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Abstract

The Internet has become an integral part of all aspects of the life of twenty-first-century learners. Yet research shows that students' ease and familiarity with the mechanics of the medium are not matched by their ability to evaluate electronic sources critically. Both faculty and library professionals are acutely aware of this, and much help is available to students in the form of checklists and guides to evaluating Internet sources. Students still seem to be falling through the cracks, however. The author suggests the adoption of the 'RADAR' approach to evaluating Internet sources. Just as a ship's captain needs electronic radar to navigate safely and efficiently through the ocean, so the information searcher needs a similar scanning device, that is, a critical, mental radar, when exploring the vast sea of information on the Internet. This device can help students develop a critical awareness of the need to establish the Relevance, Authority, Date, Appearance and Reason for writing of each web source that they encounter. Preliminary qualitative research amongst both native and non-native English-speaking college students suggests a positive user response to both the concept and the tool, providing grounds for further empirical investigation.

Keywords

critical thinking; digital age; evaluating web sources; information literacy; search strategies; student research

1. Background: Student use of Internet sources – the challenge

I've had so many problems when I've allowed students to use Internet sources for their assignments that I've banned them from doing so independently now. They have absolutely no idea how to identify what is good information on the web. So now I give them a list of good web sources and they have to work to work with these.

This kind of comment is, unfortunately, heard not infrequently in faculty lounges. I use the word 'unfortunately', as I maintain that such teacher reactions are equivalent to saying that people should not use cars because of their potential dangers, and should return to horses and carts instead.

The obvious answer to the above problem is – as in the case of driving a car – to ensure that students are taught the requisite skills for safe and efficient operation of a tool that is an inextricable part of twenty-first-century life. It is simply foolish to ignore the benefits that students may gain from the vast academic opportunities offered by the online world; the task of all their partners in learning (teachers of all subjects at all levels, library and information professionals, IT trainers) is to ensure that they develop the critical evaluation skills required for them to exploit it to its fullest potential. This article will profile an approach that was developed with college-age students, but which can be taught and exploited as a means of meeting this challenge for learners of all stages and ages.

It should be noted at the outset that the ability to evaluate critically the sources available is by no means a new requirement, nor one that is confined to working with electronic resources. In the pre-digital age students always had to determine which sources were relevant to their task, to consider their authorship and the date of publication, regardless of whether they were working with card catalogues, books on the library shelves, bound journals in the library stacks or documents stored on microfiche. A student essay written in the 1970s, 1950s or indeed in previous

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centuries was always judged partly on the writer's ability to evaluate and select good sources. Research carried out by Williams and Rowlands [1] which compared children's information-seeking behaviour in the pre- and post electronic ages, reports the two populations facing very similar problems in using strategies to find relevant information.

What is new in the digital age, however, is the challenge posed by the huge extent and free availability of the information now available. As Metzger [2] points out, such ubiquitous access to 'uncensored' information means that the burden of establishing credibility of sources in this vast sea of information is now passed onto the individual, rather than being filtered through expert gatekeepers such as publishers, librarians and teachers, as was the case in the past.

This size of this challenge must not be underestimated; it is not only pointless, but also self-defeating for educators not to recognize this, and not to develop a strategy for providing maximum scaffolding for their students. The Internet is now fused with all aspects of life: personal, social, professional and academic. At all levels of education, students are now being required or assumed to use the Internet, and at the same time more emphasis is being placed on 'self-directed learning' [3], which is often erroneously seen as synonymous with Internet-based learning. There seems to be evidence of some ambivalence on the part of teachers with this situation, and Calkins and Kelley [4] quote Young's 2004 study of college professors, which documented how 94% of their participants allowed their students to use Internet sources yet nearly half of them reported negative feelings towards student Internet usage. Yet despite the fact that such negative feelings reflect worries about students' ability to make good Internet choices, there does not seem to be a corresponding provision of help on the part of the teachers.

