

Are Moroccan Free School Support Websites Effective for Learners During the Covid-19 Pandemic? A Study Based on an Evaluation Grid

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ABSTRACT

In these times of COVID-19, many Moroccan students access websites for their school support needs. The objective of this study is to carry out an evaluation of some Moroccan free school support websites and to verify their effectiveness for learners, from a socio-constructivist perspective. This evaluation is conducted by various teachers using an evaluation grid developed by the authors following a review of literature that identified a number of elements considered as important factors for the proper functioning of an educational website. The approach adopted allowed the grid to be validated (Cronbach's alpha equal to 0.82). The results of the evaluation show several positive aspects but also some weaknesses inherent to the studied websites, especially concerning help with work methodology and pedagogical guidance and also the interactivity. Finally, several recommendations are proposed by the authors.

KEYWORDS

COVID-19 Pandemic, E-Learning, Evaluation Grid, Interactivity, School Support Website, Socio-Constructivist and Interactive Model, Usability

INTRODUCTION

In recent years, Information and Communication Technologies (ICTs) have entered several sectors, including education, and their use is becoming more widespread. "Computer technologies and other aspects of digital culture have changed the ways people live, work, play, and learn, impacting the construction and distribution of knowledge and power around the world" (UNESCO's International Institute for Educational Planning). 93% of Moroccan common core students use the Internet to conduct school research, and nearly 80% of their teachers use the Internet for the purposes of their teaching (Conseil Supérieur de l'Éducation, de la Formation et de la Recherche Scientifique, 2017). By taking into account both learners' learning styles, their environment, devices and profiles, mobile devices can help them learn (Abech et al, 2016). Ubiquitous learning, increasingly used nowadays, connects the learners, through their mobile device with educational resources, and thus supports continuous

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learning (Ferreira et al., 2020). An analysis of an experiment concerning the use of WhatsApp for teaching and learning in a university setting, identified several educational affordances of mobile instant messaging, among them interaction, knowledge sharing, collaboration and flexible learning (Klein et al., 2018). Heidrich et al. (2018) looked at learner dropout (for online distance learning) according to learning styles (global or sequential), and the study showed that learners with a linear thought process tend to cope more easily in distance learning courses than those who prefer to receive information in large leaps. The application of methods and techniques for analysing data on learning and groups of learners allows for the prediction of academic progress and possible drop-out, and enables teachers and managers to make decisions about problems encountered (Silva et al., 2021).

Technological advances and the digital revolution have led to the ubiquity of new technologies in the lives of learners, and thus the use of e-learning and the Internet for learning have become commonplace. They have also led to the emergence of school support websites, in Morocco as elsewhere.

Online school support is a trend that is currently taking hold in Morocco, as in other countries, and it is an alternative to face-to-face school support. Several Moroccan websites define themselves as “school support websites” and offer services to students, including courses, exercises and other supports. The use of the Internet for school support has become essential, especially in these last months of the Covid-19 pandemic.

This article addresses the following research questions:

- Are the Moroccan free school support websites studied effective?
- What are their strengths and weaknesses?

Given the lack of studies on Moroccan school support websites, especially during this Covid-19 pandemic, the scientific contribution of this work is to evaluate some Moroccan free school support websites, taking into account the essential aspects of an educational school support website, namely the contents, the resources and the pedagogical strategies, the help in work methodology and orientation, as well as the interactivity and the usability of the website, according to a socio-constructivist perspective. The other scientific contribution of this work is to propose a ready-to-use evaluation grid for school support websites, which would be a substantial contribution to help teachers to guide their students in the right choice of school support websites, and also to help the designers and authors of school support websites to improve the quality of their websites. The article concludes with some conclusions and recommendations. The research methodology will be based on the use and validation of an evaluation grid.

LITERATURE REVIEW

Several authors and academic institutions have published grids or pages for evaluating websites and information found on the Internet.

Some of these evaluations are qualitative and are based on questions to ask before using information found on the web. Other evaluations are quantitative or combine a qualitative and quantitative evaluation. The answers are either passable/good/excellent, yes/no, low/medium/well/very well or on a Likert scale 1/2/3/4/5. In the following, we briefly describe the main grids used to establish the evaluation grid.

- The analysis grid proposed by Buisson et al (2004, pp. 45-47) is divided into three parts: the general analysis of the educational site, the services offered, and the nature of the resources proposed as well as the general evaluation of the presentation of the site.

