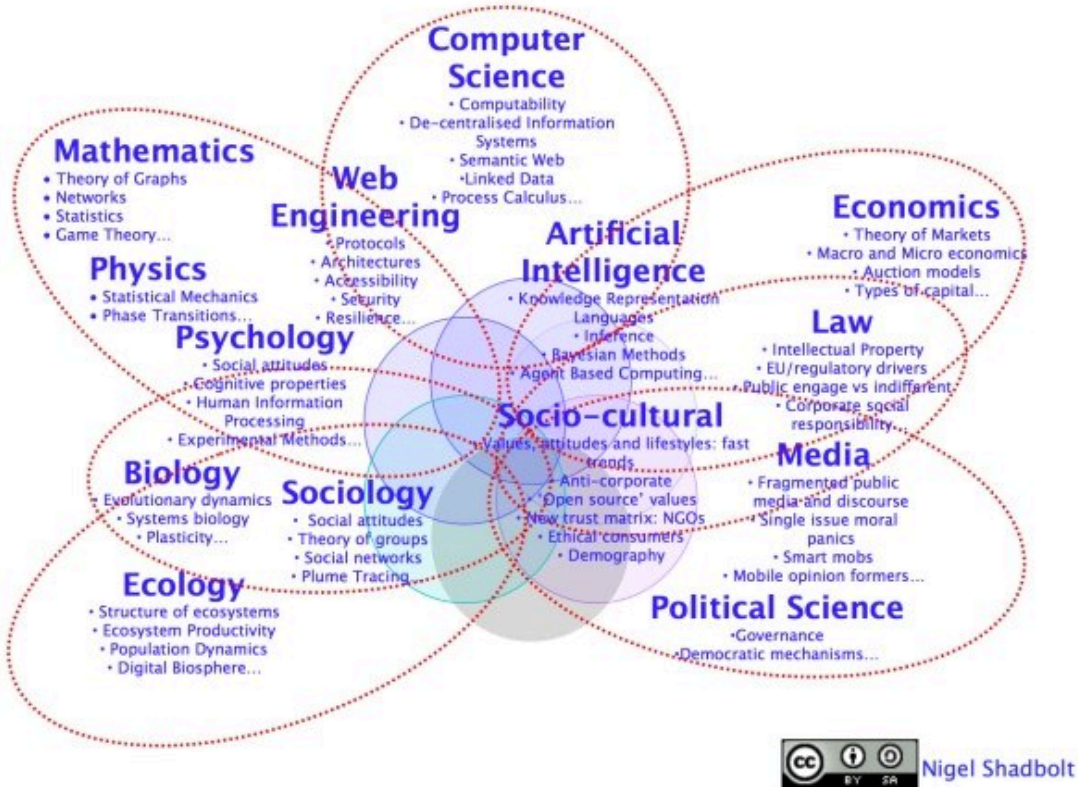

Shadbolt's Butterfly Diagram

Early on in the discussion of Web Science, a butterfly diagram of component disciplines was proposed.

This has been discussed extensively, and analytical comparisons with the content of web science discourse, has suggested a number of ommisions. (see for example Hooper et al 2012). Nonetheless, it can provide a useful starting step in understanding how many different established fields of study can feature in any piece of web science research.

Researchers and students embarking on a study of web science can usefully spend some time looking into the background of disciplinary differences before referring to more formal texts which specifically study interdisciplinarity (for example Repko, 2012)

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Disciplinary Differences – a flying visit

Biglan looked at the nature of the subject matter of research (Biglan, 1973a, b) , whist Kolb was interested in styles of intellectual enquiry(Kolb, 1981) .

Becher has been concerned with academic and disciplinary cultures where he drew on the earlier work of Biglan and Kolb (Becher, 1993, 1994, Becher *et al.*, 2001). He later returned to this theme and has worked with colleagues to consider the implications of these observations in an educational context (Neumann *et al.*, 2002). Becher identified the relationships between the following broad disciplinary groupings

Broad Disciplinary Groupings

Biglan	Kolb	Disciplinary Areas
Hard Pure	Abstract reflective	Natural sciences
Soft Pure	Concrete reflective	Humanities and social sciences
Hard Applied	Abstract active	Science-based professions
Soft Applied	Concrete active	Social professions

(Becher, 1994)

Neumann, Parry and Becher undertook further work which sought to draw relationships between the learning and teaching dimension and the research dimension (Neumann et al., 2002).

White and Liccardi built upon the analysis by Neumann, Parry and Becher (shown in appendix) who undertook a survey of student's perspectives seeking evidence to extend the analysis into the context of learning design (White and Liccardi, 2006).

