MIPAW – MODELE OF A PROGRESSIVE IMPLEMENTATION OF WEB ACCESSIBILITY

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ABSTRACT
This paper presents the elaboration of a progressive implementation model for WCAG, centered on the notions of access to information and essential needs of users. MIPAW's main goal is to serve as a framework for the elaboration of progressive enhancement methodologies, of measurement systems of the real level of accessibility, and the setting up of efficient quality assurance management systems. Based on state of the art, real-world experience, and expertise in accessibility, as well as quality assurance areas, the project has the ambition of providing methodological tools better suited to the constraints of web industrialization, while preserving the deployment of real user-centric accessibility. MIPAW is a project lead as part of the activities of the AccessiWeb GTA (Workgroup on Accessibility), and has received active support from 16 of the most prominent French companies in the area of expertise in digital accessibility.

Categories and Subject Descriptors
H.5.3 [WEB]: Group and Organization Interfaces - *Evaluation/methodology, Theory and models*

General Terms
Management, Measurement, Human Factors, Documentation, Reliability.

Keywords
WCAG, AccessiWeb, Accessibility, Progressive Enhancement, User centric, Design for All, Quality Assessments, Access to information, Accessibility Barrier

1. INTRODUCTION
WCAG 2 [1] made it possible for web accessibility to have a mature tool, adapted to modern Web technologies and uses. Although the technical implementation of WCAG, for the basic Web technologies, does not represent an issue anymore, the methodological aspects of it remain to be worked out. The nature of the Web, its industrialization, the diversity of technologies and uses have a direct impact on the management of a Web project, that reveals itself as highly complex to deal with. From that viewpoint, the framework defined by WCAG seems not very operational, and meets only very partly the needs, as expressed by the industry, to benefit from progressive methodologies that favor the handling of objectives defined by WCAG, and measurement systems better suited to the context of continuous production of contents, and more representative of the real level of accessibility. If the latter question is well documented, and is the object of numerous research works [2],[3],[4], the question of implementation methodologies is not very well-researched, and appears to be a theme essentially linked to the state of the art, that approaches these questions only in a factual and partial fashion [5],[6],[7]. After discussing about the characteristics and operational limits of WCAG and the measurement systems on which progressive implementation methodologies could be based, we will present in details the MIPAW model, based on the notion of access to information, user impact and essential needs. We will then discuss the expected results of the model in terms of application to methodologies and measurement systems, before concluding on this project's perspectives.

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2. WCAG, CONFORMITY AND MEASUREMENT
One of the invaluable qualities of WCAG is to approach accessibility under the exclusive angle of contents and technologies, this is one of the keys that made them technically operational. On the other hand, it has had major consequences for the application of WCAG in the context of a Web project. The most characteristic one is that accessibility issues can appear as disconnected from the notion of user experience, which is a central aspect of quality assurance management by Web professionals. If accessibility professionals understand well the notion of user experience, the methodological tools they use, for instance, an assessment audit, are finally only the expression of technical problems, whereas similar areas like ergonomics or usability will consider user-centric notions like the personas [8], for instance, as operational vectors. This area is generally perceived by the project teams as a set of technical constraints to satisfy, it's somehow a "low-level" consideration; whereas it should primarily be a matter of concern for the designers and project managers, on par with other areas of the quality assurance management for instance. It is very characteristic to observe that most requests for training come from « developer » profiles. The second important consequence is that the favored tool to establish a project methodology is measurement, and more specifically the conformity measurement. To make a content accessible, in terms of method, consists essentially in ensuring conformity to technical criterion, which tends to make the project stray from satisfying the users needs, and enriching the users experience. These

characteristics of WCAG are, from an essential techniques point of view, associated to a prioritization by level (A, AA, AAA) not very readable, especially for the A level which represents most of the accessibility workload (assessed as about 75% of it, according to our own experience). This makes it very difficult to answer simple questions like load increase, prioritization, or even measurement of the improvement of contents quality and the user needs satisfaction. The question of prioritization is of utter importance because it will very directly affect the project management, for example about the very delicate questions of the project resources allocation, and the determining of operational objectives.

3. ACCESSIBILITY BARRIER AND THE USER

To handle these issues, some answers have been proposed, essentially based on the notion accessibility barrier, using more sophisticated measurement systems, or proposing a rearrangement of the WCAG structure based on users typologies. Two examples allow us to expose briefly these two approaches. The question of elaborating measurement systems allowing a prioritization of the issues, has been recently approached by R. Hudson [9], that proposes for example a matrix where each issue is assessed through an incidence measure associated to a level of severity level that produces a priority score.