The sheer volume of information provided to the learner in the digital age is an obvious challenge. University students in the pre-digital age might have had access to some 20–30 print sources made available through their library; a 'google scholar' nowadays could find 20 million returns to an Internet search. Head and Eisenberg [5], in their study of US college students' research experiences, flag the problem on the first page of their report: 'the abundance of information technology and the proliferation of digital information resources make conducting research uniquely paradoxical: **Research seems to be far more difficult to conduct in the digital age than it did in previous times**' (their bolding). The lack of regulation or 'quality control' on the Internet is another substantial hazard. Metzger et al. [6] highlight its lack of checks on accuracy, the extensive possibilities for unauthorized alteration, and the increased ease of creating web materials that look both convincing and credible. Mintz [7] makes entertaining but very sobering reading, underlining the lengths to which some website creators are willing to go to mislead users and the corresponding need for the latter to develop critical web-user skills. When we couple this with the findings of Metzger et al.'s study [6], which found that students appear to be more trusting of the Internet than non-students, there is a clear indication that students need help. A particular subset of such students in need, and one that I personally work with, is international students, that is, those functioning in English in academia, but whose first language is not English. As Hughes [8] found, such learners face all the same difficulties as native English speakers in navigating the online world, but these are further compounded by the fact that they have to function in a second or foreign language.

Despite the reservations of some scholars regarding the findings and methodology of some studies [9, 10], there is considerable evidence that the aforementioned challenges take their toll on university student information users, and result in a deficiency in information literacy skills, notably the ability to evaluate Internet sources critically. There may be merit in CIBER's questioning of the value of some of the research that profiles students as mass plagiarizers and uncritical Internet users, and likewise in Meola's querying of the generally held assumption that college students are 'unsuspecting simpletons ... Easily duped by the most obviously fraudulent web pages' [10]. Nevertheless, there is plenty of research that suggests that there are extensive problems with regard to students' information evaluating practices. Given the ubiquity and extent of Internet use amongst young people at this, the beginning of the second decade of the twenty-first century, and the third decade of the existence of the World Wide Web, it would be reasonable to assume that students have by now become critical and proficient users. One would expect that the deep fears voiced by academics during the 1990s – Senn Breivik [11] and Grimes and Boening [12] were just two of many such voices – regarding their students' lack of critical use of Internet sources would have been allayed; that students' critical evaluative abilities would have developed at the same rate as their Internet use; that the Google-generation of students, both school and college, would have become expert searchers. On the contrary. If we look at recent literature we see, as Rowlands et al. found in their study of UK pre-college students using data mining and deep log analysis, that this last assumption is a 'dangerous myth' [3]. This assessment is clearly borne out by another study done in the UK by Bartlett and Miller in 2011. They summarize their investigation of what they label 'digital fluency' amongst secondary school students aged 12–18 thus: 'The Internet has become central to learning, but the skills to use it appropriately and well have not become central to learning how to learn.' [13]. In 2003 we find Metzger et al.'s study of US college students showing only 'minimal evidence of students' ability to verify information' [6]. In 2005, Stapleton's study in Japan drew attention to the extent of the problems faced by second/foreign language learners when attempting to identify suitable sources for academic

papers, despite having been given extensive input and practice in source evaluation [14]. In 2007 Calkins and Kelley provided a very useful insight obtained through qualitative methodology in their case studies conducted in a psychology course and history course in a US college. Their method of data collection (discussion, interaction, observation) allowed the researchers to establish exactly what went on [4] and they discovered, as did Stapleton [14] that, despite being given detailed guidelines and input on how to evaluate web sources, their students still found considerable difficulty in applying these guidelines successfully. McClure and Clink's 2009 research [15] provides a disquieting description of how students of English composition in a US college 'struggle with understanding and valuing source material, and their teachers struggle with instructing them on source analysis'. Similar findings emerge from the large study done by Hargittai et al. [16], also of composition students in a US university. Examining the web-searching behaviour of students in a biotechnology course, Halverson et al. observed the same 'struggles' with critical evaluation [17]. Also in a science discipline, Shanahan's study of second-year Australian radiography undergraduates stresses how much guidance and support needs to be provided by faculty if students are to develop the requisite abilities to find appropriate online sources independently [18]. And in their extensive ongoing study of how US students in composition classes use sources in their writing, one of the main problems that Howard and Jamieson identify is the likelihood that these sources obtained through the Internet will be 'junk' [19].

