

# On Modern Web Tools Used to Improve the Online Learning

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*Abstract:* - Over the past years, evolutions in IT have marked different areas, learning being among them. Today, online learning is at a very advanced level compared to what it was ten years ago. Hardware developments made possible to develop online learning anywhere around the world. Also, the number of involved people (in education or learning) is not important. Even if the hardware technologies have a greater role in the development of online learning, the software tools play an important role in the improvement of the quality of learning. Currently, websites must be responsive, to be visited from different devices. In this paper we focus on Bootstrap and how we can use it in order to improve the quality of learning, using websites or mobile applications.

*Key-Words:* - Online learning, Bootstrap, websites, mobile applications

## 1 Introduction

In this paper we are focused on the importance of the quality of information representation in online learning environments.

Today, online education is already greatly developed. We can find many learning websites belonging to corporations, companies, universities, schools, etc. Also, the current requirements for website are to be responsive - this means to be easily navigated from different devices, especially on small screen devices. Many of the online learning providers have responsive websites. Many websites, with learning content, responsive or not, are focused on video content, or on simple text. The new web design tools are by now equipped with many components, facilitating the display of information on a website. Also, these tools allow the use of a rich colour palette, big-sized text, and many other web effects. In this paper we present how *Bootstrap* (the actual and the most popular *HTML*, *CSS* and *JavaScript* framework) can improve the web design and the online learning.

In *Section 2* we make an introduction on *Bootstrap*, and in the *Section 3* we present a learning website using *Bootstrap*.

## 2 General presentation of *Bootstrap*

The starting information on *Bootstrap*, can be found on <http://getbootstrap.com/>. Valuable lessons

on using *Bootstrap*, can be found on <http://www.w3schools.com/bootstrap/default.asp>. These two sites have the most popular content on this topic. This content is in constant evolution.

Using these two websites you can learn everything you need to know about *Bootstrap*. However, in my own opinion, only these two sourced of knowledge will not be enough to show you the potentiality of this framework.

Around the world, many people develop website themes using *Bootstrap*. We give some examples of websites selling *Bootstrap* themes: *gt3themes*, *wrapbootstrap*, *theforest*, etc.

Searching the *Bootstrap theme* term on *Google*, we can find many other websites which sell such website themes. All themes have a *demo* or *preview* section, and watching them, you will be able to see how important this tool is for web design.

Among these theme offers, we can find many themes for blogging, hotels, e-commerce, restaurants, events, etc. However, at the same time, we can observe that the themes dedicated to online learning are mostly absent. In this paper we want to emphasise the importance of this friendly web design tool in the case of learning websites.

### 3 Websites and mobile apps - design for learning

In this section, we present how we can use *Bootstrap* to create websites or mobile apps, considering an example of website dedicated to learning.

#### 3.1 Design presentation

In *Figures 1* and *2*, the first website page is displayed.

*Learning considerations.* In the first website

page, we present the offer of online courses. This page also contains components for user registration and login.

*Design considerations.* The first figure refers to the website image on a desktop computer, and the second figure refers to the image on a mobile device. Using these two figures, we can observe that the representation is slightly different, but in each case, we can navigate easily inside the webpage.



**Fig. 1:** Responsive web design - desktop computer image

In *Figure 1*, we have the navigation bar, fixed on the top of the webpage. In the *Figure 2*, we can observe that the navigation bar is too large on a small mobile screen. *Bootstrap* allows us to use a button in the top right corner, to display the navigation.

Now, we proceed to presenting the website pages, dedicated to learning. Here, we consider an example of *MS Excel* online course.

In *Figure 3*, we present an example of the *Carousel* plugin, which is a slideshow component.

*Learning considerations.* In *Figure 3*, we display some images in which the *Vlookup* function is presented. Here, we consider some examples and we illustrate the two forms of this function (the use with or without the *False* argument).

*Design considerations.* Using the *Carousel* component, we can display images, video files, text, links to download files, and this means that we can display any kind of information, browsing slides. The use of *Carousel* is optional but can lead the

learner to focus on certain information, and it facilitates the learning, in certain cases.



**Fig. 2** Responsive web design - mobile image

In Figure 4 we present the tabs using. Tabs are used to separate content into different panes where

each pane is viewable one at a time.

