# Millennial Students and Technology Choices for Information Searching

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**Abstract:** This paper draws together ideas about different generations of students, notably the 'millennial generation' (born from around 1982 to 2000) which encompasses a high proportion of current students in higher education, and ideas about the different types of technology available when searching for information. In the context of higher education, this is particularly relevant when students are encouraged to find out information for themselves, typically to relate this to taught material. This is connected with information literacy, as it reflects students' abilities to carry out simple or complex research. This paper focuses on why students choose particular technologies to support their research and the effect of these choices on their learning and on their written work.

A particular current issue is the emergence of the generation of Internet resources collectively known as 'web 2.0' - notably Blogs and Wikis - and the relationship of these to the way that students presently in universities favour structuring their work. These resources also introduce issues of authoritativeness. It is tempting to dismiss wikipedia as the work of amateurs, but where a blog has been created by a notable expert, author, or journalist, questions arise as to whether the blog should be regarded as of different value from the same person's written work. Therefore some consideration will be given to how students can be encouraged to recognise and draw on intelligent exploitation of these new resources.

Underlying data for the paper is drawn from discussions with current students, both individually and in groups.

**Keywords**: Millennial students, Web 2.0, information literacy

## 1. Introduction

In recent years there have been tangible changes in students' favoured techniques for searching for information. One driver for this is ready access to the Internet, but the nature of material available on the Internet is evolving, and with it the sort of strategies that students can use to navigate this material. The work here particularly focuses on the preferences associated with those born since 1982, characterised by Strauss and Howe (1997) as 'millennials' but it should be noted that other classifications of ages are also used. For example the British Library and University College London have identified the 'Google generation' as of particular interest – being those born since 1993 who have no recollection of life without the Internet (CIBER, 2008). At present this generation is too young to attend university – in the British educational system the oldest of these will currently (2008) be studying for their GCSE (general certificate of secondary education) examinations. However some of these will be starting on undergraduate courses in another three years, which is very much within the planning horizon for universities.

Not all commentators view the emergence of this generation in a positive light. Notably Keen (2007) takes an apocalyptic view in which the Internet is seen as a destroyer of more traditional literacies. However the growth of the Internet has been accompanied by the emergence of new ways of organising and classifying data, notably the use of 'tags' and 'folksonomies' as ways to impose a structure on information held on the Internet. These are typically associated with web resources that include a significant volume of content generated by users, and provide an approach to classifying and navigating that information which contrasts with that associated with more traditional taxonomies (Lambe, 2007; Golder and Huberman, 2006). Arguably it is a misnomer to associate this trend with the 'Google generation', as this approach has emerged more recently than the widespread use of Google. But members of the millennial generation are acquiring the sort of adult information navigation skills in an environment where folksonomies are widely used, and this potentially raises challenges for educators in universities as to how to promote information literacy. A particular aspect of these challenges is the channels, or technologies, that students choose in searching for information.

## 2. Participation and user-generated content

The term web 2.0 typically refers to a range of Internet applications, characterised by contributions from a large number of participants. Its purpose has been described as 'harnessing collective intelligence' (O'Reilly, 2006), and is most familiar to many Internet users through Blogs and through wikis – particularly Wikipedia. It is very easy for somebody to set up a blog or to contribute to Wikipedia, and Blogs in particular are


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associated with tools that allow anybody with the time and interest to generate content to produce something that looks very professional. Like any written material, web 2.0 content may be good, or may be inaccurate, or it may present a view that is extremely partisan. As web 2.0 has become a commonplace component in many users' experiences of the Internet, it has attracted interest among educators and in business. Tredinnick (2006) draws attention to the potential for this approach to be used within an organisation to build an Intranet, used for sharing information and knowledge between various stakeholders: in a university this would cover knowledge being built collaboratively by staff and students. Alexander (2006) discusses a range of interesting ways in which web 2.0 concepts can be applied in higher education, illustrated by some useful specific examples. Some of these go beyond the everyday uses of web 2.0 resources and require active participation and sharing by students – for instance the use of shared searches which both students and faculty could follow over a number of weeks (Alexander, 2006: 40).