Disciplines and teaching approaches

	Curriculum/Content	Assessment	Cognitive Purpose
Hard Pure e.g. Natural Sciences	• Concepts and principles closely connected. • Content typically fixed and cumulative. Quantitative. • Teaching and learning activities are focused and instructive.	• Specific and focused exam questions. • Objective tests relying on quantitative nature of knowledge	• Logical reasoning. • Testing of ideas in linear form of argumentation. • Reliance on facts, principles, and concepts.
Hard Applied e.g. Engineering	• Concerned with the mastery of the physical environment. • Focus is on products and techniques. • Knowledge is atomistic and cumulative. • Emphasises factual understanding	• Preference for exam questions, especially problem-solving	• Problem-solving and practical skills • Emphasis on integration and application of existing knowledge

	Curriculum/Content	Assessment	Cognitive Purpose
Soft Pure e.g. Social Sciences and Humanities	• Non-linear, open and loose • Content is free-ranging • Qualitative • Teaching and learning activities are constructive and interpretive	• Essay questions, • short answer questions, and oral presentations • Ongoing assessment	• Broad command of intellectual ideas • Emphasis on creativity in thinking and fluency of expression
Soft Applied e.g. Nursing or Education	• Concerned with the enhancement of professional practice • Knowledge reiterative and holistic	• Essays, project-based assignments • Use of peer and self-assessment tasks	• Emphasis on personal growth and intellectual breadth • Development of reflective practice and lifelong learning skills

(White and Liccardi, 2006)

Whitmire found a relationship between Biglan's categorisation of disciplines and the information seeking behaviours of undergraduates in the context of library and information science.

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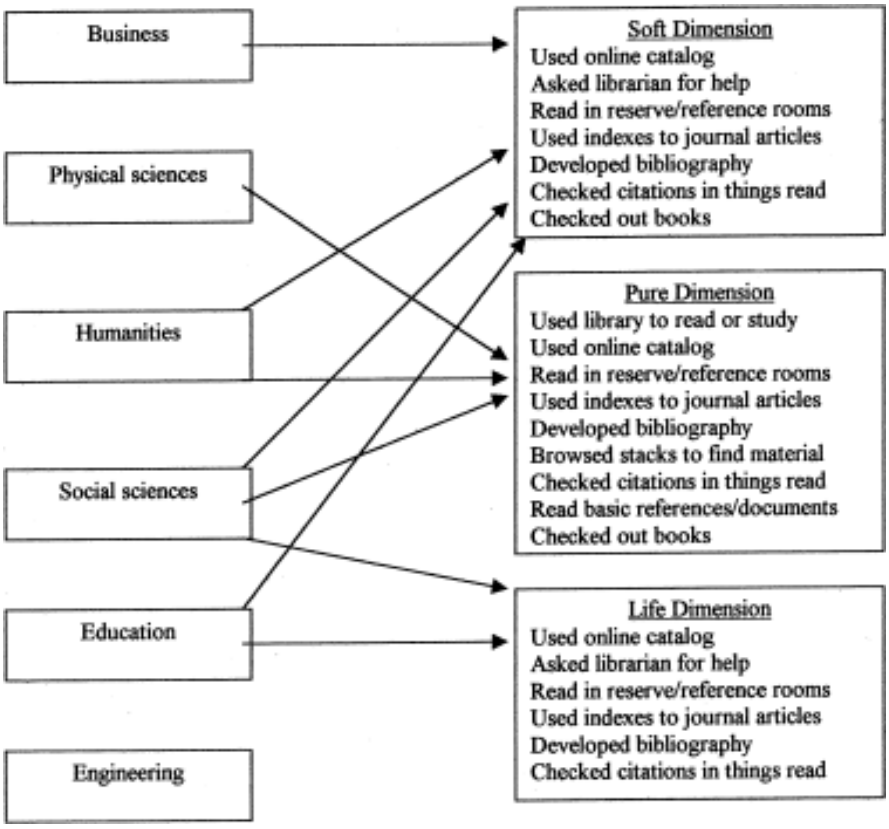

(Whitmire, 2002)

She commented

> *"It could be expected that undergraduates' information-seeking behavior would differ from faculty and graduate students because their information seeking skills are not as well developed. However, similar information-seeking patterns could also be expected because undergraduate majors are socialized and indoctrinated into the research processes of their academic disciplines through course assignments and lectures. Faculty expose undergraduates to the major theories and researchers in the field including identifying which journals, authors, books are important, and perhaps which databases and academic libraries are useful for seeking information to complete course assignments."*

(Whitmire, 2002)

It might be reasonable to assume that similar factors come into play when we consider the way in which undergraduates might make use of educational learning resources.

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Further Reading

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