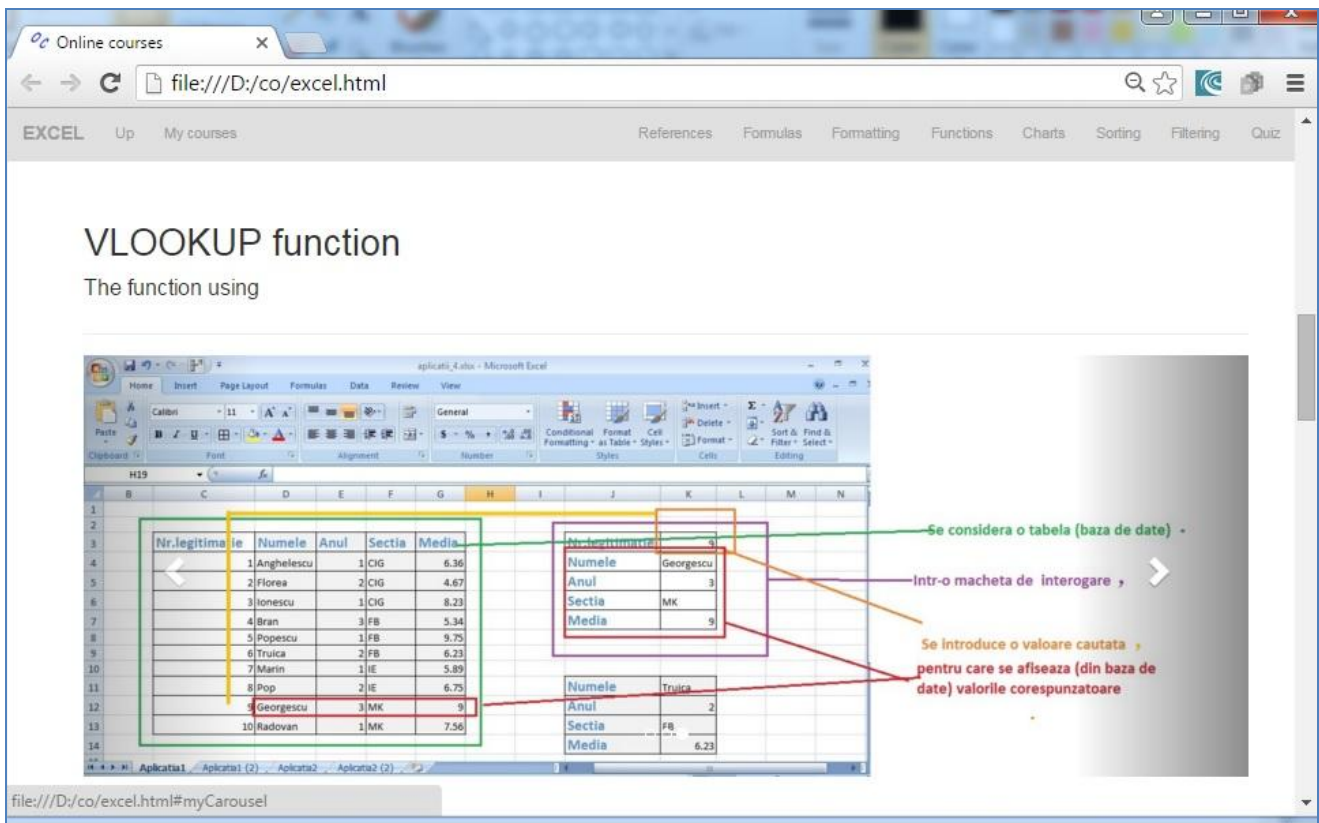


Fig. 3 The Carousel

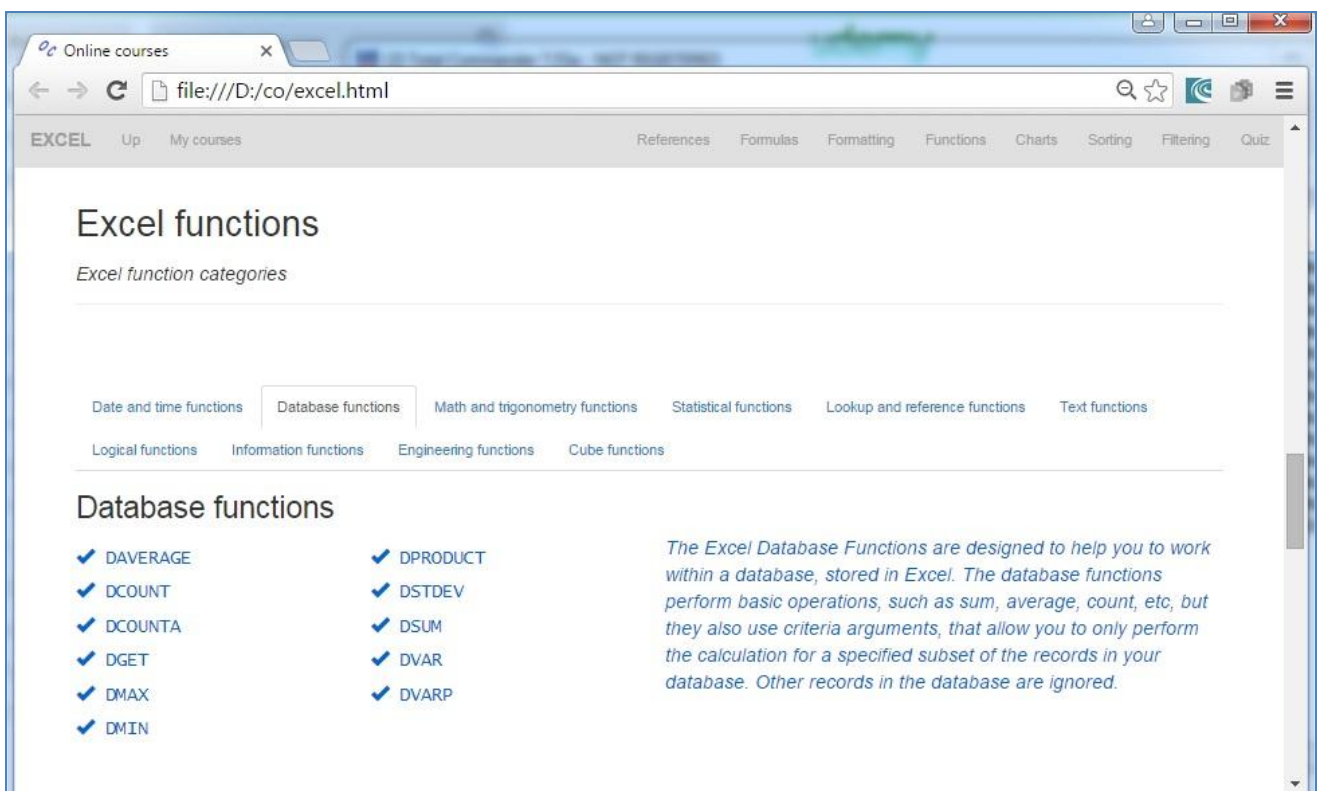


Fig. 4 Tabs, grid and sections

*Learning considerations.* In Figure 4, we present the *Excel functions*. In this figure we have grouped information by different categories of functions. Using *tabs* we can easily browse these groups. Inside a pane, we display the name of all functions from a certain category, and a short description of the category.

*Design considerations.* In Figure 4, we can observe that inside of a small part of a webpage. Using tabs, the users can easily access a massive quantity of information. This is very important especially for mobile users.

Also, we can observe the big size of the text and the spaces between the information – something else which facilitates the website navigation.

In Figure 4, inside the pane, we have used the *grid*. The *grid* is maybe the most used *Bootstrap* component. It allows us to display information in rows, using between one and twelve columns. A powerful web design technique is to use small section of rows, changing the numbers of columns from