Web Science in the context of the Arab Near East

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ABSTRACT
Beirut's Saint-Joseph University launched the first Web Science Interdisciplinary Research Unit in the Middle East in September 2009. Following the research roadmap proposed by the WSRI in 2008, the UIR Web Science will attempt to provide scientific and contextualized answers toward a better understanding of the Web and its usage in the Arab Near East (Lebanon, Jordan, Syria).

The UIR Web Science will employ offline and online researchers interested in approaching the Web through their own scientific perspectives, but also keen on sharing data and analysis with other researchers from different specialties. The UIR Web Science will try to provide a comprehensive roadmap, explore the fundamental scientific perspectives and generate new integrative research themes, based on a regional context of the Arab Near East.

This paper presents a conceptual, methodological and contextual approach on how new paradigms in Web Science, especially interdisciplinary research, can provide the most relevant perspectives on the realities of the Web in the Arab Near East. Confronting multiple layers of observation is a fundamental condition for Web Science to be considered a global scientific approach, especially when the studied usage and behaviors occur in political and geographical areas located at one least known part of the Web.

Keywords
Web Science, Arab Near East, Contextualization, Sociology of Techniques, Epistemology, Lebanon, Syria, Jordan

1. INTRODUCTION
Following the Web Science initiative launch in 2006, numerous researchers who had studied the Web for several years from the perspective of their discipline wondered about the necessity of a new science that declared itself interdisciplinary (and not cross-disciplinary) and wanted to federate around it an already existing activity, research. If "Web Science is the science of decentralized information systems" [3], it absolutely has to answer the fundamental questions on the existence of one or several interdisciplinary methodologies and the proposed (or yet to be invented) tools that will allow the resolution of the equation put forward by Sir Tim Berners-Lee: *analysis, synthesis and governance* [3].

The Interdisciplinary Research Unit in Web Science (UIRWS) at the Center of Studies for the Modern Arab World (CEMAM) of the University Saint Joseph - Beirut (USJ) was created to try to answer the central question put forward by the Web Science Initiative: is it possible to imagine, then to organize, an activity of interdisciplinary research, with its hypotheses, its methodology and its tools, around a contextualized object of study, in this particular case the Web in the Arab Near East (ANE)? The approach of the UIRWS is one of questioning the nature of its innovative disciplinary activity and an attempt to propose, in an original way, an interdisciplinary and thus new outlook of a geographical zone difficult to understand because of its character and its location. This constitutes a new frontier for Web Science, within the realm of the *Dark Side of Web*.

This contribution centers around three points: First, the insertion of the researcher within an interdisciplinary team in Web Science. The meaning of this choice, in terms of scientific questioning, methodological thinking and fundamental posture constitutes a risk. Web Science are still under construction and the first part of this study is based on an attempt to answer the fundamental questioning of the "social sciences" perspective in the road map proposed by Dr N. Shadbolt [16]. The hypothesis formulated by the UIRWS establishes that past observations of the Web phenomena have not yet given satisfactory answers because they have consisted of reusing existing scientific approaches, applying them to a new object. Web Science, as a scientific interdisciplinary approach allows for "understanding the Web as a complex socio-technical phenomenon [16]" has to lean on the existing reference corpuses, but also has to create the conditions of its acceptance as a full scientific domain.

Secondly, for that purpose, we shall see that the implementation of an interdisciplinary Web Science research team, with a precise geographical context as the object of study, such as the ANE, requires envisioning the conditions in which the scientific domains collide in order to observe the Web phenomenon in new circumstances. This will avoid the traps met by the monodisciplinary views of the past.

Finally, the creation of the UIRWS aims at showing that the scientific approach of Web Science is innovative and risky, but it stands out as the only valid approach for an effective observation of the Web phenomena. As such, the various avenues of research and scientific activities launched by the UIRWS can represent a reproducible original model, articulated around a fundamental frame in compliance with the road map put forth by the Web Science Trust.