2. The solutions?

So, who should address this issue? And how? Library professionals are deeply and urgently aware of the extent of the problems faced by students; they are also aware that they cannot solve the problem alone. A major theme in information literacy literature is the need for unstinting effort, as well as collaboration between information professionals and all those involved in educating students. Senn Breivik articulated this very forcefully back in 1998:

if this current generation of students is ever going to be information literate – if they are ever going to be successful leaders in the next century – academicians must stop assuming that students know how to research information, or that students can easily learn research skills without any intervention. [11]

but the same message is still having to be repeated well into this new century [3, 9, 15]. Badke [20], Harmon [21] and McGuinness [22], all library professionals, reflect how, despite a few notable success stories, there is still much unwillingness or resistance on the part of faculty towards taking responsibility for the teaching of information literacy skills. It is clear, then, that if any widespread success is to be achieved on this front, and faculty are going to be co-opted into this battle, they will need to be provided with user-friendly tools.

There is also much written about the 'how', about the kinds of tools that are needed. A wide variety of checklists and guidelines to help learners evaluate websites has been devised by library professionals in many institutions and is made available to both students and faculty. An alternative approach has been suggested by Meola [9], who argues that the checklist approach too often leads to a checking-boxes, mechanistic mentality and may be limited, misleading and unreliable, resulting in less 'deep' learning. Meola argues for what he calls a 'contextual approach', one that enables students 'to use information to evaluate information'. Such an approach equips students to recognize which sources have already been peer reviewed, and to exploit the skills of comparison and corroboration in order to establish quality. It is also very apparent in the literature, however, that despite being taught such hugely valuable evaluation techniques and approaches, students often fail to put them into practice. It is within the above context that I would like to present the RADAR method, which I suggest combines the advantages of both the checklists and Meola's contextual approach.

3. Introducing RADAR

The discussion of evaluating web sources may be initiated by likening the World Wide Web to the ocean. This metaphor serves well. When asked to volunteer similarities, students are able to find comparisons between the Internet and the oceans in terms of its extent and depth as a source of information. They mention the risks and dangers of swimming in both the literal and metaphorical 'seas': the possibility of drowning or of being carried away by currents, and of being attacked or injured by sharks or 'stung' by poisonous creatures both literal and metaphorical. They point out how both can be 'surfed'. I then modify the metaphor slightly, to that of a captain sailing a ship on the sea. This yields discussion of the dangers of crashing on rocks (such as those of misinformation); of technical faults and problems in the equipment; of being hijacked by pirates, and – the point to which I aim to take my students – the need for navigation equipment that

operates constantly to alert the captain to potential risks. In other words, a RADAR. I write this acronym on the board vertically.

At this point, I situate the following activity within the context of the students' current information search needs, and use an example of a topic that they are working with. This is critical to successful learning and application [23]. I project on the overhead screen a page of live Internet results that were generated by the topic's search terms. Then, as we look through the pages of results, I elicit from students the criteria that they would apply in order to decide which of these results would be usable. I find that, with varying degrees of prompting, students are able to volunteer each of the words and concepts that the RADAR letters stand for:

R elevance
A uthority
D ate
A ppearance
R eason for writing


We take one letter at a time, subjecting various sites to detailed scrutiny for each criteria before moving on to the next letter, and discussing in detail the issues that arise (see the questions following each criteria on the second page of Figure 1, a version of the handout I distribute at the end of the lesson).

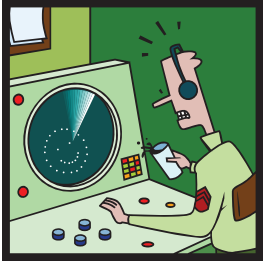
Using RADAR to evaluate information

The 21st century has been described as the Information Age. However, it is a time when we are surrounded by so much information, in so many forms, that it often seems that we are drowning. This is especially true when searching on the Internet.

You can navigate your way safely through this sea of information by using the RADAR method of evaluating information. This can be used for evaluating any sources of information: in books, on the Internet and in the periodical databases.

