

## Responsive Web Design Trend in Official Ministries and Government Institutions

### Websites in Palestine

## اتجاه تصميم الويب سريع الاستجابة في مواقع الوزارات والمؤسسات الحكومية الرسمية في فلسطين

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**Abstract:** Websites compatibility with different browsers is quite necessary as modern technology evolves and more new devices are being invented. This paper aims at determining the application of the Responsive Web Design approach in the Palestinian ministries and governmental institutions. Thirty official websites in Palestine were evaluated and tested using Google DevTools, which is a testing environment that provides a quick and easy way to test websites on mobile devices and tablets, and the Google Mobile-Friendly Test Tool, which analyzes URLs and progress reports on a site's relevance for mobile users. Maintaining accuracy in results, real devices were used to test the responsiveness of the websites. The survey results have shown that 40% of the ministries and official governmental institutions' websites are responsive ones, 30% are semi-responsive, and 30% are unresponsive websites. They also have revealed that 43% of the websites are compatible with mobile phones and tablets. The study highly signifies the responsive design technology as it is a suitable and viable solution for providing web content in an effective and efficient manner for the users of desktop devices and mobile phones with different screen sizes. The researchers also recommended that websites providing electronic services should be given special attention and that a responsive design approach should be used with different dimensional frameworks.

**Keywords:** Responsive web design, Compatibility, Usability, Ministry websites, Mobile users.

**المستخلص:** يعد توافق مواقع الويب مع المتصفحات المختلفة ضروريًا تمامًا مع تطور التكنولوجيا الحديثة واختراع المزيد من الأجهزة الجديدة. تهدف هذه الورقة إلى تحديد تطبيق نهج تصميم الويب سريع الاستجابة في الوزارات والمؤسسات الحكومية الفلسطينية. تم تقييم واختبار ثلاثين موقعًا رسميًا في فلسطين باستخدام Google DevTools، وهي بيئة اختبار توفر طريقة سريعة وسهلة لاختبار مواقع الويب على الأجهزة المحمولة والأجهزة اللوحية، وأداة Google Mobile-Friendly Test Tool التي تحلل عناوين URL وتقارير التقدم حول مدى صلة الموقع بمستخدمي الجوال. للحفاظ على الدقة في النتائج، تم استخدام أجهزة حقيقية لاختبار مدى استجابة المواقع الإلكترونية. أظهرت نتائج الاستطلاع أن 40٪ من مواقع الوزارات والمؤسسات الحكومية الرسمية متجاوبة، و30٪ شبه مستجيبة، و30٪ مواقع غير مستجيبة. وكشفت أيضًا أن 43٪ من مواقع الويب متوافقة مع الهواتف المحمولة والأجهزة اللوحية. تشير الدراسة بشدة إلى تقنية التصميم سريعة الاستجابة لأنها حل مناسب وقابل للتطبيق لتوفير محتوى الويب بطريقة فعالة وفعالة لمستخدمي أجهزة سطح المكتب والهواتف المحمولة ذات أحجام الشاشة المختلفة. كما أوصى

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الباحثون بضرورة إيلاء مواقع الويب التي تقدم خدمات إلكترونية اهتمامًا خاصًا واستخدام نهج تصميم متجاوب مع أطر ذات أبعاد مختلفة..

**الكلمات المفتاحية:** تصميم مواقع الويب سريع الاستجابة، التوافق، قابلية الاستخدام، مواقع الوزارة، مستخدمي الهاتف المحمول.

## INTRODUCTION:

Technology advancement has seen remarkable development in mobile devices as well as an increase in their usage, as Gartner's research showed that the total shipments of devices around the world (computers, tablets, and mobile phones) amounted about 2.16 billion units in 2020, however, the shipments increased by 0.9% in 2019 (EGHAM, 2020). In addition, according to Atwal (Data analyst at Gartner), markets will see another increase in mobile device purchases in 2023 when 5G phones account for more than 50% of cell phones.