- Gilbert (2008) has developed a pedagogical and technical evaluation grid for an educational website which has eight parts, among them learning objectives, credibility, target audience, content and pedagogical strategies and interactivity.
- The page “Evaluation d’un site web” (École de Bibliothéconomie et des Sciences de l’Information, Université de Montréal, 2009) is composed of 5 categories: author of the website, website structure and navigation, content of the website, graphics-images-sound-video, and finally the usefulness of the website. It offers some guidelines on how to evaluate a website.
- The document “Aide Mémoire - Evaluation de l’Information” (Institut National des Sciences Appliquées, 2010) is an evaluation grid of a document found on the Internet and consists on several categories: who is the author of the website, what are the goals of the website, what are the skills of the author (or authors), who is the intended audience, what information is given, and how does the organization and presentation of the information facilitate their access and ownership?
- Mottet (2012) proposes the grid “L’évaluation de la fiabilité d’un site Internet” composed of eight categories relating among others to the identification of the author, the objectivity of the website, the reliability of the references as well as the navigation.
- The grid “Proposition de grilles d’identification et d’évaluation de sites web” by Serres (2018) is composed of five categories which concern the identification of the website or the organization responsible, the identification of the author, the identification of the nature of the document and the information, the evaluation of the structure of the website or of the document and finally the assessment of formatting and accessibility.
- The page “Fiabilité de l’information-Évaluer le contenu en ligne” (Bibliothèques, Université de Montréal) is composed of 4 criteria, each with several questions to ask before using a web resource. The criteria concerns the quality and validity of the content, the authority of the source, the update and the ease of use.
- The list “Evaluating Web Pages: Questions to Consider: Categories” (Cornell University, 2020) consists of five categories. It is based on Jim Kapoun’s original list. This list includes five criteria for the document: the accuracy of the information about the author and the institution that published it and how to contact him, the author’s authority, the objectivity of the information, the credibility of the information and finally the ease of visualizing it.
- Muhammad et al (2020) conducted a study that proposed a hierarchical quality model for the evaluation of e-learning websites. The proposed model used a Likert scale to evaluate four factors: content, usability, organisation and design of the website.
- The research conducted by Alfayez and Altawriy (2020) aimed to evaluate and identify usability issues of the University of Basrah (Iraq). For this purpose, they based their research on four categories: Content, Navigation and Links, Performance and Design of the website user interface.
- Rerung et al. (2020) conducted a study to measure and describe the quality of a government institution’s website using the Webqual 4.0 method. Using a Likert scale, they took into account 4 criteria: usability, information quality, interaction service and overall evaluation.
- The “Evaluating resources” web page (Berkeley Library, University of California, 2021) consists of six categories related to the resource considered: author’s authority, the purpose for which the source was created, where it was published and in what medium, its relevance, its publication date and the citation of the sources used in the document.
- The research conducted by Brilliant and Ananda (2021) aimed at evaluating the quality of the website of a Faculty of Science and Technology, adopting Webqual 4.0 which is a tool for measuring the quality of a website. Using a Likert scale, they evaluated 3 variables: usability, information quality and website interaction. Each of the variables is composed of several questions.

A comparison between related works is presented in Table 1, according to aspects presented in these works.

Table 1. Related works comparison

Grids/Aspects	Author authority	Quality of the information	Content	Learning objectives	Usability	Interactivity and navigation of the website
Buisson (2004)	Yes	Yes	Yes	Yes		Yes
Gilbert (2008)	Yes	Yes	Yes	Yes		Yes
École de Bibliothéconomie et des Sciences de l'Information, Université de Montréal (2009)	Yes		Yes		Yes	Yes
Institut National des Sciences Appliquées (2010)	Yes	Yes	Yes			Yes
Mottet (2012)	Yes	Yes	No			Yes
Serres (2018)	Yes	Yes	Yes			Yes
Bibliothèques, Université de Montréal	Yes	Yes	Yes			Yes
Cornell university (2020)	Yes	Yes	Yes			Yes
Muhammad et al. (2020)			Yes		Yes	Yes
Alfayez and Altawriy (2020)			Yes			Yes
Rerung et al. (2020)		Yes			Yes	Yes
Berkeley Library (2021)	Yes	Yes	Yes			Yes
Brilliant and Ananda (2021)		Yes			Yes	Yes

Most of the works focused on the authority of the author, the quality of the information, the contents and the interactivity of the website. Interactivity was the aspect most dealt with in the different studies (13 out of 13). None of the works compared analyzed simultaneously the 6 aspects mentioned in table 1. Based on this literature review, this work proposes a grid that aims to evaluate free school support websites based on the 6 aspects of the table1, but taking into account the specificity of an educational website.

SCHOOL SUPPORT IN MOROCCO

The reference document “Charte Nationale d’Education et de Formation” has been developed and has enjoyed general consensus (Commission Spéciale d’Education et de Formation, 1999). The latter already mentioned “pedagogical support” in lever 7 (article 106, paragraph f.). The limited success of the reform that was started later prompted the elaboration of “Emergency Programme 2009-2012”

that aimed in Project E1.P5 to “Fight against repetition and dropout”, through “the establishment of a personalized monitoring system for students, the establishment of a system of educational support for students in difficulty and upgrading sessions to fight repetition” (Ministry of National Education, Vocational Training, Higher Education and Scientific Research, Morocco, 2009, p. 3). The support recommended is support within schools. Then, the National Report EPT 2011 (Education for All 2011) speaks about the program of “School Accompaniment” which tries to develop “innovative approaches” [...] to promote “the educational watch in the school” (Ministry of National Education Morocco, 2011, p. 51). More recently, the establishment of school support, extra-curricular support and school accompaniment for learners in difficulty has been advocated - see levels 1,7 and 20 - (Conseil Supérieur de l'Education, de la Formation et de la Recherche Scientifique, 2015).