2. CHOOSING WEB SCIENCE
2.1 Being a web scientist
The study of Web Science still requires an honest preliminary reflection upon the fundamental and epistemological nature of the researcher's approach as he chooses to adopt an interdisciplinary posture. Interdisciplinarity, as a basic premise of Web Science, requires putting the scientific methods of every concerned discipline into perspective, to draw a series of exchangeable experimental methodological approaches. This can possibly

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represent by a choice of tools for the observation and the Web Science research. Though several propositions were already put forward by the founding documents of the Web Science Initiative, we are still far from truly being able to draw the theoretical, epistemological, methodological and even lexicological outlines of Web Science. In reading the various founding texts of Web Science, we see the necessity of considering that the Web requires an in-depth study, with the objective of understanding its function, its effects and to comprehend its evolution in order to influence its future. Whether the creation of a new scientific discipline is required to do so remains a source of debate.

Since its launch in the 1990's, the World Wide Web has been the subject of numerous technical studies or observations by persons and social sciences research. These studies have raised interesting hypotheses on the role of the "social machine"[2]. But it seems in the reading the founding texts of Web Science, that these mono-disciplinary approaches were not successful in understanding, or modeling the consequences of Web usage on the behavior of its users. It is nevertheless necessary at this point to take into account the perpetually changeable nature of the Web, fluctuations of usage based on the arrival of new tools, which generates new practice, new combinations and new intersections. For example, a description of the characteristics of Web 2.0 by O' Reilly [13] arises from observation, not calculation. But supporters of Web Science today, are trying to modify the research paradigm that prevails around an observation of the Web, and to move away from a descriptive point of view. Instead they look to combine modeling and social conventions to anticipate changes and try to influence them.

The road map published by Dr. Nigel Shadbolt on the Web Science Trust website [16] proposes multiple questions that seem absolutely fundamental for a team of researchers wishing to proceed not as a group of discipline-based specialists combining their studies on the Web, but as an interdisciplinary team with methods of observation that integrate new means to proceed, inferred by the contribution of new shared tools. It is a methodological risk to develop a Web Science research question. It is also a heuristic one when trying to address the following:

- Do we participate in the elaboration of an epistemology that might be shared by several scientific disciplines to allow the observation of the Web phenomenon?
- Or do we create the epistemology for a science, the object of which is the Web, with its own methodology, its own theoretical production and its own hypotheses?

In considering this, the stake is larger than the simple constitution of a multidisciplinary team. Is it, at this stage, possible to be a Web scientist? If we refer to the theoretical framework put forward by Sir Tim Berners-Lee, the study of the Web overlaps with its intrinsic shape: The Web is basically a complex system consisting of several technical structures. But its construction is also meaningful and the epistemological questions proposed by Sir Tim Berners-Lee reflect this semantic dimension: to define the intrinsic properties of the future platforms of contents, which will have to avoid dogmatic control and “facilitate rational discussion of ideas” [3] for a smooth operation of the debate and to imagine the means of avoid malicious usage of decentralized Web structures. We shall see that these are at the heart of the questioning of the Web Science researcher, who wishes to understand and propose an anticipative approach to the Web within a context. However, this is not about creating a sociology for the Web (A Webology?). This approach would stand against the basic principles of Web Science. If we consider the Web as a complex object; it is clearly difficult to separate the levels of structure which frame it: the posture of the IT engineer and that of the researcher in social sciences in their common attempts to understand, model and anticipate the impact of the Web is almost the same if this takes place in the context of Web Science. There is no fundamental epistemological break with a model of an anthropology of techniques: techniques do not limit themselves to objects and to tools. The objective of The Anthropology of Techniques” is not to limit itself to an outside observation of the technique but to approach the idea, the conception, even the sensitive perception of the technique. Anthropology is interested in "what the people have in mind" [9] and in the fact that they think and feel when they act technically, which testifies to their culture and their belonging to a society. This anthropology is interested in the "human" and social dimensions of the technique, as an activity defined and determined by recognized and estimated effects within the society.