R	Relevance
A	Authority
D	Date
A	Appearance
R	Reason for writing





Turn over for an explanation of the RADAR method of evaluating sources of information.

Figure 1. (continued)

Each time you find a new information source, switch on your **RADAR** and ask yourself the following questions:

Relevance: **HOW** is the information that you have found relevant to your assignment?

Authority: * **WHO** is the author? (this may be a person or an organization)

* What tells you that they are **authoritative**? What are their credentials?

⇒ Is the author well known and respected?

⇒ Does the author work for a reputable institution, e.g. a university, research center or organization (e.g. NASA)?

⇒ Does the author have good qualifications and experience?

⇒ What does the 'About Us' button tell you?

⇒ Is other information available about them (e.g. from Google)?

⇒ Does the URL of the site give you clues about authority?

➤ Look for names of reputable organizations in the URL

➤ Look at the endings of the web addresses:

- .edu or .ac indicate universities (but be careful because these addresses may also be used by students: % or ~ before a name indicates that the author is a student)

- .gov indicates official government sites

- .org indicates a non-profit organization

* Does knowing the authority of the site help you make a judgment about the **ACCURACY** of the information?

* Even if you have doubts about the authority of the site, does it contain links to other authoritative or helpful sources?

Date: * **WHEN** was the information published? Is the publication date important to you?

Appearance: * **WHAT CLUES** can you get from the **APPEARANCE** of the source?

* Does the information look serious and professional? Does it have citations and references?

* Is it written in formal, academic language? Or does it look as if it was written by a non-professional?

* Does it look as if it was published for children? * Or to sell something?

Reason for writing: **WHY** did the writer publish this?

* To produce a balanced, well-researched, professional piece of work to add to the body of knowledge?

* Was it written as part of an ongoing debate, to counter an opposing claim?

* Or is it for propaganda, and biased? Note: a biased or problematic site may still be useful to you; the key is to recognize its bias or limitations.

* Or was it written in order to sell something? * Or is it a spoof site, written for fun?

Note: RADAR is a palindrome, i.e. it reads the same whether you start reading at the beginning or the end. The RADAR approach is more than palindromic, as it allows you to begin your evaluation using any one of the 5 letters or criteria.

Figure 1. The handout on RADAR.

Helping Students to Operate RADAR

3.1. Relevance

Focus here on the ‘how’ part of the question. Students often fail to deliberate on this carefully enough, and frequently print out dozens of pages from sources that have little or limited relevance. Requiring them to articulate exactly how each source is relevant and what it adds to their research helps them develop vital critical reading skills.

3.2. Authority

Encourage students to work as detectives, performing rigorous background checks on the author. Too often, this is done perfunctorily – if at all [Hargittai et al. 16]. Demonstrate how the website, or the wider web, needs to be mined for as much information as possible which indicates the credentials of the author, and therefore the accuracy and reliability of the information. However, it is also important to get students to realize that even sources that they may deem to be lacking in authority (e.g. Wikipedia, a blog or a site produced by students), may still provide a useful initial overview or ‘leads’ to follow, as well as very useful further reading such as links or references to more authoritative sources.

3.3. Date

The publication date may be critically important, or not – this depends entirely on the students’ information needs. The crucial thing is that students develop an automatic date-checking instinct in each information search.

3.4. Appearance

Often overlooked, this criterion can often be the one that gives the first invaluable clues to the quality of a source. Sensitize students to things like font type and size: large non-professional fonts often indicate sources written for children; inappropriate colors and design often suggest non-professional authors. Serious, professional sites usually look just that. In addition, there is increasing availability of academic publications on the Internet, and helping students recognize the surface characteristics of scholarly publications (layout, font, abstract, citations and referencing) enables them to perform the evaluation triage efficiently. It is also important, however, to show them examples of fake or spoof sites, the appearance of which may be very convincing for even skilled web users.