Despite the stated willingness of decision-makers, for the establishment of institutional school support, many students use paid school support and Internet-based school support (Conseil Supérieur de l'Education, de la Formation et de la Recherche Scientifique, 2017).

THEORETICAL FRAMEWORK

This section introduces the basic concepts and theory of this work. Jonnaert's socio-constructivist and interactive paradigm forms the general framework for this study. In addition to ICT, the section also deals with e-learning and online school support, Help with work methodology and pedagogical guidance, interactivity and usability of an educational website, and finally methods of website evaluation.

Jonnaert's Socio-Constructivist and Interactive Paradigm (SCI)

In this study, the general reference framework is the “socio-constructivist and interactive paradigm” proposed by Jonnaert (2006, pp. 71-75), which is a paradigm of construction of knowledge. It has three dimensions: the “constructivist” dimension whereby the learner manipulates previous ideas, knowledge and conceptions about the object of learning, to solve the new problem posed; the “interactive” dimension that works in combination with the constructivist dimension concerns the interaction of ancient knowledge with new objects in a situation, which may be codified knowledge; and finally the “socio” dimension which refers to the partners involved: the peers and the teacher and the social interactions, in the school context or elsewhere. The three dimensions are interdependent and form a triptych, each dimension feeding the other two.

ICTs, E-Learning and Online School Support

The UNESCO Institute for Statistics (2009) defines information and communication technologies (ICTs) as “a diverse set of technological tools and resources used to transmit, store, create, share or exchange information”. These technological tools and resources “include computers, the Internet (websites, blogs and emails), live broadcasting technologies (radio, television and webcasting), recorded broadcasting technologies (podcasting, audio and video players, and storage devices) and telephony (fixed or mobile, satellite, visio/video-conferencing.)” (p. 120).

According to Yuen and Ma (2008), new possibilities and the invitation to innovative pedagogies are offered by e-learning. E-learning is “the use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration” (European Commission, 2005, p.1).

Help with Work Methodology and Pedagogical Guidance

According to Maury (2008), pupils often misunderstand instructions, do not master note-taking or the creation of index cards. This makes it difficult for them to learn. The same author recommends a work methodology course to help students. Perrenoud (2017) states that good work includes working

fast enough and in an organized way. Help with pedagogical guidance is also an important element for the learner's success.

Interactivity of an Educational Website

According to Zhao, Zhang & Lai (2010, Vol 1, p. 391) "It is through interacting with content that learners actively reconstruct knowledge and deepen their understanding. A highly interactive learning environment would be one in which learners have frequent opportunities to make a wide variety of significant choices. By doing so, learners feel a higher degree of involvement and engagement and as a result, become highly motivated".

Several elements must be checked regarding the interactivity of a website: among them the presence of interactive exercises, a forum, a discussion/ mailing list.

Usability of a Website

Usability is defined by Nielsen and Loranger (2006, p. xvi.) as: "a quality attribute relating to how easy something is to use. More specifically, it refers to how quickly people can learn to use something, how efficient they are while using it, how memorable it is, how error-prone it is, and how much users like using it. If people can't or won't use a feature, it might as well not exist".

According to ISO 9241-11 (International Organization for Standardization, 2018): Usability is the "extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use".

Website Evaluation Methods

Two methods exist: the empirical one and the heuristic one.

Empirical Method

This is the method requiring direct user participation, hence its other name of user test. In these tests, one or more people participate either in the execution of representative tasks for which the website was designed, or in the free exploration of the website. The aim is to identify the difficulties encountered by users, based on the actions of the users or from several indices, such as the time required to complete a task, the accuracy of the results, the number and type of errors encountered.

Heuristic Method

This one presents two variants:

Automatic Evaluation Method

This is the example of evaluation proposed by some websites, like the tool "Test, Analyze and Optimize your website performance" (Dareboost website), or the "Website assessment" (Business Development Bank of Canada website). But these methods only partially answer the questions that should be addressed when evaluating an educational website, especially since these methods focus on accessibility and usability.

Method Using an Evaluation Grid

Several evaluation grids are available. Some are qualitative and others quantitative. The "Evaluation chronologique d'un site par un utilisateur" (Sloïm & Gateau, 2000) is a tool concerning the website address, the identification of interlocutors, the navigation in the website, the usability and the validation of available information. In addition, the free tool "Evaluate the quality of your website" (Sloïm & Gateau, 2003) allows a self-assessment of a website according to several criteria.

