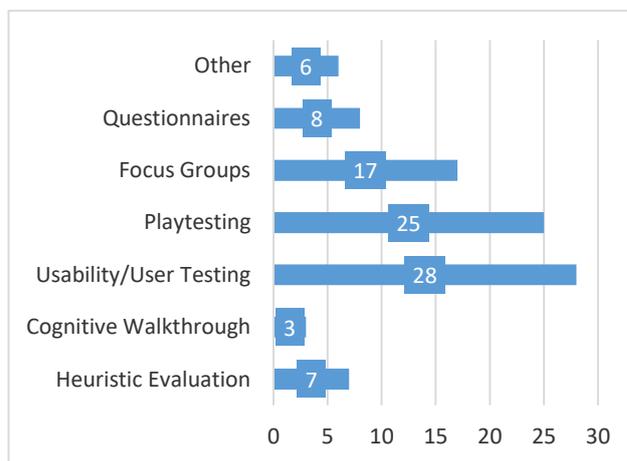


Figure 1: Usability Methods Used in Arab Game Companies

Most respondents (87% of the 30 companies) stated that they are in charge of the usability research themselves, whereas only 3% mentioned that the game publisher takes care of such activities. None of the respondents reported using an external company nor an outsourced expert to conduct any usability activity on the games they develop.

Figure 2 shows at what stage the Arab game companies evaluate their products. Only few of the respondents conduct usability testing at an early stage. 3% of Arab game companies evaluate their products using paper prototypes and 30% do not make such testing until a working prototype is available. All respondents test the usability of first playable versions and 60% test it after a release version. The usability of alpha versions is tested by 33% of respondents, whereas all of the 30 companies stated that they test the usability after a beta version of the game is released.

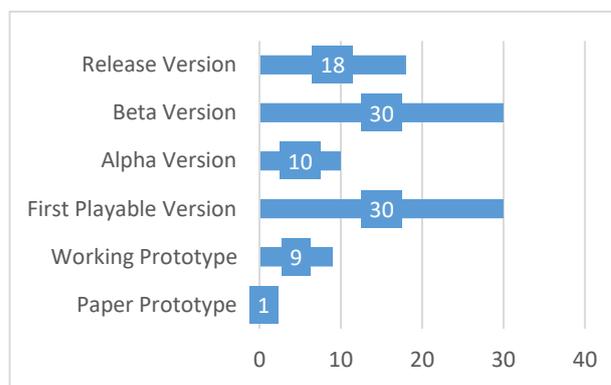


Figure 2: Stage of Evaluation in Arab Game Companies

The size of the company appear to have an impact on both the number of usability methods used for testing and the number of usability testing stages that each game goes through in its lifecycle. Table II shows more detail in terms of this relation. On average, Arab game companies use around two different usability methods of the ones shown in Figure 1 and they test the usability of games in around three different stages of the ones shown in Figure 2.

Table II: Impact of Company Size on Usability Methods and Stage of Evaluation

Company Size	Average Number of Different Methods used in Usability Testing	Average Number of Different Stages used in Usability Testing
1-5	0	0
6-10	1.3	1.3
11-20	1.8	2.1
21-30	2	3.2
31-50	2.75	4
50+	4	4

C. The Concept of Mobile Game Usability

All 38 respondents (those who conduct usability and those who do not) were asked about their perception of the concept of mobile game usability using open-ended and Likert-scale questions. When asked to define mobile game usability, almost all of the answers included the phrase “easy to use” with some extra details that varies among game companies who conduct usability activities and those who do not. Figure 3 depicts the aspects that Arab game companies believe the mobile game usability consists of.

As shown in Figure 3, companies who do not conduct usability research agree with the ones who conduct it on almost all aspects. For example, all respondents believed that the user interface and user experience are aspects of the mobile game usability. Controls came third as an aspect of game usability and game mechanics came last. The biggest difference between companies who conduct usability activities and those who do not in terms of the aspects was clearly seen in the level of challenge. On average, 67% of Arab game companies who conduct usability activities regarded the level of challenge as an aspect of game usability, whereas only 38% of Arab game companies who do not conduct usability activities had a similar thought on that regard.