Barrier Description	Reference	Incidence	Severity	Remediation
	WCAG 2.0	Range 0-4	Range 1-5	priority
Use of CAPTCHA without describing the purpose and/or providing alternatives for different disabilities	1.1.1	4	5	Critical
Images without appropriate text alternatives	1.1.1	2	4	Very High
Insufficient colour contrast between foreground (text) and background	1.4.3	3	2.5	High
Purpose or destination of link is not clear	2.4.4, 2.4.9	1	3	Medium
Failure to use mark-up for headings that conveys the document structure	1.3.1	1	2	Low

Figure 1 : example of application of the Accessibility Barriers Score system

G.Brajnik [10] proposes a rearrangement of WCAG based on a user typology (considered from the viewpoint of impairments) associated to a measure, similar to the previous one, based on impact measurement and the persistence of barriers.

Impact	Persistence	Severity
1	1	minor
1	2	minor
1	3	significant
2	1	significant
2	2	significant
2	3	critical
3	1	critical
3	2	critical
3	3	critical

Figure 2 : measurement system proposed by G.Brajnik

Although these two approaches, briefly exposed here, are very interesting, they address only imperfectly the issues met by Web industrials. These approaches by measurement and prioritization, like all those who are currently being actively researched [4], are excellent means to assess accessibility and elaborate quality and improvement management systems. But, because they are mostly based on a ratio between a number of objects and an error rate, they neither allow to clearly define the essential needs of users, nor the conditions required for the achievement of an accessible web project. Besides, although this kind of prioritization, through the measurement of an incidence ratio, can have very positive effects on the perception of user experience by the project manager, it does not address the lack of readability issue for the WCAG levels, of which the A level remains, because of its incurred workload notably, seen as an “impassable wall” by most of the project teams.

4. MIPAW, ACCESS TO INFORMATION AND THE ESSENTIALS NEEDS OF USER

Facing these issues on a daily basis, in our professional activity, we aimed at approaching the issue in a more pragmatic fashion, clearly oriented towards operational goals. Thanks to our position as lead managers of the Accessiweb reference list, which is historically the most implemented WCAG-based application methodology in France, and leaning on the high level of expertise available through the GTA, we were able to conduct particularly interesting research on the elaboration of a model allowing, at every phase of a project, and specifically at the requirements and design phases, the establishment of a progressive handling of the WCAG issues (and their levels) in coherence with the users needs. We leant on the notion of access to information, a complex notion, that defines and matches accurately the most essential needs of the user. The first phase of the project was to assess the structuring factor of this notion in WCAG (applied to the Accessiweb reference list). For that purpose we surveyed a panel of experts, including technical experts as well as expert users, asking them to assess and sort each criteria of the Accessiweb reference list [11], through a notion of access to information that was not defined yet at that stage (each expert was asked to define it on her own terms). Then, in the same time, for each criteria not classified as impacting access to information, to rate its impact on users as either weak or strong. The results of this survey have then been processed statistically.

Table 1: results of access to information survey

Category	Rate (%)	A	AA	AAA	Tot
Access to information	> 85	35	3	7	45
Access to information variable	>0 & <85	33	10	16	59
Access to information nul	=0	14	7	8	29
	Tot	82	20	31	133

This first survey allowed us to validate a certain number of hypotheses:

- The notion of access to information is a very structuring element in WCAG
- The notion of user impact appears to be uncorrelated from the notion of access to information. This means for instance that a criteria with no impact on access to information can be assessed as having either a weak or a strong impact

Regarding the notion of access to information, one can notice that it impacts the 3 WCAG levels, which confirms the base hypothesis of using this notion as a structure element, notably linked to the notion of essential need for the user. Besides, its effect is unequal throughout the levels: very structuring for level A, from which it allows the extraction of a basic set of criteria equivalent to 43% of it; but its effect is less perceptible on levels

AA and AAA, which confirms that these levels are dedicated to improvements.

5. MIPAW, MODELE OF A PROGRESSIVE IMPLEMENTATION OF WEB ACCESSIBILITY

The MIPAW model derives and adapts the structures revealed during this first phase of the project, to constitute 4 sets of criterion. This distribution uses the notion of access to information as a primary structure, to which can be associated a more refined substructure by using other factors like presence, relevance and user impact. This distribution has set a first model of two groups, including two sub-sets.

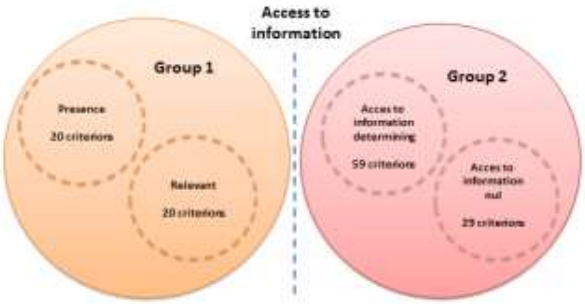

Figure 3 : sets and sub-sets criterion based on MIPAW

MIPAW is essentially a reformulation of this initial distribution in more operational phases, borrowing from concepts of quality assurance management and ergonomics, which should ease their integration in project management processes.