METHODOLOGY

The aim of this study is to develop and validate an evaluation grid that is used to evaluate a number of Moroccan free school support sites, this evaluation being carried out by several teachers.

Regarding the methodology used in this work, we chose to adapt the one used by Pottier et al. (2016), which aimed at validating a competency assessment grid.

Development of the Evaluation Grid

Searching for the Components of The Evaluation Grid

In order to develop this evaluation grid for school support websites, existing analysis grids for educational websites have been studied. They each deal with one or more aspects: pedagogical, interactive, and others. The most representative elements of the evaluation of an educational website were sought. Then specific elements to a school support website were added. All the elements retained as relevant were inserted in the initial grid.

Characteristics of the Initial Grid

It comprises 49 items grouped into 7 dimensions (see Table 2). Each item is rated on a five-point Likert-type scale: not at all = 0 pts, a little = 1 pt, moderately = 2 pts, sufficiently = 3 pts, perfectly = 4 pts.

The weight of the dimension “Identification” is equal to 10%. The weight of the dimensions relating to the pedagogical part of the school support website (“Contents” + “Pedagogical strategies” + “Educational resources” + “Help with work methodology and pedagogical guidance”) is equal to 51%. This respects the importance of the essential role of the pedagogical aspect in an educational website. The dimensions “Interactivity” and “Usability” have respective weights of 20% and 18% (i.e., a total of 38%).

Choice of Websites Evaluated

The choice of websites to be evaluated was made following interviews with several students and also following an Internet search. It has been limited to free school support websites, as they are the most visited by students. Finally, 15 Moroccan websites - aimed at secondary school students - that seemed quite representative of school support websites were retained.

Validation of the Grid

The validation of the evaluation grid followed several stages.

Qualitative External Verification

The initial grid composed of 7 dimensions and 49 items was submitted to the opinion of 2 teacher trainers, experts in Didactics and in Information and Communication Technologies for Education (ICTE). Their feedback helped to improve the grid and make changes.

Quantitative External Verification

The modified grid was then sent to three teachers who agreed to use it to evaluate the same set of 5 free school support websites. The results obtained allowed to detect a misunderstanding for several items, and to modify the evaluation grid.

Statistical Validation

For the statistical validation, 10 teachers were asked to evaluate the same set of 15 free school support websites. It aims to test the reliability and validity of the internal consistency of the grid. A total of 150 observations were obtained. This validation followed 3 steps:

Table 2. Dimensions and items of the initial grid

Dimensions	Items
1 - Identification	The publisher / author is clearly identified
	The publisher's contact details are clearly indicated
	There is no request for donations
	The website is open access
	The target audience is clearly defined
2 - Contents	The contents belong to the school programs
	The contents cover the school programs
	The resources offered are relevant
	The information is accurate
	The search engine is effective
	The sources are indicated
	No presence of advertising
3- Pedagogical Strategies	The educational objectives are clearly expressed
	Learning strategies are relevant
	Assessments are proposed
	Proposed activities are relevant
	The instructions of the activities are clear
4-Educational Resources	It is possible to download the courses
	It is possible to watch courses in video
	Online courses are offered
	Simulations are present for the different courses
	MCQs, course questions are present
	Exercises are present for each chapter
	Exercise corrections are present
	White/annals baccalaureates are present
	A lexicon and a bibliography are available
	Links to other educational resources are available
5- Help with work methodology and pedagogical guidance	Help with work methodology is present
	Pedagogical guidance is present
	Links to foreign universities exist
6- Interactivity	Interactive exercises are present
	Tutoring is proposed
	Collaborative work can be done on the website
	A virtual classroom is present
	A whiteboard can be used on the website
	A forum is present
	A discussion / mailing list is used
	A FAQ is available
	The moderation of the communication tools is carried out
	Interactivity allows appropriate feedback

continued on next page

Table 2. Continued

Dimensions	Items
7- Usability	The website is easy to use
	A site map exists
	The menus are clear
	Hyperlinks are effective
	The content is readable
	The images are of good quality
	It is easy to find back the information
	The structure of the website is coherent
	The website loads quickly

Step 1: Inter-item correlation analysis

The inter-item correlation is estimated. An inter-item correlation value greater than 0.80 leads to targeting the potential elimination of one of the two correlated items (Brown, 2015);

Step 2: Measuring the internal consistency of the evaluation grid

The internal consistency reliability of each dimension is estimated by its Cronbach's alpha, with a score of at least 0.7 being recommended (Hair et al., 2019), and the validity of the internal consistency of the items is evaluated by correlating each item with its dimension using Pearson's coefficient, with a correlation of 0.40 or higher being recommended (Fayers & Machin, 2016);

Step 3: Validation of the grid structure

The validity of the grid is evaluated by a Principal Component Analysis (PCA) using a Varimax rotation, which makes it possible to determine the final structure and the number of independent dimensions. Eigenvalues greater than or equal to 1 are retained for the components used to construct the Varimax rotation matrix (Hair et al., 2019). A confirmatory factor analysis (CFA) is then performed to validate the structure of the grid. This analysis is based on several statistical tests evaluating the adequacy of the data with a model representing the assumed structure, using a set of goodness of fit indices. The proposed model is considered correct for RMSEA and SRMR values below 0.10 and a normed chi-square value below 3 (Hair et al., 2019).