3.5. Reason for writing

Students are often told to avoid ‘biased’ sites. However, it is important to note that bias of varying degrees exists in all writing: investigation of the author’s background may throw up all kinds of academic, political, commercial or personal biases. In addition, a site’s bias may be the very reason that students might want to investigate it further – for example, in researching issues and beliefs of two opposing groups in a current ethnic conflict, a student would learn much from examining a site produced by one of the groups. The key, however, is for students to identify any possible bias, and factor it into their decision-making process when assessing sources.

The initial familiarization session is only the start. During the subsequent classes I get students to apply the RADAR in a variety of activities as they search for valid and usable web sources. These may include worksheets on which they have to document their application of RADAR to a specified number of sources; sharing of experiences in pairs, groups or in class presentations; written analyses of web sources such as annotated bibliographies; or reflective commentaries in essay form. I find that there is a need for constant review of the RADAR approach so that students do not view it as a one-off session. It takes time, practice and frequent reminders for them to realize the need to have their RADAR constantly functioning from the moment they switch on their computers.

4. Student perceptions of RADAR: A small-scale preliminary diary study

In order to assess how students perceive the usability and usefulness of RADAR, I carried out a preliminary case study in my own institution, an English-medium liberal arts college in Greece. Permission to conduct research with human subjects was obtained from the relevant institutional committee. The student body consists mostly of Greek speakers, but includes also some speakers of other languages, including English. The context of the research study was an English composition course with 25 students distributed amongst two classes. Course learning outcomes require students to write

an argumentative research paper and use a variety of print and electronic sources. One week of the course (3 class hours) is allotted to Internet sources, and students have to submit an assignment that demonstrates that they can identify four web sources that are useful and usable for their final paper. During the first session, the RADAR approach was presented, discussed and analysed. After this initial session, students were then invited to participate in the research study; the incentive for doing so was that participation would exempt them from having to submit the reflective essay required as part of the above assignment. Twenty volunteered, three of whom were native English speakers.

A solicited, event-contingent diary study was used as the method of data collection. An event-contingent diary study requests participants to record experiences each time they occur, so in this case students were asked to keep a written record during each session that they spent searching for Internet sources for their assignment over the coming week, and to comment on the degree to which they found RADAR easy to understand, remember and use, the extent to which it helped them make good Internet choices, and anything else they felt was pertinent. This form of data collection was chosen as it has the advantage of yielding much richer data than a questionnaire, which is often done perfunctorily, or interviews, which suffer from the disadvantages of participant problems with recall of events. See Dörnyei [24] and Bailey [25] for further information regarding this approach to data collection. An important additional advantage of using diary studies is that they can benefit participants as well as the researcher, as the activity of recording and reflecting on their experiences may foster a degree of critical reflection and awareness regarding the task in hand, which is precisely the objective of RADAR. Participants were informed that they could write their diary records in any form, that is, handwritten, email or word documents, and in note form or continuous prose. It was stressed that participants should not be at all concerned about the quality of their writing, and that the content of their diaries was the sole object of interest.

The data yielded about 80 pages of written text, which was analysed the first time round according to the categories derived from the guiding questions in the instructions, relating to ease of comprehension, use and recall, and to the perception of the efficacy of RADAR. Further levels of coding were then developed as the data was revisited and significant further themes emerged. Four main themes emerged. Firstly, there was extensive evidence that participants reported finding RADAR both easy to understand and operate. One wrote, 'The beauty of the RADAR is its simple and practical name.' It was also clear that they found it easy to remember. One student commented how 'The fact that it comes so easily to mind does the trick.' Another reported that 'it was easy to remember, as I shared this way of understanding the validation of sites with my friends after the class, without seeing it a second time', and another noted 'Its greatest advantage is that it can be easily remembered ... and it doesn't have to be written down ... It includes all the significant aspects that one should look for in a source.'

Participants also reported that they felt RADAR improved their evaluative faculties. All participants testified to how it caused a positive change in their information searching habits, describing situations where RADAR caused them to reflect on and revise their initial evaluations of web sources and make more informed decisions. One student summed this up: 'It helped me a lot to reconsider the way I searched for sources on the Internet.' One reported how '[previously] I didn't consider who is the author, or about the appearance. But now I understand that plays an important role to get trustful information'; and another that 'Without the RADAR I would have never thought about checking the "About" part of the web page.' One interesting reflection was 'I was surprised about how careful I have to be.' Several respondents commented how RADAR enabled them to make quicker and more efficient decisions, one recounting how 'from the first click the RADAR was useful'. It should be stressed here that, as Metzger et al. [6] point out, reported behaviour by no means translates into actual behaviour or competence. Nevertheless, these initial findings are worth noting.