The first layer of the model consists in the expression of these sets on a scale of arbitrary values, going from the presence of a device essential for access to information, until the improvement of the user's experience.

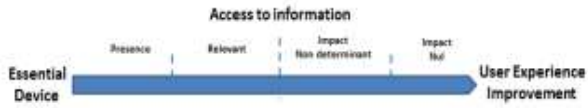

Figure 4 : distribution of the sets and sub-sets criterion on MIPAW scale values

See under this angle, WCAG has a first turning point where all the issues identified as impacting access to information are satisfied. Beyond this turning point, the issues are expressed in terms of user impact. This reformulation of the WCAG structure allows to design phases of progressive approaches of the WCAG levels, with very operational objectives, based on the notion of essential user needs. They are structured by the notion of access to information which defines the first necessary step, preliminary to the handling of accessibility issues.

On this new structure constituted by four successive phases, the primary structure of WCAG (i.e. the priority levels) is totally preserved.

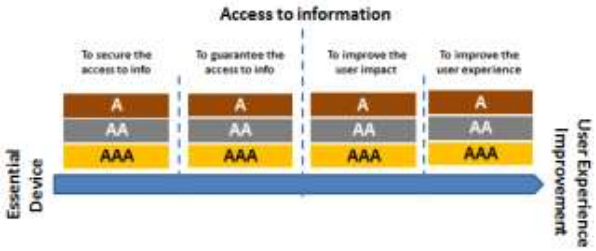

Figure 5 : MIPAW with WCAG priority levels

Actually, this model is an adaptation of the WCAG structure to 4 successive implementation phases, structured by the notion of access to information, representing the essential users needs and the notions of user impact and user experience.

The 4 phases are defined by:

To secure the access to information: this group is composed of criterion of presence of technical devices or alternative contents, essential for the access to information, for example the lack of an alt attribute on image or the lack of the transcript of a video are typically involved in this phase.

To guarantee the access to information: This group is composed of criterion of relevance of technical devices or alternative contents, essential for the access to information, partly based on the technical basis implemented at the previous phase.

At the end of these two phases all technical devices and the relevance of alternative content essential for access to information are completed.

To improve the user impact: This group is composed of criterion of presence and relevance of devices or contents having a "strong" impact on the user: for example contrast or parsing are involved in this phase.

To improve the user experience: This group is composed of criterion of presence and relevance of devices or contents having a "weak" impact on the user, for example decorative image or image of text.

This proposition of a model is not a methodology in itself, but it allows the definition of a framework from which methodologies of all kinds can be designed, coherently with the essential needs of the users, defined by the necessity for all to at least access to information.

6. EXPECTED RESULTS

Expected results for the application of this model concern three key areas: methodologies, measurement systems and objectives of compliance.

On methodologies: a methodological tool based on this model could give to the projects teams a clearer vision of the goals to aim for, a better sense of what to start with, and thus better distribute the efforts and project resources. Besides, this model could also allow for the installation of quality management processes and continuous progressive improvement, while guaranteeing that the user remains effectively at the center of the processes, ensuring that the project's constraints do not become the only decision vector, which is the main criticism that can be made towards the existing state of the art.

On measurement systems: they could be more adapted and more representative of the real level of accessibility of the contents.

This model does not contradict at all the current researches on issues linked to measurement; on the contrary, it offers them a very favorable ground for expression.

On conformance objectives, since keeping identical WCAG levels allows the elaboration of more subtle strategies, more adapted to users' needs. For instance, one could imagine progressive handling that would consist in implementing the AA criterion for the subset "access to information" as soon as the initial implementation phase of level A, in order to offer a better response to users' needs.

And on project management, notably by giving a clearer vision of the essential issues, we expect very positive effects on the very delicate issues of appropriate allocation of project resources to meet the project's goals.

Finally, we expect from this model that it reinstalls the user at the center of the processes and methodologies, while preserving the extremely valuable qualities of WCAG, of which not one aspect is either modified, reinterpreted, or reformulated.

7. PERSPECTIVES

MIPAW is a collaborative project, proposed by the association of Qelios and BrailleNet, publisher of the Accessiweb reference list. It is currently in an incubation phase, comprising setting up different workgroups and the tools they require.

Four workgroups will be in charge of the design of the final model and its attached methodologies:

The group « techniques » : it will elaborate the technical model, applying it and generalizing it to all types of references and guidelines based on WCAG.

The group "methodologies": based upon the results of the "Techniques" workgroup, it will be in charge of designing the various methodologies expected by the industry.

The group « measurement »: it will be in charge of designing the measurement systems representative of the real level of accessibility.

The group "users": it will be in charge of validating the whole works from the other groups.

First results are expected during the first semester of 2012.

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