Software Used

Different software were used to carry out different analyses:

SPSS 21.0 (IBM Corp.): Inter-item correlation, Estimation of the Cronbach alpha value for each dimension, Pearson correlation coefficients of the different items with their dimensions, Principal Component Analysis (PCA)

Amos 21.0 (IBM Corp.): Confirmatory factor analysis (CFA)

Excel 2016 (Microsoft Corp.): Calculation of the averages obtained for each dimension and each website.

RESULTS AND DISCUSSION

This section presents the results and discussion of the different steps of the grid validation, the characteristics of the final grid, the results obtained by the different websites evaluated, and the results obtained for each dimension.

Qualitative External Verification

The initial grid was composed of 49 items grouped into 7 dimensions. During this external qualitative verification, carried out thanks to the opinion of two experts in Didactics and ICTE.

Their feedback mainly concerned the “Interactivity” dimension, and allowed the removal of 2 items from this dimension. These are the items “A virtual classroom is present” and “A whiteboard can be used on the website”. These two items, despite their definite added value for a school support website, are not easy to implement given the technical constraints involved. These two items were considered by the two experts as not being within the reach of all educational websites, and therefore as being discriminating elements.

Quantitative External Verification

The resulting grid of 47 items was presented to 3 teachers to evaluate the same set of 5 school support websites. The grids were filled in 100%.

The analysis of the results showed a problem of understanding and/or redundancy of some items. After reflection within the working group, 5 items were removed: one item was removed from the “Identification” dimension as it was considered unnecessary; one item was removed from the “Contents” dimension because of its lack of understanding by the teacher-evaluators; 3 items were removed from the “Usability” dimension, as these 3 items are quite close to the other items constituting the dimension. In addition, one item was moved from the “Contents” dimension to the “Usability” dimension.

Statistical Validation

For this purpose, 10 teachers were asked to evaluate the same set of 15 school support websites using the 42-item evaluation grid, utilizing an Excel file. The grids were 100% completed. Once the results of the evaluation were obtained, a statistical validation in 3 steps was performed.

Step One: Inter-item correlation analysis

In this step, the inter-item correlation rates for the whole grid (consisting of 42 items) was calculated. The analysis of the results revealed a correlation above 0.80 (maximum value according to Brown, 2015) between several items. This led to the elimination of 3 new items: one item was removed from the “Content” dimension, and two items were removed from the “Interactivity” dimension.

Step Two: Measuring the internal consistency of the evaluation grid

Table 3 shows the Cronbach’s alpha coefficients by dimension for each website (calculated from the items in each dimension of the 39-item grid), as well as for all websites.

Among the 112 coefficients, 27 are less than 0.70, value usually considered as correct (Hair et al., 2019). Poor internal consistency was found (among the 15 websites) especially for the dimensions “Content” (9 coefficients) and “Interactivity” (8 coefficients). All websites combined, the Cronbach’s coefficients were correct, except for the “Content” dimension, which has poor internal consistency ($\alpha = 0.68$). Which items, when removed, would increase Cronbach’s alpha coefficient were determined.

Table 3. Cronbach's alpha coefficients by dimension for each website

Websites	Dimensions						
	Identification	Contents	Pedagogical Strategies	Educational resources	Help with work methodology and pedagogical guidance	Interactivity	Usability
1	.82	.70	.70	.69	.94	.27	.80
2	.76	.57	.91	.70	.87	.61	.81
3	.86	.28	.82	.69	.41	.23	.82
4	.60	.64	.87	.80	.92	.81	.84
5	.83	.79	.78	.82	.92	.67	.81
6	.73	.64	.73	.71	.84	.80	.76
7	.76	.81	.87	.68	.85	.79	.84
8	.82	.67	.85	.81	.87	.60	.88
9	.69	.69	.91	.85	.86	.79	.88
10	.77	.49	.90	.82	.13	.79	.54
11	.71	.65	.91	.78	.92	.61	.87
12	.80	.88	.88	.82	.94	.95	.92
13	.67	.67	.90	.80	.94	.36	.80
14	.75	.70	.82	.75	.91	.61	.84
15	.89	.71	.88	.73	.85	.72	.90
All websites	.75	.68	.86	.75	.82	.76	.83

In bold, Cronbach's alpha coefficients less than 0.70

Then, for each of the 15 websites, and for all websites combined, the Pearson correlation coefficients between each item and its dimension (i.e., 624 coefficients) were calculated. 542 coefficients (87%) were greater than 0.40 (minimum value recommended by Fayers and Machin (2016)), and the remaining 82 coefficients (13%) that were less than 0.40 mainly concerned the dimensions “Identification” (15 coefficients), “Educational resources” (34 coefficients) and “Interactivity” (15 coefficients).