2.2 Mixed methods

Dr. Nigel Shadbolt raises a second line of questioning that concerns the use of “mixed methods research to explore the relations between ethnographic insights to Web practice and the emergence of the Web at the macro level” [16]. James Hendler and al. also wonder “how cultural differences effect the development and use of social mechanisms on the Web” and ask if “infrastructure can help in bridging cultural divides and/or increase cross-cultural understanding” [10]. These two questions show that neither the purely technical approaches, nor questioning the usages by specific cultural groups do enough to propose satisfactory answers that, at least, address the necessity of basic understanding. It seems almost obvious that the research of Web Science can only work by replicating the original network structure of the Web, based on interaction and sharing, within a group or a team of interdisciplinary researchers. Today, the necessity of creating structures to welcome, frame and facilitate an interdisciplinary approach is more and more striking, whether it is at the level of universities, governments or transnational organizations. These institutions will be the place for sharing methods and hypotheses with interdisciplinary or intercultural approaches. It is almost impossible to consider research or an article that was the result of an individual or mono-disciplinary approach as in compliance with the methodological objectives of Web Science. Basic “rules” must be established in order to define future studies by research teams: it will not be enough to study the Web or to place it at the center of a hypothesis. If it is necessary to invent the conditions of a Web Science “Label”, then it is also necessary to define the interdisciplinary approach and the integrated methods as the conditions of a scientific production sine qua none are willing to refer to this discipline.

The Web Science researcher, or Web Scientist, is the heir of a discipline under construction, which overlaps with a traditional observational approach to the Web as “social machine”. Even if the researcher retains the resources of this tradition, it is still necessary to invent a new epistemological frame, to integrate methods, to investigate new crossovers between disciplinary approaches and to try to create an exploitable apprehension of the mechanisms of development of Web usage. This position, as an interface beyond disciplines, is a real risk. It must be taken into account in a scientific manner, initiated within the Web Science context.

3. WEB SCIENCE IN A CONTEXT: THE ARAB NEAR EAST

3.1 The difficulty of defining a context

The choice to proceed with study of the Web in a given context is also a risk taken by the Web Science researcher. Not only does he have to innovate and propose an epistemological break, he is immediately confronted at the start of this complex task with the necessity of defining this space. The Web is by definition a global phenomenon, its technical dimension is unique, unified, but its reality is the large sum of micro-experiments, which confirm each other in an infinity of places and produce an infinity of forms and connections. Mathematical models could constitute an effective and relevant tool, in their capacity to draw maps and to supply information on the main points of connection of the information and the meta-usages it creates. These virtual places, these crossroads of content and usage, do not follow traditional borders any more so than geography, political science or sociology. The contextualisation of the Web Science study should not be placed within terms of country or region. It must investigate the new "physical" dimensions that are the territories of virtual communities or the flows, their origins and their directions. As an example, Yves Gonzalez-Quijano proposed, in 2006, a computerized map of the Arabic media, created using TouchGraph software [7].

The contextualisation usually proceeds via a demarcation of the limits of the context. These limits define the conditions of the membership within the context of the various objects (Users, actors, regulation, social values, language, culture, etc.) that characterize it. Concerning the interdisciplinary approach of the Web, we cannot avoid drawing a secondary demarcation forced by the nature of the shape of interactions on the network: users of the Web are not just simple subscribers in a national IT structure, but are actors within a new societal space, the borders of which are no longer dictated by the regulatory framework of the operators of the network, nor by the political decisions of the States. For example, Facebook is officially forbidden in Syria, but the President of the Syrian Arab Republic maintains a profile and an elaborate communication strategy there. Also, the industrial structure of the producers of content is made almost unobservable because of the increasingly narrow interactions between the multinational companies of the Web and small local structures benefiting from the phenomena of flow syndication. Even in spaces as remote as the rural zones of Jordan, the cultural influence of the western media puts off the Arabic language as a classic means of social communication, in favor of English. This technical, industrial and cultural overlapping of influence makes it almost impossible to define boundaries for a strict object of study and observation. Even in this respect, Web Science as scientific discipline must bring new solutions, which are in sync with the realities of the new data structures of modern Arab societies.

