Mapping the Web Science Curriculum(s)

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ABSTRACT
This work describes a project which aims to explore the scope of the discipline Web Science; an emerging subject which is fundamentally inter-disciplinary. There are very few definitive subject definitions currently available for Web Science. Additionally, the nature of the subject is constantly evolving as an increasing number of different disciplines begin to practice what might identifiably be called Web Science. This potentially provides educators and students with a problem; how do you teach or learn about Web Science when there is no clear definition. The ultimate aim of this project is to collate and analyze current material available, in an attempt to provide recommendations for a clearer definition of Web Science.

Keywords
Web Science, Web Science Curriculum, Education.

1. INTRODUCTION
There are currently very few definitive subject definitions available for Web Science, which is an issue if Web Science is to continue to gain popularity as a taught subject. In order to address this issue, we began conducting an examination of current Web Science related curriculums and resources available, in order to attempt to build a picture of how Web Science is currently taught, and compare and contrast this with available subject definitions for Web Science, with the ultimate aim of presenting a set of findings depicting the scope of the Web Science subject.

2. Exploring the Web Science Curriculum(s)
The perspective of what constitutes a Web Science course varies according to each institution. In order to gain an accurate picture of worldwide Web Science teaching, regional and institutional biases should be considered. Differences in delivery methods for programmes should also be considered; for example are teaching methods such as traditional lectures used, or are more modern methods such as Massive Open Online Courses (MOOCs) favored? The study also looks at the difference between existing subject definitions, such as the Web Science Subject Categorization, [1] as well as the most frequently occurring keywords found in papers taken from the Web Science conferences, [2] comparing these results with what is taught as part of current Web Science curricula. A previous study conducted by White et al [3] outlined a proposal for gathering information about the Web Science curriculum, and also conducted a brief study of Web Science educational institutions. This contributed to the authors' decision to conduct a desk survey of educational institutions which teach a Web Science related programme. The subsequent desk survey conducted involved manual web searches in order to identify a list of institutions which teach an active Web Science syllabus, and also included institutions which teach a module or other content relating to Web Science. Having successfully compiled a list of institutions, we then expanded the study to include details of individual modules relating to Web Science. The process involved time-consuming navigation of web pages for each of the institutions identified, in order to manually gather the information relating to the headings shown in table 1. The data was then recorded in an Excel spreadsheet with the above cell headings. This process was repeated for each of the institutions identified in the previous stage of the study. It was only possible to gather data from institutions which provide public information relating to modules. Information is often formatted differently by each institution. For example, some universities provide detailed dates for module teaching times, whereas others only provide basic information such as semester 1 or semester 2, whilst others completely omit such information; this provides an additional challenge.

Table 1. Key Fields Used in the Modules Desk Survey

Institution Location	Resource Title	Topic(s) Taught	Teaching\ Assessment format
Contributors(s)	Materials Used	Level (e.g. Masters)	Module Dates\Duration

3. Attempting to Automate the Process
Although the manual study is a thorough means of gathering data, the information is static, and can very quickly become outdated as web pages change and universities update their syllabi. Therefore, the next logical step in this process is to create an automated method for continuously monitoring and gathering the same information. In an attempt to achieve this, we created a draft version of a web crawler using Python, initially outputting a file in JSON format. This crawler searches the .ac.uk domain for a combination of the keywords 'web' and 'science', in an attempt to identify institutions which teach web science related content. The crawler currently returns the results in the format of a list of URLS, which can be traced to teaching institution. The crawler is currently limited to the UK domain, and a desirable further development would be to expand it to include institutions worldwide, although this would require considerable computational resources. It would also be beneficial to expand the crawler so that it is able to take into account variations of the term 'Web Science', so that it might be capable to location programmes such as 'Digital Sociology', which are not explicitly labeled as Web Science, but which relate closely to Web Science.

4. Conclusion
This provides us with much scope for future work; ultimately aiming to provide recommendations for a curriculum with common elements taken from the most frequently occurring topics across current Web Science courses. Another desired outcome would be to build upon the currently crawler, in order to develop an automated method for tracking the evolution of the Web Science subject.

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