Modern website design is more critical than ever, and companies allocate more budget to website upgrades regularly. Web design is also moving at a fast pace. Any of 2020's breakthrough solutions could become obsolete as early as 2022, and in 2024, they will be laughed at (Digitalsilk, 2020). One of the most significant factors in the performance of any website design is usability. This involves making content accessible and providing consumers with all they want. A successful website design makes it simple to understand and use the platform and move on to the next level. Furthermore, when using a website, users do not have to think too hard (Al-Shanti & Eleyan, 2014).

Responsive web design was presented to solve user experience issues related to the static web design model. With responsive web design, web applications are designed to appropriate the screen sizes and resolutions of each device dynamically (Mikkonen et al., 2015). The website user interface (UI) design is one of the most important factors for the success of websites as it allows the user to use the site easily when browsing and provides easy access to content and benefits from services. Lack of responsive design results in slower loading times. Responsive sites serve content to users in fewer steps, but non-responsive sites may take longer (Mrnwebdesigns, 2020). User experience is critical to websites owners. Easy usage of websites is a convincing feature to have the users come back using them. If someone visits the website on a mobile device and spends much time loading the website or the images are not of the proper resolution, they may not return. Responsive design offers a better user experience than non-responsive design, which can help convince the visitor to engage with the site and stay on it for a long time. Since zooming and scrolling will be eliminated, content can be viewed faster, and the overall impression on visitors will be more positive (webfx, 2020). It is with this in mind that a responsive web approach has been adopted to evaluate websites in terms of usability.



Figure (1). Example of a website created with a responsive design (IEXPerto, 2018)

This paper aims at identifying the trend of using RWD on the websites of ministries and governmental institutions in Palestine. It is of utmost importance to study the trend of using RWD in ministries and governmental institutions in Palestine, as the most effective and efficient websites use the RWD approach. This poll includes 30 websites of ministries and governmental institutions in Palestine, and websites are evaluated and tested using Google DevTools and the Google Mobile-Friendly Test Tool. Real devices were used to test the website's responsiveness to increase the accuracy of the results. This research contributes to clarifying the importance of using responsive design technology in web design, as researchers analyzed and evaluated a group of websites that provide a range of electronic services to citizens and employees, using testing tools provided by Google. An overview of responsive web design tools and frameworks is also provided to encourage the use of this technology. The problems facing websites that did not apply responsive design technology and the criteria to improve the usability of the government's websites using responsive design technology were also discussed.

## Background

In the past, web design was done using a fixed width, and designers can control several graphic elements and page layouts with a fixed-width design. The disadvantage of the fixed-width design is that its usability is highly dependent on the screen size. A fixed-width layout, for example, allows much white space on larger screens and necessarily requires the use of a horizontal scroll bar on smaller screens. Then came the development of fluid design technology (also known as liquid design). The layout elements share a percentage of the width in the flexible design, enabling them to adjust to the screen resolution (Cazañas & Parra, 2017). Although both fixed-width and liquid design give web designers more flexibility, their applicability on mobile devices is limited. When a compact design is made in a viewport smaller than 800x600, the usability of the design suffers significantly, according to Marcotte. Text navigation can wrap unattractively, images can crop, and text can become too tiny to read. Because of fluid and fixed-width

design limitations, adapting the layout is not a viable option for providing usability to mobile users. Marcotte suggested a solution and coined the term Responsive Web Design to describe it (Marcotte, 2010).

A responsive web design allows a website to wrap around and adjust to the size of the screen on which it is being viewed. When someone visits a website on a smartphone, the page will look very different on a laptop or desktop computer. The site reformats the page for the users to provide a better experience that is tailored to their devices. A responsive design also considers interactivity, making the site easier to use by recognizing and integrating features like touch screens and special mobile-aided navigation. The importance of responsive web design for websites is as follows (Gregory, 2021):

- Increasing customer reach across all platforms.
- More visits improve lead generation, increase conversions and sales.
- Maintaining a consistent user experience encourages people to come back.
- Competing with other brands in your field.
- Analytics, tracking, and reporting can all be done in one place.
- Reducing the amount of effort and money spent on managing materials on site.
- Improved Local Speed on Mobile.
- Google is responsible for 96% of mobile search traffic and recommends responsive design as a best practice. Since responsive web design is mobile-friendly, it can help your website gain more popularity in search engines, which can lead to more traffic.