one section to the next. This facilitates information viewing, on a desktop computer, but especially on small devices. In Figure 4 we use three parts, each on four columns from the grid - two parts are for function names, and one part is for function category description. The number of columns which will be used is up to whoever implements the website, but the manner in which we do this will influence learning. Also, *Bootstrap* users know well that the numbers of columns which will be displayed for different parts of information, can be different for devices, according to their screen size.

In Figure 5, we present the *grid* using a *section* (a certain part of webpage which will be displayed on screen).

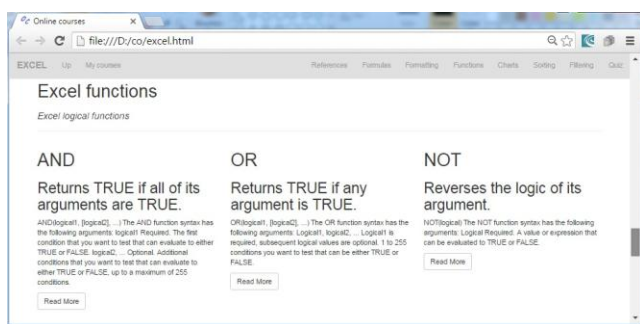


Fig. 5 The grid

*Learning considerations.* The most important logical functions from Excel are *and*, *or* and *not*. To emphasize their importance, we use a special lesson section to present them. We present the name of the function, the signification and the syntax. At the

*Read More* part we provide examples and more explanations on each function, separately.