This participative model also has the potential to encourage learner-centred and more informal approaches to learning – for example the extent to which students become 'non-formal' learners where they assimilate knowledge informally in parallel with attending classes (Eraut, 2000). Much teaching and learning within universities is influenced by the concept of reflection-in-action (Schön, 1983) and participative approaches to Internet use have the potential to stimulate this, for example through one contributor raising an original, and possibly contentious, point that can prompt a reflective discussion among others.Furthermore, web 2.0 offers an environment where people can be seen to engage in reflection and to produce useful, and evolving, content as a result. This has the benefit of transparency, of it being possible to see how knowledge is built up – a point addressed by Clark (2008) who robustly criticises academics who forbid students from using Wikipedia, and instead suggests that students be encouraged to use the 'discussion' tab on Wikipedia pages. Smith (2001) notes, among criticisms of Schön's concepts, the observation that they do not necessarily contribute to praxis – to informed, committed, action. Web 2.0 tools do offer the potential for groups of people working together to work towards action. Incidentallyit should be noted that Smith's work cited here is an example of a thoughtful and scholarly resource that is freely available on the Internet, and that is continually revised and expanded.

The very ubiquity of Wikipedia offers evidence that students are prepared to use, and trust, web 2.0 content. However the indications so far are that many of them – even those of the millennial generation who have grown up with the Internet and who are used to participating in social networking sites such as Myspace and Facebook – have a limited awareness of the origins of material that they use in their studies. In other words Wikipedia is just another web site carrying information – and perhaps because it is comprehensive, easy to search, and easy to find it is one that is tempting to use. Students are very ready to use Wikipedia, but much less willing to engage with it. This lack of engagement is not necessarily a bad thing; notably the concept of communities of practice (groups of people united by a very specific common interest, often working in different places but linked by the Internet) depends on valuing peripheral participants as well as active contributors (Wenger et al, 2002).Web 2.0 supplements user-generated content with a series of tools, such as RSS feeds, that facilitate navigation of knowledge and, for instance, to track contributions that an individual might make to a discussion. At present many students remain reluctant to use these tools effectively, and will only draw on material that is presented in a simple form on a web page.

In theory, RSS feeds, by alerting users of the Internet to changes in pages which might be particularly relevant to their interest, match one particular characteristic that is frequently associated with the millennial generation. This is the effect termed by Stone (2008) as 'continuous partial attention' – the ability to work on several activities at once and to distribute attention between them. Davenport and Beck (2001) identify attention as an important commodity within organisations, and one of the challenges in using web 2.0 in learning is to understand how material can be structured to attract students' attention.

## 3. A classification of web 2.0 competences

This paper is intended to be exploratory in nature, and uses student experiences observed by, and reported to, the author to determine a classification of different students' abilities to use Web 2.0 resources. The intention is to use this classification as a framework for conducting further inquiry in more depth in the future. It became apparent at an early stage of discussion that web 2.0 competencies could be divided into two broad categories:

- *Necessary* competences are essential for students to use web 2.0 resources, and students who lack these competences run the risk of producing work which is ill-informed or positively misleading.

 

- *Supplementary competences* allow students to explore web 2.0 resources in more depth and potentially to contribute to such resources and to the construction of a body of knowledge.

The students whose work informed these concepts were predominantly undergraduates, and were all studying business or management related subjects. The subject area is relevant because of the range of topics that it encompasses – a reason that it is tempting for students to set off and search the entire Internet for sources, rather than to look at specific journals, or specialised websites.

Two key necessary competences are proposed:

- *Accurate searching* implies the ability to use a range of search tools on the Internet, to formulate searches accurately (notably to understand how and when to *exclude* terms from a search), how to extract the most useful and relevant items from a long list of search results. The skills implied here are relevant when using specialised databases, for example of articles from business journals, as well as when using Google or other popular search engines. They include judging search results by context and type as well as by keywords, so an article which originated in the *Harvard Business Review* carries more weight than an unpublished piece on a student website.
- *Judging authoritativeness* is much more important in the web 2.0 context than when using the traditional web, or when using printed materials. At a simple level, students can be asked to say *why* a particular source is authoritative if they are to cite it in their work. But there are also several dimensions to material being authoritative. If it does deal with a contentious subject, then students need to acknowledge any bias, and possibly to draw on two or more sources with contrasting views. They need to distinguish between cases where the author of an item declares that they are authoritative (do they take the reasons why at face value, or can they investigate them in some way) and cases where somebody independent vouches for the material being authoritative. They need to recognise that a range of types of publication exists on the web (magazine, scholarly journal, and so on) and that some, but by no means all, of these mirror types that also exist on paper. In the context of the web they need to recognise that the number of other sites that link to a page is some measure of the destination page's value: there is a parallel here with the use of the number of citations as a measure of the value of an scholarly paper. All these facets of this competence depend on an ability to take a critical viewpoint, and a lack of criticality among students can lead to material being used inappropriately.