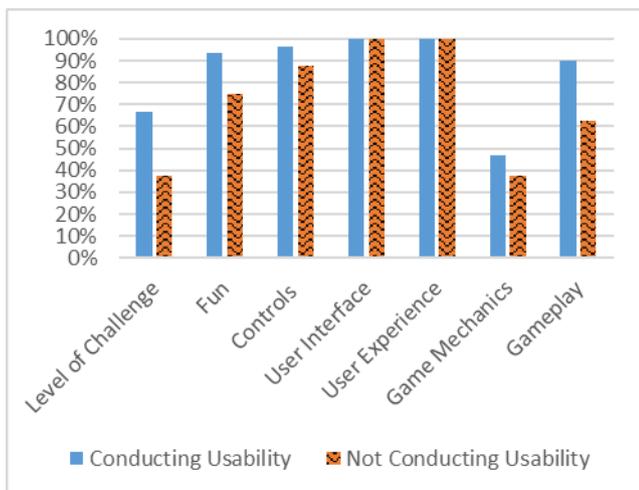


Figure 3: Aspects of Mobile Game Usability to Arab Game Companies

D. Heuristic Evaluation in Arab Game Companies

As Figure 1 shows, only 23% of companies who conduct usability activities (7 out of 30 respondents) stated that they

use heuristic evaluation in testing the usability of their mobile games. There was no clear relevance between the size of the company and the use of heuristic evaluation. However, all smaller companies (less than 20 employees) who conduct heuristic evaluation stated that they use it mainly because it is cheap. Other reasons for respondents to use heuristic evaluation in games were the ease of use (71%), an effective way to find problems (86%), and not being a time-consuming method (57%).

All of the seven respondents strongly agree that the heuristic list they use is not comprehensive enough. Moreover, they agree that currently there is not a single comprehensive heuristic list to evaluate mobile games. Four out of the seven companies who use heuristic evaluation agree that different mobile game genres should have their own specialized heuristic list. In addition, only two of the respondents agree that they need to make a new list for every new mobile game they develop.

In terms of the heuristic lists used for mobile game evaluation, the list of Desurive, Caplan and Toth [17] was the most used (86%), followed by Pinelle, Wong and Stachs [20] (71%). Nokias Heuristics [19] and Mellisa Federoffs [22] came third (57%).

On the other hand, the majority of respondents who do not use heuristic evaluation stated that they do not know the method (22 out of 23 respondents). Figure 4 summaries the main reasons of not using heuristic evaluation by Arab game companies. Because the majority of respondent did not know the method nor know how to use it, they were not able to comment on or select other reasons of not using heuristic evaluation. However, 83% of those respondents mentioned that they might consider using heuristic evaluation in the future.

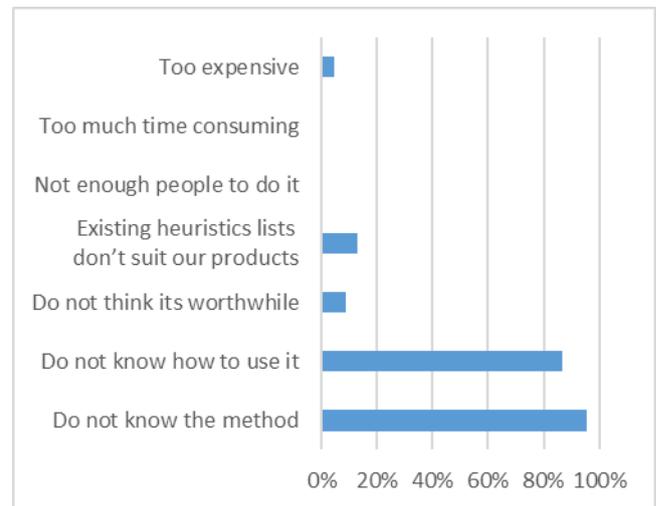


Figure 4: Reasons of Not Using Heuristic Evaluation among Arab Game Companies

V. DISCUSSION

The aim of this study was to answer four research questions: (i) how important is mobile game usability to the Arab game companies,

(ii) how the Arab game companies perceive and define mobile game usability, (iii) what usability methods and tools are used in the Arab game industry to improve game usability, and (iv) to what extent heuristic evaluation is used in the Arab game companies.

In regard to the first research question, results have shown that almost all of the surveyed Arab game companies find usability to be an important process in the lifecycle of mobile games. Moreover, bigger companies consider usability to be very important with a strong impact on the success of the mobile game. Even smaller companies who do not conduct mobile game usability, stated that usability is important or very important but they do not have the expertise nor the budget to conduct it. We believe that these companies will apply usability testing if they were introduced to cheaper methods. There was a clear relation between the size of the surveyed companies and conducting usability research; Bigger companies conduct more usability testing than smaller ones.