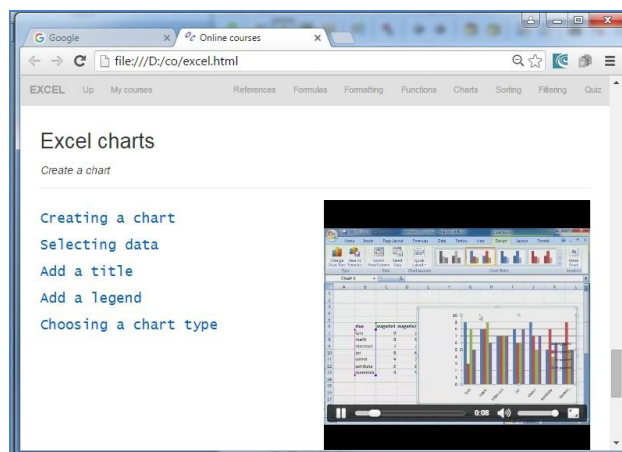


Fig. 6 Video files

*Design considerations.* In Figure 5 we have a *section*, which contains:

- A page header (with the title of topic: *Excel functions*, and the title of the subtopic: *Excel logical functions*). Using headers, we emphasize parts of information.

- A grid with three parts, each of them using four columns from the grid. Here, we use equal numbers of columns, because we present three subjects from the same category (i.e. the same kind of information). The number of columns can be different, according to the information which must be transmitted to the website users and visitors.

In Figure 6, also using the *grid*, we present the information using a video file.

*Learning considerations.* In Figure 6, in the video file we present the way in which we can create charts in *Excel*. We consider that in the online environments, certain learning parts can be best transmitted using video files. This is one example: learning to create charts. Our video file time is of 40 seconds. Our recommendation is to use as few video files as possible, only where is necessary. Also, the time of video must be short. Long videos can be boring and the users lose the interest for studying. However, in certain situations using longer video files is the best way for present the information in the online environments. In such a case, a good idea is to put the video file on *YouTube*, and embed the link in your website.

*Design considerations.* In a website, the video file can occupy all the width of webpage, or only a part, according to the content of the video file. In Figure 6, we use only a part of the *grid* for video representation, and another part for text.

In online learning two components are important: displaying the information to be learned, and the

quizzes and testing. Many website are focused only on the first component. However, the second part is also a learning component, helping the user self-evaluate the level of knowledge reached on the learning website. If he is satisfied with the results, we have the chance to involve him in other courses

from our offer, or to refer our website to someone else. At this point we don't talk about recognition about such evaluation. However, we want to point out, that the parts of testing in the online environments are valuable parts of learning.