The approach of the Web Science researcher, who would like to capture the impact of the Web phenomenon in the realm of the human and informational flow that characterizes the Web in the ANE is particularly complex: the researcher will have to consolidate his own scientific reality in the face of direct contact with the object of study and he will have to ceaselessly proceed with a systematic check of the validity of his fundamental posture. Like a navigational cartographer, who draws the outlines of the coast he has to follow as he discovers it. In this, today's ANE Web Science researcher is almost totally blind: the lack of quantitative data obviously impinges upon the development of an observation based on a validated and objectively validated reference corpus. The speech, when it is not purely of the prescribed order, stands, very rarely, on an objective observation of the reality: little of the available global statistics proposed by various international or local organizations (ITU[1], ESCWA[2], AAG[3]) can be considered as really useful in an environment in perpetual evolution. A real ground observation, sector-based, organized and systematic then becomes necessary for the construction of the reference corpus which will be used as a foundation for the activities of the Web Science researcher in the ANE.

Researching in a given context, whether its geographical, linguistic or cultural can face numerous problems and difficulties. John Kelly uses the example of the "myopia of networks" [6]: the point of view of bloggers located outside the chosen space is generally influenced by authors of blogs who write in the same language as them and who are closer to the model of the Arabic blogger envisioned by Westerners: democratic and secular. This bias is very close to the concept of homophily, coined by Lazarfeld and Merton [12].

3.2 A hypothesis for the Web in the Arab Near East

The ANE virtual territory comes about via a reduction: it is mainly defined with regard to a wider cultural region, the Arabic world, which includes the Asian and North African countries that have the Arabic language in common. It de facto excludes Israel, Iran, the African countries (Egypt and the Maghreb), for geographical reasons. The countries of the Arabic Peninsula are also not included, at this time for economic reasons[4]. According to statistics compiled by Nielsen, the ITU, the Computer Industry Almanac and published by the Internet World Stats Website, the number of Internet users in the ANE in July 2009 was approximately 6.5 million users within a total population of 30 million inhabitants.

However, statistics are just indicators: they do not provide any answers to the following questions:

- Does a Web actor in the ANE necessarily have to be of Syrian, Jordanian or Lebanese nationality?
- Can a Syrian religious Web site, created and maintained by activists in England, be considered as part of the Web of the ANE?
- Is a blogger from the Lebanese Diaspora in Paris a Lebanese blogger, even if the topics of his posts have nothing to do with Lebanon?

These simple questions do not concern only observation in the context of the ANE. They are at the base of the problem in developing a geographically contextualized study of the Web. These questions arise in a very precise way here, not only because the Web of the ANE is rarely the object of internationally

[1] ITU: International Telecommunication Union. www.itu.int

[2] ESCWA: Economic and Social Commission for Western Asia – United Nations. www.escwa.un.org

[3] AAG: Arab Advisors Group. www.arabadvisors.com

[4] The ANE should also include Iraq and the Palestinian Territories. But the current situation of these two zones does not allow for effective and stable research work.

available studies, but its inherent characteristics have placed this context in the blurry neighborhoods of the *Dark Side of the Web*. Islamic activism, extremist movements, terrorist networks and the confrontation with Israel are the most often approached topics when researchers address the ANE. This trend in research towards this particular region hides the reality of a space that increasingly differentiates itself from the typical prescriptive analysis.