Despite the importance of this technique, some websites do not use the responsive web design technique for several reasons, including Web development which is a complicated mix of new development tools and rising user expectations, driven by consumers' enthusiasm for new Internet browsing capabilities. One such complication is deciding of which web design and development technique is to use to maximize reach across all platforms while providing the best possible user experience. Some huge websites contain the content management systems causing cumbersome and difficulty of usage to power these websites. It can be a huge task to retroactively apply responsive web design methods to these websites. In addition, conservatism and fear may be keeping them from taking the risk of spending a lot of time and money to fix something that is not broken. Perhaps they have already spent millions of dollars on their mobile websites and are reluctant to spend even more money on a different means to achieve the same goal. It may be easier for some companies to create apps that work on both smartphones and tablets other than developing a website that contains huge data in a specific format. Many organizations have developed multiple versions of mobile websites to ensure that the user interface (UI) of the website is compatible with the various resolution sizes the mobile browsers. Unfortunately, building a new mobile website for each new browser's resolution size is not a viable option (Moon et al., 2012). Therefore, responsive design technology emerged to provide a single website for all browsers and screens.

Using responsive design to serve a large audience is extremely effective. However, sometimes compromises are required, particularly when it comes to improving performance and user experience.

According to (Hammad,2021) the disadvantages of responsive design:

- **Load Speed:** The responsive design is based on an HTML5 structure that is linked to CSS styles. As a result, all of the devices load all of the data. Even if the mobile version only retains 60% of the desktop content, 40% will be loaded and hidden with CSS.
- **Compatibility with web browsers:** It is important to note that all browsers do not yet support HTML5 particularly on older smartphones. If the audience lacks access to modern devices, responsive design may not be the best solution.
- **Difficult to navigate:** Responsive websites are specifically designed to fit on small devices. However, maintaining the simplicity of large websites for small devices can be difficult at times. This is because small devices have smaller screen sizes, making it more difficult to navigate websites on small devices.
- **Development takes a long time:** Responsive websites are necessary, but they take a long time to develop when compared to standard websites.

Responsive Design refers to the ability to reshape material for optimum display and interaction depending on detected user capabilities. Responsive Design parses and prioritizes content spaces, photographs, video, navigation bars, and multimedia features for reuse through devices. Responsive Design essentially goes beyond realizing accessibility and determining the amount of real estate availability on a computer. It also understands and makes use of computer capabilities (Musti & Kashyap, 2013). Based on the foregoing, websites need to adopt a responsive design approach to improve and develop the user experience. Among the most frequently used websites are the government's websites that provide electronic services to the public. E-government is considered one of the modern and advanced ways that countries' governments could adopt to provide their citizens with the best mechanisms, and the fastest and easiest ways to access the government's information and services using modern technical means. Moreover, it gives them the best opportunity to share their opinions and suggestions with the various governmental institutions (GovernmentPortal, 2021). Accordingly, the websites of ministries and official bodies have been provided with a set of electronic services that make it easier for citizens to carry out their work. The main goal of the ministries and institutions' websites is to provide information and electronic services for the public. So that, it attracts citizens to do their work electronically, avoiding visits to the ministries' headquarters. The same applies to employees, as most ministries' websites provide a portal for employees to follow up on work matters. Therefore, it is essential to provide a site that is easy to use by anyone and can access through any available device. By applying RWD technology, websites will be able to reach more mobile device users and indirectly increase the number of visitors.

### **Responsive Web Design Frameworks:**

Responsive web design frameworks are used by most IT service providers because they are easy to access and have fewer problems. They also come with a complete package, including off-canvas models, which are needed for web creation. Responsive web design frameworks are applications that collect HTML, CSS, and JavaScript codes to simplify responsive web design. However, there are many frameworks on the market. The most commonly used frameworks are Bootstrap, Foundation, Pure, Semantic UI, UI kit, Materialize CSS, Skeleton.