Taking into account the results of the measurement of the internal consistency of the evaluation grid (Cronbach's alpha and Pearson's correlation coefficient), 11 items were removed from different dimensions. The deletion of these items makes it possible to improve both Cronbach's alpha coefficient (for the various dimensions) and Pearson's correlation coefficient (for most of the remaining items). The resulting grid then consists of 28 items.

Step three: Validation of the grid structure

The PCA, using a Varimax rotation with Kaiser normalization (performed on the 28-item grid), detected 6 components (eigenvalues 7.20, 4.76, 3.00, 2.15, 1.93 and 1.46). The Bartlett test of sphericity performed (see table 4) was statistically significant ($p = 0.000$), and the Kaiser - Meyer-Olkin measure of Sampling Adequacy (0.828) is greater than 0.8 (Hair et al., 2019), which was very good results. The 6 components explain 73% of the variance. This analysis allowed to go from seven to six dimensions, and the same dimensions as in the initial grid was kept except the dimension “Pedagogical Strategies”, since most of the items that initially made it up were either deleted or moved to another dimension following the PCA carried out. In addition, two items were removed

from the “Usability” dimension (as they appeared isolated in their dimension) and thus a new grid composed of 26 items was obtained.

The Cronbach’s alpha coefficients were then recalculated, as well as the Pearson correlation coefficients between each item and its dimension. Based on the results obtained, 3 other items were removed: 1 item of each of the following 3 dimensions: “contents”, “Help with work methodology and pedagogical guidance” and “Usability”.

Table 4. KMO and Bartlett’s test

KMO and Bartlett’s Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.828
Bartlett’s Test of Sphericity	Approx. Chi-Square	2921.775
	df	378
	Sig.	0.000

A CFA was carried out for the grid then composed of 23 items. The measurement model recorded a significant chi-square value ($\chi^2 = 472.590$; $df = 215$; $p < 0.001$). The normed chi-square $\chi^2/df = 2.198$ (< 3) is a good value. In addition, the following other fit indices confirm the good fit of the data with a hexadimensional model: SRMR = 0.085, RMSEA = 0.090, CFI = 0.872 (Hair et al., 2019).

The final grid retained then comprises 23 items grouped into 6 dimensions. For this grid, the Cronbach’s alpha coefficients corresponding to each dimension are all higher than 0.70 and the Pearson correlation coefficients between each item and its dimension are all higher than 0.40 with p values < 0.01 . Thus, the statistical validation of the grid shows its good psychometric properties.

Characteristics of the Final Grid

The initial grid consisted of 49 items grouped into 7 dimensions. After the validation of the grid, it consists of only 23 items grouped within 6 dimensions. Table 5 summarizes the main features of the final grid.

The Cronbach’s alpha coefficients are high, being above 0.82 for each of the dimensions tested, except for the “Content” dimension, which has a Cronbach’s alpha of 0.79. The Cronbach’s alpha for the entire grid is 0.82. The new version of the grid has no items for which Pearson’s correlation coefficient is less than or equal to 0.40. There are only two items with an inter-item correlation greater than 0.80.

Note that the weight of the dimensions relating to the pedagogical part of the school support website (“Contents” + “Educational resources” + “Help with work methodology and pedagogical guidance”) is equal to 48%. This respects the importance of the essential role of the pedagogical aspect in an educational website. The dimensions “Interactivity” and “Usability” have respective weights of 22% and 17% (i.e., a total of 39%). The detailed final grid is presented in the Appendix A.

Results Obtained by the Evaluated Websites

Calculation of the Results Obtained by Each Website

The results obtained by different items belonging to the same dimension are summed to get the result of the dimension. The sum of the results of the different dimensions then gives the result of the website.

Remember that each website was evaluated by 10 teachers. For each website, there are therefore 10 results per item, 10 results per dimension and 10 results for the website. From the 10 results

Table 5. Characteristics of the final grid

Dimensions							
	Entire grid	Identification	Contents	Educational resources	Help with work methodology and pedagogical guidance	Interactivity	Usability
Number of items	23	3	3	5	3	5	4
Dimension weight	100%	13%	13%	22%	13%	22%	17%
Cronbach's Alpha Coefficient	.82	.85	.79	.88	.85	.87	.87
Nb. items Pearson £0.40	0	0	0	0	0	0	0
Nb. highly inter-correlated items (>0.80)	2	0	0	0	2	0	0

obtained, the average results are then calculated, for each website, (for each item, each dimension and for the entire website).

