Web Science: learning from experience

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ABSTRACT

This position paper argues the case for a more detailed understanding of the learning experiences of early cohorts of web science students. The web science education workshop has a purpose of establishing a community of practice for web science educators. Alongside academic discussions of the appropriate content and processes incorporated into the web science curriculum, it will be valuable to gain insights that identify any barriers that might emerge when creating an interdisciplinary educational pathway. Such insights will necessarily reside in the experiences of early web science cohorts at undergraduate of master's level. Valuable experience will also exist in the reflections of academics engaged in designing and teaching on these early programmes.

The paper's topic is teaching materials and curriculum development and it addresses a number of the primary goals of the workshop, particularly experience of web science education. It is also relevant to the experience sharing goals of trans-disciplinary teaching techniques and praxis; teaching content design, student profiles in WS education and program design.

Categories and Subject Descriptors

K.3.2 [**Computers and Education**]: Computer and Information Science Education – *Computer Science Education, Curriculum.*

General Terms

Design, Human Factors.

Keywords

Web Science Curriculum, Web Science Education.

1. INTRODUCTION

The argument presented in this paper are based in part on reflections on early work of a new PhD student seeking to identify key research questions in web science education. Findings from this work are set alongside broader claims for future directions of the web science curriculum.

Early papers drew attention to the fundamentally interdisciplinary nature of web science from a theoretical perspective, and there was an implication of the case for a top down approach to the curriculum. By contrast, the proposal for a web science curriculum repository, based on discussions across a range of web

science labs, argued for emerging the curriculum from the bottom up [4]. Since the curriculum development workshop series began in 2009 and a number of institutions have begun to teach web science at masters and undergraduate level. Less formal activities such as summer schools, seminar series and most recently MOOCs have each contributed to defining the web science curriculum in a more organic manner than the initial web science Curriculum categorization established by Vafapoulos in 2009 [2,3]. The findings of a recent desk survey to determine the extent of taught web science programmes identified 18 different examples (table 1). The authors are aware of a few courses that have been launched, but not sustained. In addition in the past year two MOOCs on web science have been run. Notwithstanding the strong case made by Halford et al for a broad interpretation of the scope of web science [1], examining the formal course content shown in table 1 appears to confirm that previous observations of possible confusions between Web Technologies and Web Science persist. If, as was suggested by White et al, the curriculum should emerge from practice, then perhaps what will emerge will not reflect the web science known to active researchers. This would argue for any automatic data driven approach to curriculum definition to be moderated in some way.

It might be useful to look at the curriculum from two perspectives. From the point of view of academics professing their discipline they might wish to ensure that it addresses developing in the students the knowledge, skills and understandings which would enable those students to become well-informed and effective practitioners in the field of web science. From the point of view of students, the issue is one of how to make sense of the complexity of a novel academic discipline, and at the same time situate knowledge and understandings by acquiring a set of skills which enable them to become effective and well informed practitioners in the field of web science.

Since web science made its claim as a field of study in 2006, the numbers of students who have participated in the field have been relatively small, and the community of academics who have designed and taught courses is also quite modest. It might be relatively straightforward to collect in a systematic manner, reflections on these teaching experiences, and even some evidence of the nature of the student experience. In addition, the experience of teaching larger numbers of students via MOOCs presents an opportunity for data collection on a much larger scale. Simple learner analytics is typically available from such systems, whilst the leakage of discussions into visible social media provide opportunities for observation as well as possibilities for targeting specific future surveys into inter-disciplinary learning. The opportunity for data collection, is also an opportunity for sharing insights and understandings whether of teacher or learner. Such insights could be powerful drivers for the collaborative ambitions of this workshop.

2. REFERENCES

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Table 1. Web Science Teaching Institutions.