Table 1. Some core indicators for the Arab Near East

Indicators	Lebanon	Syria	Jordan
Surface	10452 km2	185 180 km2	92 300 km2
Population	4 millions	22 millions	6,2 millions
Political system	Confessional Democracy (Consensus)	Authoritarian Regime (Baathism)	Hashemite Kingdom
Languages	Arabic, English, French	Arabic, English, French	Arabic, English
Diaspora	12 millions*	20 millions**	N/A
Religions	Muslims (70%), Christians (30%)	Muslims (90%), Christians (10%)	Mostly Muslims
Number of Internet Hosts	45000	7800	28000
Number of Internet users***	1.500.000	3.500.000	1.500.00
Internet penetration***	30%	16%	25%
Average Internet speed available for household	ADSL 256 Kb (Ogero.gov.lb)	ADSL 256 Kb (STE.gov.sy)	ADSL 2Mb****

Source : CIA World Factbook, 2010
* Source: IFPO – French Institute for the Near East, Beirut, 2009
** Source: IOM – International Organization for Migration, 2009
*** Source: IWS – Internet World Stats, Nielsen Rating, UIT, 2010
**** Source: AAG – Arab Advisors Group, Amman, 2009

The effects of globalization are often relatively less obvious than expected in the ANE. The comparative approach using western societies as the counter-point can sometimes be disappointing, considering the expectations produced by the very popular concept of "Clash of civilizations". For example, Yves Gonzalez-Quijano [8] refuses to limit Arabic space on the Web to a territory bounded by linguistic beacons, common practices, or the political borders of states. He prefers an approach that combines flows of transnational content, means, actors and tools. The study proposed by Bruce Etling et al., [5] concerning an observation of 35,000 blogs, defined the public sphere of the ANE around an original typology of countries, cultural influences, links (called "bridges") between Arabic bloggers, Diaspora bloggers, and around a topic or a cause (e.g. religion, political extremism or the Palestinian Cause) and finally through online tools such as Arabic Space on YouTube or on Twitter.

In this, Jordan, Syria and Lebanon possess numerous characteristics common to an integrated cultural space, including language, religion or history. But other phenomena also bind them, such as that of Diaspora, archipelagoes of globalization implanted within their capitals cities or within the attachment to the use of foreign languages inherited from colonization as the vector of the modern communication (to the detriment of Arabic, which nevertheless is the national language of these three countries). These phenomena, when they are observed outside the prescriptive frame which so often characterizes the discourse on the ANE, seem to draw a virtual geography, a common territory. A logical collision of the concepts of "imagined communities" (Anderson [1]) and of "*déterritorialisation*" (Roy [15]) that brings to light the virtual dimension of an Arab virtual space on the Web, so difficult to apprehend. (Chalhoub [4]).

The hypothesis that was put forward by the UIRWS, is the following one: the reality of the Web in the ANE has become so complex, it does not necessarily follow the lines of the evidence of the prescriptive language any longer and moves away from the referential norms: the actors of the Web in the ANE create new original practices, the fruits of multiculturalism, multilingualism and the search for an identity to be built in a social space in full transformation. This reality has too often been observed from far away, with for effect the construction of a prescriptive discourse: But Web Science add a new dimension to a study of the Web and new means to succeed in defining not only an interdisciplinary methodological frame of observation, but also a new epistemological positioning, which should finally fulfill the "deficit of differentiation" (Anderson [1]).

4. A ROAD MAP FOR INTERDISCIPLINARY RESEARCH IN WEB SCIENCE IN THE ARAB NEAR EAST

The UIRWS, created in 2009, benefits from the work produced by the CYBERLAB laboratory, which since 2001 has worked on observing the realities of the Information society within the Arab Middle East specifically the Internet and the Web in Lebanon, Syria, Jordan and the Palestinian Territories. Between 2003 and 2007 CYBERLAB produced a series of monographic and disciplinary studies on these topics[5]. With the launch of the Web

[5] Available in French at: webscience.blog.usj.edu.lb/category/17/

Science Initiative and the development of the Web 2.0 tools, the research activities moved toward an interdisciplinary approach and the sociologists-only CYBERLAB team was replaced by the UIRWS, which now includes specialists in computing science, information science, economy and political sciences.