### **RELATED WORK**

Most websites were static before the responsive web design technique, which meant that mobile users would see a preview version of a desktop site. Thus, the visitor will face difficulty reading the texts because the font size is non-compatible with the mobile screen size. It will be challenging to interact with the website by mobile, resulting in a poor user experience (McKannie, 2021).

The fixed-width design may create annoying white space for users with larger screen resolutions. Fixed-width design's disadvantage is that if the available browser window is smaller than the page grid, parts of the page will not appear and may require horizontal scrolling to display. Horizontal scrolling is a hindrance to usability, so it should be avoided. In addition, elements may change unexpectedly if the browser's font size is larger or smaller than the font size used in the design process. The basic concept of designing a responsive website is to fit the content according to the device's size without hiding any content or changing the layout view. Since the number of visitors to different websites that mobile phones are growing every day, it has become necessary to design websites with responsive layouts (Yadav & Barwal, 2014).

Since people tend to use the internet on tablets or phones rather than PCs, responsive web design is critical for businesses to satisfy their customers. Responsive design allows websites to scale their content to suit any device without losing details. Responsive web technology aims to write once, run anywhere (Aryal, 2019).

The responsive design emerges as a technological solution that mitigates the problem of different screen sizes. According to Subic et al., a website's content should intelligently re-shape itself for optimal usability and effect (Subić et al., 2014). This allows the user to quickly access data from various devices without knowing the flow of information's input and output. Users do not have to use a specific computer to access the web (Yadav & Barwal, 2014).

The concept of responsive design is being based on two rules. First: Mobile Priority means that when designing a website, we consider the diversity of the size and resolution of the mobile devices entirely and design the page effect of the mobile devices first to achieve the adaptive mobile devices layout. The page impact on the PC side is then be considered, which helps to improve the user experience. Second rule: Progressive Enhancement is the incremental conversion of a page's display size from small to large to prioritize mobile devices. The page's content should be highlighted, and the content output should be

simplified due to the restricted display space of small size. The performance of the content should be immeasurable as the size grows while the content remains unchanged. The content's performance should be enhanced, as well as the page's appearance (Li & Zhang, 2019).

According to W3Schools, Web pages can be accessed using various computers, including desktops, laptops, and smartphones, thanks to responsive web design. Regardless of the computer, your website should look nice and be simple to use. When you use CSS and HTML to resize, hide, shrink, expand, or transfer content to make it look nice on any computer, it is called responsive web design, and it can be done in various ways. This can be done by selecting the viewport which is the visible region of the web page, creating a responsive grid, employing a media query to control the page layout based on the computer being used, and employing a responsive image and video (W3Schools, 2021).

Page components reshuffle in responsive design as the viewport expands or contracts. For a notebook, a three-column desktop-style can be reduced to two columns and a single column for a smartphone. To rearrange material and interface features, responsive design uses percentage grids (Schade, 2014).

In this way, a website's HTML and CSS code adapt to the device's resolution without the need to specify different types. Three technological components make up responsive web design: fluid grids, flexible images, and media queries. Fluid grids assign relative units to page elements; versatile images are also sized in relative units. Media queries allow switching between different CSS styles depending on the device's features (Cazañas & Parra, 2017).

Website design indirectly plays an essential role in SEO strategy. Therefore, Google proposes on its site several recommendations to designers and web developers, and among the recommendations is to work on responsive web design, as responsive web design enables Google to discover the site's content more efficiently as it will not need to crawl a page using different Googlebot user agents to retrieve all the content, and index it. Google also offers a mobile responsive test, so you can see how easy it is for a visitor to use the site on a mobile device (GoogleSearchBlog, 2012). According to research, a wait of more than one second can disrupt the user's thought process, resulting in a poor user experience (Dyson, 2013).