In regard to the second research question, surveyed companies have not agreed on one definition of mobile game usability. They agreed that it is a wide and broad concept. They also agreed that usability is about providing easy to use games. Moreover, they believed that any definition of mobile game usability should include aspects of user interface, user experience, controls, fun, challenge, and playability. Although companies who do not conduct usability find user interface, user experience and controls to be important aspects in a usability definition, they regarded the level of challenge and the fun aspects to be of less importance. Furthermore, companies who use the publisher to conduct usability testing seem to have a more comprehensive definition of mobile game usability than companies who only conduct such testing themselves. The results of this question were on the same page with the definitions of game usability and results presented in [30], [22], [18] and [8].

Regarding the third research question, results showed that different methods and tools are being used in the surveyed Arab game companies. Usability/user testing and playtesting were reported to be the most common methods used in testing usability. Bigger companies used more methods and in different stages of the mobile game lifecycle. Moreover, results showed that all surveyed companies who conduct usability testing perform it at least in the post-production phase. Bigger companies conduct their usability activates on the pre-production and production stages as well. Although it is cheaper, on the long run, to find usability problems in systems in early stages, smaller surveyed companies do not conduct any kind of usability at these stages. In addition, cheaper usability tools, such as paper prototypes, were only used by very few companies. In fact, surveyed companies reported that they do not conduct any type of usability testing until they release a working prototype.

Results have also shown that not all surveyed Arab game companies are familiar with the tools and methods of mobile game usability that are currently available. Companies in which the game publisher takes care of usability research showed a better familiarity with the availability of such methods and tools. Moreover, several surveyed companies who are familiar with the availability of some mobile game

usability methods and tools, have not used them because of the lack of expertise.

In regard to the fourth research question, only very few of the surveyed companies reported to apply heuristic evaluation in testing the mobile games they develop. Although heuristic evaluation is widely used in other types of software [8], the results of the surveyed Arab game companies in that regard were in line with the results presented in [29]. Several reasons were the rationale behind this result. The main reasons were either unfamiliarity with the mobile game heuristic evaluation method or not knowing how to use it. Moreover, companies who use heuristic evaluation found it challenging to select one comprehensive list to follow. They believe that current heuristics are too general and need to be specialized for each game genre. They also agreed that in order for a game company to use heuristic evaluation, it has to develop a new set of heuristics to follow and evaluate its games, which requires more resources and training.

VI. CONCLUSION AND FUTURE WORK

This paper aimed at studying the mobile game usability practices in Arab game companies. A comprehensive survey was distributed to Arab game companies and game developers in Jordan, United Arab Emirates, Saudi Arabia, Egypt, Lebanon, and Morocco. All collected data were then analyzed to identify potential and useful results and patterns. The study focused on four aspects of mobile game usability including its importance, perception and definition, methods and tools, and heuristic evaluation from the perspective of Arab game companies. The presented results in this paper provide an interesting overview and understanding of the current practices of usability in Arab game companies. Results have shown that Arab game companies agree on the importance of usability testing to the mobile games they develop. It also presented their perception of mobile game usability and the methods and tools they use in conducting usability activities. In addition, heuristic evaluation does not seem to be a common practice among Arab game companies. The few companies who use it find it challenging to agree on one heuristic list for games.

Results have also shown that several of the studied aspects were influenced by the size of the company as well as the party in charge of conducting usability testing. For example, Arab game companies in which the mobile game publisher takes care of usability testing had a comprehensive definition of mobile game usability and were more familiar with the tools and methods of mobile game usability that are currently available. Moreover, it was seen that bigger companies use more than one mobile game usability method in several stages of the lifecycle.

Although this study showed interesting results, several directions of future work can be identified. The focus of this study was on the profile of the company and its size. We believe that there might be an interesting coloration between the role of the respondent who completed the survey and the studied aspects.

In addition, although the six surveyed Arab countries release almost all of the Arabic mobile games into the market, including other Arab countries in the study might provide a wider overview of mobile game usability practices. Moreover, during our research and analysis of Arab game companies, we find it very interesting to study the impact of conducting usability testing on games among Arab game users.

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