It is important to note that this new interdisciplinary dimension is not only the result of a decision to join the Web Science Trust Initiative, but also to define the ANE as an experimental zone for Web Science. As clearly stated in our hypothesis, the classic approaches did not provide us with the expected results and the Web in the ANE still remains more or less a shadowy zone of the Web, as much for the researchers than for the industrial actors. The actors of the ANE Web are often considered as consumers of new technologies, rather than actors or even creators. This perception has important repercussions in terms of the development of technical initiatives, investment, advertising markets, etc. The production of observational models stemming from integrated research methods should allow for a modification of this global attitude toward the ANE.

The UIRWS is going to proceed with the formalization of its scientific review by working at several levels: As stated earlier in this discussion, the researchers will above all have to develop answers to the epistemological and methodological questions of their approach. They will have to build their own tools, test them, validate them directly in the context of their practice but also expose them to the falsifiability concept of Karl Popper [14]: a hypothesis, proposition, or theory is "scientific" only if it is falsifiable. With an object of study as changeable as today's Web, it is obvious that it will be necessary to adopt a dynamic logic and forget about a definitive relation with static fundamental concepts. In parallel to this epistemological stance, the researchers will face the need to create the conditions of the interdisciplinarity: i.e. suggest crossed hypotheses, explore valid concepts for several observations, supply data and exploitable constants for the other disciplines. Concerning the context chosen by the UIRWS, the collection of macroeconomic and demographic data on Web in the ANE will no longer consist of an aggregation of statistical values but will be inspired by the model of wikis (collaborative intelligence), with an interest in permanent updates, obtained through combined methods of observation. This intelligent compilation of coded resources will be associated with a virtual space of real-time multidisciplinary bibliographical reference, shared with other teams of Web Science researchers, through communities such as Zotero or CiteUlike.

The subjects of study and the research projects will be the product of several researchers from different disciplines. For example, an economist and a computer specialist can work together on a study of the location of Lebanese IT businesses in the logic of the *long tail*. Historians and sociologists will try to draw together a history of the practices of social Web in Syria, while confronting their study with lawyers on the current ban on using Facebook there. Educators will study the impact of social networks on the *Digital Natives* generation in religious schools in Lebanon or Jordan, in a context of confrontation to traditional and modern values.

As research projects progress, approaches will collide and create additional data that will be used to offer new observational profiles, the objective being, to try to systematically avoid the established doctrine, prescriptive or imported by the referential norm. A better understanding of the phenomena of the Web in the ANE should also allow proceeding within the implementation (according to the awareness of the scientific validity of the approach of Web Science) of conditions for a contextualized training for the Web, as a university curriculum. An awareness of the existence of a new reality by local governing authorities, passed on by the distribution of the results of the research activities through sites and conferences, can also have a direct impact on the industrial policies and regulations. This will create a positive evolution of the conditions of Web use in the region. These consequences, these *positive externalities*, correspond to one of the main objectives of Web Science which is to make the Web a better place.

5. CONCLUSION

We can imagine Web Science as having almost the same characteristics as its object of study: dynamic, changeable, variable and maybe unpredictable. The necessity to have a scientific frame to study the Web object and the impact of its use is doubtless. But to label any research project that has the Web as an object of study as a contribution to Web Science, would greatly limit the bold impact of the Web Science Trust initiative. This call for a basic, interdisciplinary research, capable of adapting itself to evolution and contexts, and capable of envisioning new methods of observation of a complex phenomenon is totally innovative. As with any innovation, it is necessary to establish a present in order to imagine a future. The creation of a team of interdisciplinary, international researchers in the ANE who select a precise context for its observation contributes not only to highlighting the concrete application of Web Science, but also to federate around the proposed frame of action, the other teams having the same concerns of interdisciplinarity, mixed methods and experiments.

The contextualisation is also very important: in the face of the complexity of the Web and the densification of its use in the most remote zones of the globe, it is important that researchers throughout the world be able to benefit from localized observations, freed from the prescriptive speeches. Thanks to this new transparency, the ANE will finally leave the shadow zone in which it is at present.

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