The way the site is being designed also affects the site's appearance in the search results, as Google includes sites that are easy to use and compatible with all devices in the first search results. Also, Google prefers responsive web design because content displayed on a single website and a single URL is much easier for users to share, interact with, and link to than content on a separate mobile site (Taylor, 2013).

Statistics indicate that there are over 1.2 billion smartphone web subscribers globally, with 25% of whom are mobile-only users in the United States, and they rarely use a desktop to access the web (Johnson, 2019). The mobile strategy first emphasized the site's ability to look good on small screens. As the desktop-first approach layout makes the web look good on more spacious desktop screens later (ThemeOver, 2021).

Based on the foregoing, we conclude the importance of responsive design because of the services and capabilities it provides to help website owners to provide their services in an appropriate manner and

serve all visitors, in addition to eliminating the problems that the visitor may encounter when entering the site from devices with different screens. The responsive design allows website content to flow freely across all screen resolutions and sizes and makes it look great on all devices. It also makes it unnecessary to maintain different versions of the website for mobile and desktop, and saves time, resources, and effort.

## METHOD

In this paper, a survey was conducted on 30 websites of ministries and official governmental institutions in Palestine to determine the trend of RWD use. The source of the ministries and official governmental institution's websites were obtained from the Palestine cabinet website. Emphasis was placed on websites that provide electronic services to citizens and employees. In this experiment, Google DevTools has been selected as the reference for testing RWD technology. It is a test environment that provides a quick and easy way to test websites on mobile devices and tablets, in addition to the Google Mobile-Friendly Test Tool, which is a URL analysis tool and gives a report on the suitability of a site for mobile users. Real devices were used to test the website's responsiveness to increase the accuracy of the results such as desktops, tablets, and smartphones. At the end of this survey, the observed websites were classified into three categories: responsive, semi-responsive, and unresponsive. Table1 shows the criteria we followed in testing websites according to Qawerk, which is a company specialized in examining the compatibility of websites with all browsers and different screen sizes (Qawerk, 2019).

**Table (1) Checklist for Responsive Web Design Testing**

Criteria	Explanation
Page content alignment (text, image)	Page content alignment must be appropriately adjusted for the site.
Clickable area suitability and interactivity	Buttons must be designed flexibly so that the user can quickly press them.
Padding around the edges	The edges and around the text must be set conveniently and appropriately so that all the page contents appear.
Scrolls and displays	While browsing the site on the mobile, keep in mind that the whole page appears without having to use horizontal scrolling.
Font size, style, and color for different text types	Font size must be adjusted to all screen sizes, and the style should be readable.
Readability of pages regardless of the resolution	The content should be excellent and readable easily and flexibly without enlarging the font or scroll screen to the right and left.
Color and highlights changes	The colors should be consistent with the template's color, and the night light option should be placed.

Responsive web design is used to ensure that the content on a website is presented effectively and without lack of information regardless of the mobile device from which it is accessed. The advantage of responsive web design is that a website that can adjust its layout to the size of the browser should also adapt the size of fonts, images, and other components so that the user can read the entire content without having to scroll horizontally to see the hidden parts of the website. Since the responsive website is designed to build a comfortable UI and manage the small size of a mobile browser, the total click caused by mistakes should be decreased (Lestari et al., 2014).



Using Google DevTools, we analyzed and reviewed 30 official Palestinian ministries and governmental institutions' websites, as well as utilizing Google's Mobile Testing site that reports on mobile usability and gives insight on how to fix mobile usability issues. Moreover, real mobile devices are used to evaluate whether a website is suitable for different types of mobile devices or not. Each page of the website has been checked to determine its level of response. Table 2 shows the results. URL and site designs are also observed and evaluated. In addition, Android and IOS smartphones should know if the websites offer mobile application service. The results are described in Table2.