Drawing on the issues raised above, supplementary competences allow students to draw on resources in more depth, and also to engage actively in building knowledge. Three supplementary competences are proposed here, but it is recognised that they may usefully be subdivided into others in the light of further inquiry, and also that there are potential overlaps. These focus on understanding the complexity of knowledge.

- *Use of a variety of channels* implies being able to use (for example) RSS to monitor information that is of particular interest, and being able to synthesise information from different resources. A prerequisite for this is understanding the different types of content and knowing how this can be build up to provide something useful for a particular student's needs. The emphasis here should be on understanding the relationship between different resources, and in seeing the potential to generate new and useful material by combining different sources. This addresses a concern that has been observed with undergraduate students in particular: when searching for relevant literature they often look in vain for one book or paper which covers the exact subject about which they want to find out, but they are reluctant to look for several different sources which cover overlapping issues which together are relevant to their work.
- *Structural understanding* implies an interest and understanding in the intricacies of how web 2.0 content is formed. Potentially there is some overlap with the previous competence, but here the emphasis is on how the knowledge has been built up over time, and on the contribution that different people have made to it. In the case of resources structured as wikis (not just Wikipedia itself), an example of this would be a readiness to look behind the 'page history' and 'discussion' tabs on a page and to draw inferences about the page content.
- *Positive engagement* implies participation in the construction of knowledge through web 2.0 . This could be done though students creating their own resources (but these need to be ones that actively invite discussion, such as Blogs which welcome comments), or more typically through students becoming active participants in a discussion. Prerequisites to this include understanding the tacit and explicit rules of behaviour that prevail in an electronic forum: Wikipedia is a particularly instructive example of this because it has evolved a complex set of

rules and conventions for contributors, and being able to identify whether other contributors are knowledgeable, willing to collaborate, and so on.

## 4. Encouraging these competences

These competences can be viewed as an emerging set of research skills which students will need to learn in the future. One characteristic of web 2.0 is that the tools available can be expected to change over time, so students need to learn skills which are not restricted to a particular generation of software applications. It is difficult to be prescriptive about how educators can best encourage these competences, especially the supplementary ones. The necessary competences can be incorporated into the assessment criteria for students, through for instance an instruction only to use Internet resources where students can make a strong case for the resource being relevant and authoritative. They can be strengthened by educators themselves encouraging and monitoring good practice, and also by inviting students to check their own work against certain standards.

Encouraging the supplementary competences is a greater challenge. Preliminary evidence suggests that students are extremely reluctant to reach the stage of positive engagement, and even if they are active participants in web discussions in connection with their hobbies or social life, they are reluctant to become similarly active in contributing to knowledge. It is not unrealistic to expect every students to be comfortable with all of these competences, which would be the equivalent of expecting every student in a large formal lecture to be comfortable with posing questions from the floor. Also, just as there is a concern in classes where participation is encouraged, that the most vocal students dominate the interaction and therefore gain the most from it, the use of web 2.0 raises a concern that it might privilege a small group of students with very highly developed competences. It is reasonable to expect that positive engagement, in particular, will be easier for students when a critical mass has been reached of students willing to participate in this way. One possibility for educators is to focus on particular areas where students can usefully build up a critical mass of useful knowledge that includes user-generated content, and where educators can comment on the validity or otherwise of the knowledge to guide student contributors in a useful direction. Finally it should be noted (returning to generational issues) that this is a very different approach to building knowledge from that practised by most academics, and it is essential that academics are prepared to learn, if necessary, from the experience of others who have contributed effectively to web 2.0 resources.

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