These average results are then converted into a score out of 20. Thus, the score of an item is obtained by multiplying its average result by 5 (the maximum average result being 4 points for an item). The score of a dimension is obtained by multiplying its average result by (20/ (number of items in the dimension * 4)); for example, for a dimension composed of 3 items, the maximum possible average result is equal to 12, and the score out of 20 is obtained by multiplying the average result of the dimension by 20/12. The score of the website is obtained by multiplying its average result by 20/92 (the maximum possible average result for the website being equal to 92 (23items*4)), or by dividing this average result by 4.6.

For each of the 15 websites, the score of each dimension, the score of each item and the score of the website are thus obtained. Each website is ranked according to the score obtained (see Table 6):

Table 6: Website level

Score < 8/20	The website is not suitable at all
8/20 £ Score < 12/20	The website is of medium category
12/20 £ Score < 16/20	The website is good
Score ³ 16/20	The website is excellent

An Overall Result

Table 7 shows the maximum and minimum scores for the 15 websites and the 6 dimensions, and their means.

Table 7. Maximum, minimum and mean scores for the websites

		Dimensions					
	Websites	Identification	Contents	Educational resources	Help with work methodology and pedagogical guidance	Interactivity	Usability
Minimum	8.1	6.7	9.7	6.6	3.0	1.7	8.9
Maximum	10.2	15.5	15.3	13.9	11.3	5.9	13.6
Mean	9.1	12.3	13.2	11.6	5.4	3.0	10.9

All websites have a score between 8 and 12, making them websites of medium category. Of these, only one website has a score above 10/20. The average score of all the websites studied is 9.1/20. As for the 6 dimensions, the scores obtained are between 1.7/20 and 15.5/20, with an overall average of 9.4/20. 4 out of 6 dimensions have an average of more than 10/20.

Results by Dimension

This subsection provides the results for each dimension and their discussion.

Identification

For this dimension, the average score for all websites is 12.3/20. Only two websites scored below 10/20. Of the three items that make up this dimension, only the average score for the item “The publisher’s contact details are clearly indicated” is less than 10/20 (i.e., 9.2/20), and 8 out of 15 websites have a score of less than 10/20. These results therefore show a gap for several websites regarding the contact information of the website publisher. Correcting this deficiency would surely give more credibility to the websites concerned.

Contents

The average score for all websites is 13.2/20, with 14 websites out of 15 having an average score of 10/20 or higher. The contents belong to the school programs (average score 15.6/20), and covers it (average score 13.6/20). The item “The resources offered are relevant” has the lowest average score of 10.4/20. Overall, for this dimension, the results are above 10/20, but the relevance of resources could be improved.

Educational Resources

This dimension is designed to check the presence of various resources such as courses, exercises and their corrections. The average score for this dimension, for all the websites evaluated, is 11.6/20, with 14 websites out of 15 having an average score of 10/20 or higher. It is possible to download courses from all the websites studied (average score 14.1/20), but with differences (ranging from moderately to perfectly). On the other hand, it is moderately possible to view video lessons (average score 9.0/20). Exercises and their corrections are sufficiently present on all websites (average scores of 12.9/20 and 12.7/20 respectively). The last item relates to the presence of mock exams and annals, and the results obtained indicate an average presence of these elements in the websites studied (average score of 9.5/20).

For this dimension, the essential elements are present, but some efforts should be made, especially concerning the presence of video lessons, mock exams and annals which are very useful for students. This would make the websites more interesting for the students and would surely help them in their learning. Overall, the websites studied moderately present the desired elements.

Help with Work Methodology and Pedagogical Guidance

This dimension aims to verify the presence of help with work methodology and pedagogical guidance as well as the clarity of the instructions of the proposed activities. For this dimension, only 1 website out of 15 obtained a score equal to or higher than 10/20 (i.e., 11.3/20). The average score for all the websites is low: 5.4/20.

Help with work methodology and pedagogical guidance are only weakly present in all the websites studied (with average scores of 5.1/20 and 4.3/20 respectively), except in the case of one (with average scores of 13.5/20 and 13.0/20 respectively). As for the clarity of the instructions for the activities that the student can carry out on the websites, the average score is 6.7/20.

These results show lacks concerning important elements for the learning and pedagogical guidance of students. Those responsible for educational websites should give increased importance to these elements which are more than necessary for the good work of the pupils.

Interactivity

In this dimension, the aim is to check the presence of interactive elements. No website scored 10/20 or higher, and the average score for all websites is very low (3.0/20), as are the average scores for the five items in this dimension (which range from 2.0/20 to 4.1 / 20).

Overall, interactive exercises are almost absent from the websites studied, as well as discussion lists. Most websites are static, which clearly means that designers have not yet managed to fit into a socio-constructivist and interactive perspective. Significant efforts are needed in this area, despite the difficulty that this could represent. And this at least regarding the presence of interactive exercises with appropriate feedback- many tools for creating interactive exercises being available now and being easy to use-, and that of a discussion forum.