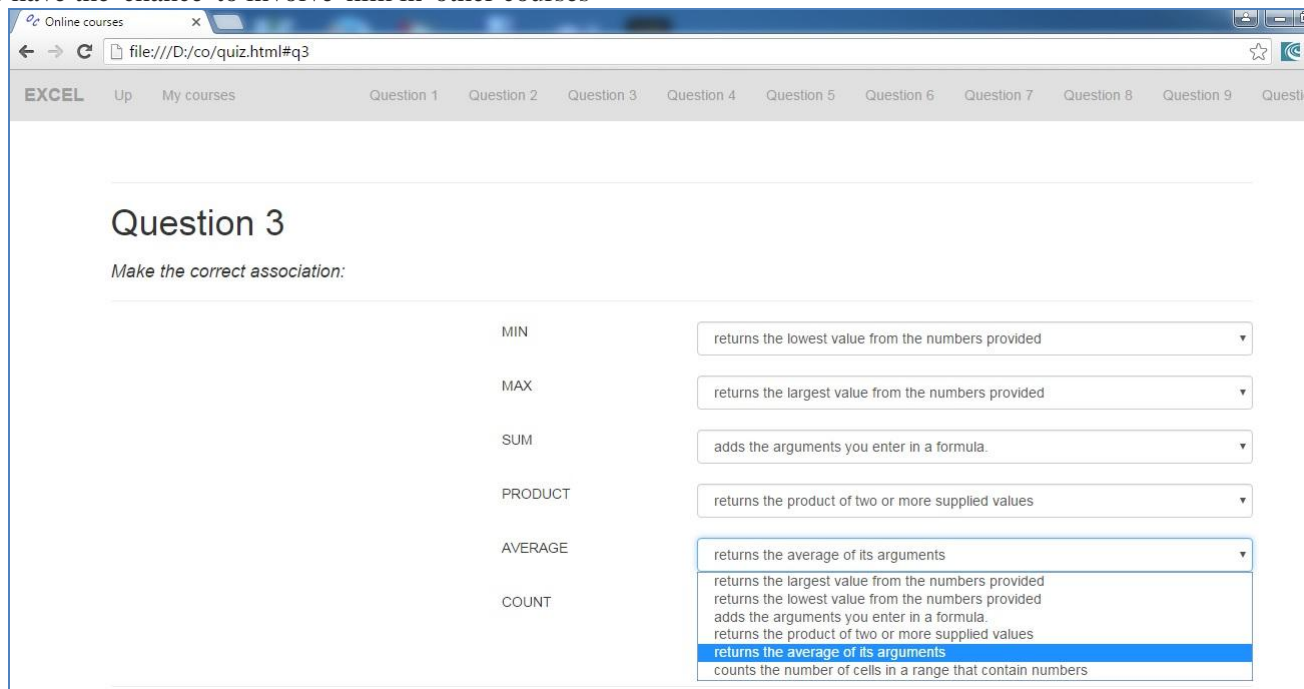


Fig. 7 Quizzes - drop boxes

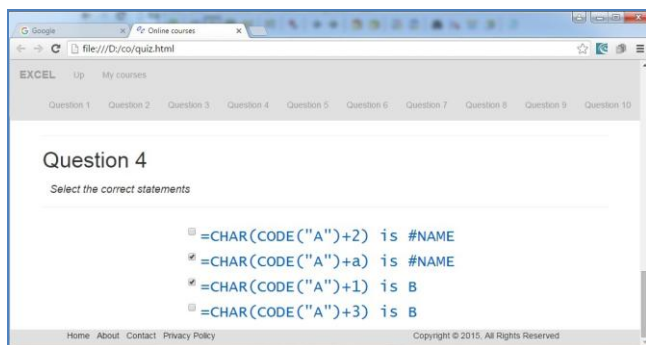


Fig. 8 Quizzes - check boxes

In Figures 7 and 8, we present two examples of questions. In Figure 7 we use drop boxes and in Figure 8 we use check boxes. We can present many others, using different Bootstrap components. However, we would like to point out that for quizzes, we use form components. Also, it is a good idea to change such components from one question to another. We can use drop boxes, lists, check boxes, text boxes, radio groups, etc. Also, for question formulation we can use text, images, or video files. We choose them according to a certain situation.

In this section we have presented only some Bootstrap components. Many other components can be found at <http://getbootstrap.com/>, and of course we suggest using most of them. Here we have given only some examples, but we consider that these are enough to understand the importance of the web design in online learning.

### 3.2 Website and mobile app implementation

In the Subsection 3.1 we were focused on content and design of learning website.

In this subsection, we want to point out some ideas on websites and mobile applications implementation.

If we consider a website, we can add some code, in order to allow registration, login on website, access to certain courses, store different kind of data (on users, results, etc.). Depending on the website, we can add parts of payment or e-commerce on the website. Whatever the case, to add code, we can use Java, Python, Node.js, C#, PHP, or other programming environments. Also, to store different kinds of information we can use databases (relational database, or NoSQL).

If we consider our application from *Subsection 3.1* to be a mobile application, we must convert the files in mobile files (e.g. in *apk* file for *Android*). At this step, we can use *PhoneGap* online (in cloud, see <https://build.phonegap.com/>) or offline (using, *Android Studio*, *Eclipse*, or other software tools).

Before the *PhoneGap* conversion, we can obtain a preview image of the mobile application on different mobile devices using the *Ripple Emulator* from *Google*. The mobile application can use the Internet or not. If we don't to use the Internet (on mobile devices) we can use *json* files for storing some data (e.g. the results on quizzes).

In the case of mobile applications, we can make the observation that there also are other important tools, e. g. *jQuery Mobile*, *Material Design Lite* (other HTML, CSS, and JavaScript frameworks) and in certain cases they can be more better than *Bootstrap* (which is especially created for websites).

## 4 Conclusion

The IT evolution over the past years can be found everywhere: hardware, software, etc. The online learning platforms, from the IT view point, must be aligned to the current technologies. In the current offers of online learning around the world, we can observe this alignment in terms of hardware, performance of learning platforms, and knowledge. However, the parts of web design (which are newest for website, generally, not only for learning websites), are absent from some online learning environments. A big part of websites are focused on video content, or on the simple format text content. In this paper, we wanted to emphasize the appearance of the newest web tools, which increase the quality of websites, especially by facilitating mobile navigation. We consider the importance of the web design in the online courses, from two reasons: the first - the websites of online learning must be in line with new web design trends, and the second, and a very important reason, these new elements considerably increase the quality of information representation.

Today, the online learning is becoming increasingly popular and for most people it is about to become the *main way of learning*. For this reason, we consider that the quality of information representation ( in the online environments) is very important to facilitate the learning.

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