## RESULTS AND DISCUSSION

The results of the thirty official sites of the Palestinian ministries and governmental institutions were analyzed, and are highlighted in Table 2. This was achieved by examining and analyzing the sites using the Mobile-Friendly Test Tool, obtaining reports on the work of each site and the problems encountered, and simulating the results using Google DevTool on different types of mobile devices and laptops. In this survey based on the results obtained, it was found that 40% of the websites of the ministries and governmental institutions use the concept of RWD, and 30% of websites are semi-responsive. Furthermore, 30% are not responsive websites. The results also showed that 43% of the websites are compatible with mobiles and tablets.

**Table (2) List of ministries and official governmental institutions, and the extent to which it supports responsive design.**

#	Link	Responsive with Desktop & Laptop?	Compatible with mobile and tablet?
1	<a href="http://www.palestinecabinet.gov.ps">http://www.palestinecabinet.gov.ps</a>	Yes	compatible
2	<a href="http://www.pcbs.gov.ps">http://www.pcbs.gov.ps</a>	Yes	compatible
3	<a href="http://gaca.gov.ps/">http://gaca.gov.ps/</a>	Semi	Incompatible
4	<a href="http://www.darifta.ps/">http://www.darifta.ps/</a>	No	Incompatible
5	<a href="http://www.saacb.ps">http://www.saacb.ps</a>	Yes	compatible
6	<a href="http://www.gpc.pna.ps">http://www.gpc.pna.ps</a>	Semi	Incompatible
7	<a href="http://kudah.pna.ps/index.aspx">http://kudah.pna.ps/index.aspx</a>	No	Incompatible
8	<a href="http://www.penra.pna.ps">http://www.penra.pna.ps</a>	Semi	Semi- compatible
9	<a href="http://www.courts.gov.ps">http://www.courts.gov.ps</a>	No	Incompatible
10	<a href="http://www.pcma.ps">http://www.pcma.ps</a>	No	Incompatible
11	<a href="http://www.minfo.ps">http://www.minfo.ps</a>	Yes	compatible
12	<a href="https://www.mtit.gov.ps/">https://www.mtit.gov.ps/</a>	Semi	compatible
13	<a href="http://www.mne.gov.ps/">http://www.mne.gov.ps/</a>	Yes	Incompatible
14	<a href="https://mopwh.ps/">https://mopwh.ps/</a>	No	Incompatible
15	<a href="http://www.pal-wakf.ps">http://www.pal-wakf.ps</a>	No	Incompatible
16	<a href="http://www.moehe.gov.ps/">http://www.moehe.gov.ps/</a>	Yes	compatible
17	<a href="http://www.moc.pna.ps">http://www.moc.pna.ps</a>	Yes	compatible
18	<a href="http://www.molg.pna.ps">http://www.molg.pna.ps</a>	Yes	compatible
19	<a href="https://www.moi.pna.ps/home/">https://www.moi.pna.ps/home/</a>	Yes	compatible

20	http://www.moa.pna.ps	Yes	Semi- compatible
21	http://www.mosa.pna.ps	No	Incompatible
22	http://www.mofa.pna.ps	Semi	compatible
23	http://www.moh.ps	Semi	Semi- compatible
24	http://www.mol.pna.ps	Yes	compatible
25	http://www.pmf.ps	Semi	Semi- compatible
26	http://www.mot.gov.ps	Yes	compatible
27	http://www.mowa.pna.ps/	Semi	compatible
28	http://www.coc.ps/ar/index.php	No	Incompatible
29	http://www.pgp.ps	Semi	Semi- compatible
30	http://lwsc.ps/	No	Incompatible

Based on the results obtained, they have been summarized in Table2. It can be concluded that the concept of RWD is used by some official websites of ministries and governmental institutions. We have 12 sites that used Responsive Design technology, and 9 still have not applied it due to insufficient experience in this technology. We also have 9 other semi-responsive sites, and 13 websites that are compatible with mobile devices and tablets. Table3 shows the strategies used in the ministries and official governmental institutions in Palestine.