Usability

In this dimension, 11 out of 15 websites scored 10.0/20 or higher. The average score for all websites is 10.9/20. The results of the four items are generally average: the clarity of the menus (average score of 12.1/20), the readability of the content (average score of 11.3/20), the ease of retrieving back the information (average score of 10.0/20) and the consistency of the structure of the websites (average score of 10.3/20). Improving these different elements regarding the usability of educational websites could make their use more fruitful for students. Thus, the websites evaluated offer students only moderately socio-constructivist and interactive activities.

Limitations and practical implications of the study

This study, carried out on a sample, remains of course limited, and would greatly benefit from further study and improvement. But it could be a starting point for thinking about online school support, on the contribution of e-learning to school support and on the role and characteristics of a school support website that can meet the specific needs of students.

In fact, this grid can serve as a basis for reflection when creating a school support website and thus avoiding certain weaknesses in these websites. In addition, carrying out an evaluation of existing school support websites by the responsible teams would improve the effectiveness of these websites.

It is also an interesting tool for teachers that can help them to better choose tutoring websites for their students.

CONCLUSION AND RECOMMENDATIONS

E-learning can have important contributions to school support, and facilitate learning and assimilation of knowledge by students, through online school support. Distance education and Internet-based school support have become essential, especially in this time of health crisis related to the Covid-19

pandemic where learners are increasingly using mobile devices to learn, and where they use school support websites.

This study allowed to develop and validate an evaluation grid of school support websites, and to question some Moroccan free school support websites to know if they allowed learners to have socio-constructivist and interactive activities. Having an evaluation grid of school support websites, usable by teachers, is an appreciable contribution in the pedagogical field and can strongly help them to guide their students in the choice of good school support websites.

The set of steps taken for the qualitative validation of the evaluation grid, as well as the subsequent multi-step statistical analysis, highlighted the essential elements that should be present in each school support website. These elements have been grouped into several dimensions in order to be able to list the main strengths and weaknesses of the school support websites.

Of course, a lot of effort has been made by the designers and authors of the websites studied that offer important elements for school support, such as courses and exercises and their corrections, but the present study has identified many weaknesses, including the identity of the author, the almost lack of interactivity... In view of these weaknesses, it is obvious that the designers and authors of the websites have efforts to make, especially with regard to help with work methodology and pedagogical guidance as well as the interactivity which is not very present in the websites studied.

As a future work, it is intended to conduct a research among students in order to collect students' expectations regarding a school support website.

It is advisable to:

- Indicate the contact details of the author and publisher of the website.
- Take into account the differences between learners, by offering differentiated activities.
- Set up working teams of teachers, preferably multidisciplinary teams, with the aim of creating a database of ready-to-use pedagogical scenarios. This work should be institutional (supported by the Ministry of National Education and the Regional Academies).
- Use e-learning authoring tools to create interactive learning paths, to enable learners to better "review their lessons".
- Use tools to create interactive exercises, as there are many that are accessible and easy to use, and allow for appropriate feedback.
- Allow communication between students through the website (using a forum for example).
- Avoid, if not proscribe "the transfer of textbooks on the web", page by page, as they are, because then the learner has before him the school book in electronic format (usually in PDF or HTML page) instead of have it in paper format.
- Incorporate work methodology and pedagogical guidance help into the website as it would be very beneficial to help the learner "work better" and "get better oriented".

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APPENDIX A: THE FINAL GRID

Table 8 presents the final grid that can be used by teachers to evaluate a school support website as follows: for an item: $\text{score}/20 = \text{result} \times 5$, for a dimension: $\text{score}/20 = \text{result} \times (20/(\text{number of items of the dimension} \times 4))$, and for the website: $\text{score}/20 = \text{result}/4.6$.

Table 8. Detailed final grid

Dimensions	Items	Result 0/1/2/3/4	Score/20
1 - Identification	The publisher / author is clearly identified		
	The publisher's contact details are clearly indicated		
	The target audience is clearly defined		
	Dimension 1		
2 - Contents	The contents belong to the school programs		
	The contents cover the school programs		
	The resources offered are relevant		
	Dimension 2		
3-Educational Resources	It is possible to download the courses		
	It is possible to watch courses in video		
	Exercises are present for each chapter		
	Exercise corrections are present		
	White/annals baccalaureates are present		
	Dimension 3		
4- Help with work methodology and pedagogical guidance	Help with work methodology is present		
	Pedagogical guidance is present		
	The instructions of the activities are clear		
	Dimension 4		
5- Interactivity	Interactive exercises are present		
	A forum is present		
	A discussion / mailing list is used		
	The moderation of the communication tools is carried out		
	Interactivity allows appropriate feedback		
	Dimension 5		
6- Usability	The menus are clear		
	The content is readable		
	It is easy to find back the information		
	The structure of the website is coherent		
	Dimension 6		
Website			

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