List of Web Science Teaching Institutions				
Institution Name	**Type ***	**Course Title**	**Comments\Observations**	**Link to website**
Aristotle University of Thessaloniki	T	Masters in Web Science	heavy bias to technical/mathematical elements– almost a Web Technologies course; little evidence of the social impact of the Web being taught.	http://www.webscience.auth.gr/
British university in Egypt	T	Informatics and Computer Science MSc	Only five students! content described as: "Web Languages Technologies, Net-Centric Computing, Services Oriented Software Engineering, Introduction to Web Science"	http://www.internationalgraduate.net/school/the-british-university-in-egypt/program/informatics-and-computer-science-msc-M2596
Cologne University, Germany	M	MSc Web Science	website describes need for an "interdisciplinary approach and of focusing on the possibilities of the "Web" as the interconnection of people, services and systems." The modules offered include: "Design, Web Trust & Security, Decision & Management, Web & Cooperation, Web & Society.	http://webscience.fh-koeln.de/live/
Eindhoven University of Technology	M	(BSc) Major program Web Science	undergraduate degree. Explains "Web Science combines computer science with other disciplines such as psychology and sociology. This enables us to understand how online communication is used."	http://www.tue.nl/en/education/tue-bachelor-college/undergraduate-programs/web-science/
Georgia Tech University – Web Science Courses	NA	WS Modules available	WIP Course planned. However, current students interested in Web Science can take current modules in Web Science which are available as part of other degree programmes.	http://webscience.cc.gatech.edu/education
Goldsmiths London	S	MA/MSc in Digital Sociology	Focuses upon providing a Social perspective on the use of digital technology, such as 'big data'.	http://www.gold.ac.uk/pg/ma-msc-digital-sociology/
Johannes Kepler University Linz	M	Master's Degree in Web Sciences	providing an "in-depth look at fields relevant to the web such as technology, business, law, society, art and culture".	http://www.jku.at/content/e262/e242/e2666/e104207?tagcloud_weighted=1
Northwestern University School of Communication	S	'Doctor of Philosophy in Media, Technology, and Society'	a PhD programme that studies the impact of technology on society.	http://www.communication.northwestern.edu/programs/phd_media_technology_society/main.php
Oxford Internet Institute	M	*'MSc in Social Science of the Internet' DPhil in Information, Communication and Social Sciences'*	The Oxford Internet Institute includes both a masters and a PhD course which look at Web Science from a Social Science perspective. (Also includes a summer doctoral programme)	http://www.oii.ox.ac.uk/teaching/
Rensselaer Polytechnic Institute	T	'Information Technology and Web Science'	This institution offers a BSc course dedicated to Web Science. This is an example of a course which approaches Web Science from an IT perspective. There are also opportunities to study further at PhD level.	http://catalog.rpi.edu/preview_entity.php?catoid=11&ent_oid=577&hl=%22web+science%22&returnto=search
Saint-Joseph University of Beirut	NA	Master in Web Science and Digital Economy	This course allows Digital Economics MSc students to specialize in Web Science, providing students with the opportunity to study "The impact of the Web and its technologies in the economic and financial world".	http://fse-wsen.blogs.usj.edu.lb/presentation-du-master/
The University of Edinburgh: School of Social and Political Science	*S*	*'MSc in Science and Technology in Society'*	The MSc course specifically looks at the impact of technology on society. Describes technology as a powerful 'agent of change', which needs to be studied in order to determine its impact.	http://www.sps.ed.ac.uk/gradschool/prospective/taught_masters/o_z/msc_in_science_and_technology_in_society#SaTiS
University College London	T	MSc Web Science and Big Data Analytics	a more technically biased Web Science course, subjects from "information search and retrieval, data mining and analytics, large-scale distributed and cloud computing, to e-commerce". There is little suggestion that the social impact is considered.	http://www.cs.ucl.ac.uk/?id=4556
University of Erlangen-Nürnberg	NA	Innovation Technology (Master)	This 'course' contains related modules – difficult to determine if this is a full masters course or just referring to one lecture\module.	http://wi1.uni-erlangen.de/teaching/innovation-technology-master
University of Koblenz-Landau, Institute for Web Science and Technologies,	M	Master Programme in Web Science	a 'fully rounded' Web Science curriculum looking at both the technological and social aspects of Web Science. Topics mentioned include: computer science, social science, economics, and studies of the law, linguistics, semiotics, communication studies, and mathematics.	http://west.uni-koblenz.de/master-web-science
University of San Francisco , USA	T	Master of Science in Web Science	Heavy emphasis upon Computer Science topics. Advanced topics in Internet-based computing including software engineering, distributed computing, artificial intelligence, networking, interface design, and Internet systems.	http://www.usfca.edu/catalog/artsci/msws/
University of Southampton, UK	M	'BSc Web Science' *'MSc Web Science'* and *'Web Science Doctoral Training Programme'*	Detailed syllabus and wide range of modules. Southampton is unusual in the fact that it offers Web Science courses right through from undergrad to PhD level. Undergrad level offers two pathway options, one with a bias toward social science, and the other with a bias toward computer science.	http://www.southampton.ac.uk/webscience

*Type: M=Mixed approach S= Social Science focused T=Technology focused