**Table (3) Strategies used in websites**

Strategy	Number of sites
Responsive website	12 out of 30
Semi responsive website	9 out of 30
Not responsive website	9 out of 30
Compatible Mobile and Tablet	13 out of 30

For sites that applied responsive web design principles, they appeared perfectly on different screens and mobile devices. We also had no problems while rendering. Responsive web design principles have been implemented in the PCBS website, and the website has been tested by Google DevTools on iPhone 7, iPad Tablet, and HP ProBook Laptop. Additionally, the Mobile-Friendly Test Tool reports that the site is mobile-friendly and easy to use. The site can be browsed well on these devices without any change in size and horizontal scrolling, and is fully responsive as shown in Figure 3, Figure 4. The icons appeared well arranged, the menus open in an easy way with the ability to click on every link, the text has been readable on all pages, and the text alignment has been set from the right. In addition, we had no problems while moving between pages through the links, and the distribution of the contents of the page appeared well on the screen of mobile phones, tablets, and computers.



Figure (3) iPhone 7 Screen – Responsive Website



Figure (4) iPad Screen Responsive Website

For sites that did not apply responsive web design principles, the result showed that browsing the site on the HP Pro Book computer was weak as the site appeared as one fixed block and there is no interaction or movement within the site. The text size is small, the screen needs enlargement to become clear, and the colors are inconsistent.

Browsing on mobile devices and tablets was poor and unacceptable. We found it difficult to read the articles due to the small font size and not being suitable for the size of the tablet screen, and there were images that did not display correctly. It was not possible to move between the pages easily. The icons do not appear well and are close to each other so can only be clicked with difficulty. In addition to the unordered page elements, there is also blank white space. The Mobile-Friendly Test Tool reports that the site is not mobile-friendly and difficult to use. The image of the site on mobile devices is shown in Figure 5 and Figure 6.



Figure (5) iPhone 7 Screen - Not Responsive Website



Figure (6) iPad Screen - Not Responsive Website

For sites that have partially implemented responsive web design principles, semi-responsive websites appeared well on some mobile devices and large screens, while not looking neat on others. For example, the Palestinian Ministry of Finance website did not implement all the principles of responsive web design, and the site was tested by Google DevTools on iPhone 7, iPad Tablet, and HP ProBook Laptop. We noticed that the site works fine on the screen of computers, mobile phones, and tablets with some problems. As the need to use the horizontal scroll bar to see all the contents of the page, there is empty and untapped white space in the pages. The lists are not arranged and do not appear in order on the tablet screen. The font is very small and the page needs enlarge so that we can read the article on the tablet device, while on the mobile phone it appeared fine as shown in Figure 7, Figure 8. The Mobile-Friendly Test Tool also indicates that the site is mobile friendly and easy to use although there are some issues.



Figure (7) iPhone 7 Screen – Semi Responsive Website



Figure (8) iPad Screen - Semi Responsive Website

Based on previous results, we conclude the Benefits and importance of adoption an RWD approach in creating an efficient and successful website, which is essential for maintaining a more user-friendly website.

## CONCLUSION

With the significant increase in the number of Internet users and different devices that can access websites and the emergence of more screens of different sizes, new challenges have emerged for web developers and designers to build a site that can adapt to these devices and display them perfectly. This is the primary function of responsive web design, so the need arose to design websites that follow a rule (one website, many devices) to suit all screens and sizes. It keeps the elements and content organized flexibly and effectively. The results of this survey indicate that the ministries and official governmental institutions in Palestine are moving towards the RWD approach. The results of the survey indicated that 40% of the ministries and governmental institutions' websites use the concept of RWD, and 30% of websites are semi-responsive. However, 30% of them are not responsive websites. The results also showed that 43% of websites are compatible with mobile phones and tablets. However, the websites of some ministries and institutions do not provide this technology or even partially due to the lack of responsive web design as it needs expertise and flexibility. In general, this research focused on the use of responsive web design by the Palestinian ministries and official governmental institutions. Many further responsive web design technology tests can be conducted on governmental websites and e-services to find ways to improve the usability of mobile devices through best practices. In addition, the usability of mobile devices can be improved by figuring out the way to improve performance through the use of the network. We also recommend further research in RWD technology in web development and the use of off-the-shelf frameworks.

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