A noticeable feature of the diaries was the frequent occurrence of positive evaluative adjectives used to describe RADAR. Adjectives such as 'clever', 'meaningful', 'interesting', 'progressive', 'ingenious', 'indispensable', even 'brilliant' were used, and one participant ended his diary with the pronouncement that 'It is a very smart invention, keeping web users from "sharks".' Several students indicated that they felt RADAR could benefit students and researchers, with one stating that 'even an inexperienced researcher can do a very good job'; one pointed out how it could be used with other sources of information, and one remarked how it was useful for her 'everyday life'.

However, what was also very revealing was the feedback from four of the 20 diaries that indicated some degree of participant difficulty or confusion with the RADAR, in particular with using the 'Reason for writing' criterion. Two also noted how they had found PDF files that had no link to websites, and they therefore felt they were unable to assess their usability. The significant point to make here is that all four of these participants had been absent during the introductory session in which the RADAR approach was presented. They had, therefore, not taken part in this highly interactive session in which we work with live Internet sites, which requires student comment and analysis of how each of the RADAR criteria can be applied. The comment by one of my participants bears this out when he wrote how 'The overall participative process [of the introductory session] made it easier for me to understand the criteria by trying to establish them myself.' However, I feel that this is a particularly useful finding, in that it indicates quite how much support students need if they are to become critical users of the web. Simply being given an evaluative tool, albeit one that may be

straightforward and memorable, is not enough; students need to be shown how to operate it, how to apply the skills of critical thinking to this incredibly complex and potentially confusing medium, and to be reminded frequently of the need to operate in constant evaluative mode, that is, to keep their RADAR on at all times. As Harmon concurs, it is most likely their teachers who will play the pivotal role in helping them develop this awareness and apply these skills: 'This needs to occur in every class and every assignment, so that by the time they students leave the university, they have acquired the skills necessary to evaluate that next news report, medical claim or political soundbite' [21].

Clearly this small-scale study was very limited in both scope and purpose, and it makes no claim to supply evidence that positive student perceptions of RADAR might also translate into effective evaluative competence. However, I do feel that it has provided a very useful preliminary indication that RADAR merits consideration and further investigation.

5. Commentary: Merits of the RADAR Approach

I suggest that the RADAR approach may have several merits. Firstly it is an acronym that not only actually means something, but one whose meaning relates directly to its purpose. A metaphorical RADAR does precisely what a literal one does; as one of my respondents wrote, 'it is symbolic'. While there are other extremely useful techniques that have been developed to help students with various reading and evaluation tasks, such as SQ3R, PQ4R, SQ6R, SQ10R or CARS [26], with the exception of the interestingly named CRAAP technique [27], their acronyms are neither intrinsically meaningful nor related to their purpose. I believe that this is significant because, while students may not always recall instantly each of the RADAR criteria, the term itself is memorable, as is its associated concept, that is, the need to be constantly alert to possible information dangers. My small study indicated that students react positively to both the term and the concept.

Secondly, as my research showed clearly, students reported that RADAR has the benefit of being easy to remember and 'operate'. Importantly for non-native speakers of English, the term RADAR and its concept are used in the same form (albeit with a slightly different pronunciation) in many foreign languages, so it poses no problem of understanding or explanation. The data collected from my Greek-speaking students bears witness to this, and the same would apply to speakers of languages ranging from French, Spanish and other European tongues, to Arabic, Hindi, Urdu, Chinese and Japanese. I suggest that the same would apply to teachers as well and that it provides a teacher-friendly tool that can be used by college professors across the disciplines to integrate critical evaluation of web sources into their curricula, as Harmon [21] recommends.

Thirdly, it has the advantage of being short. Both Meola [9] and Metzger [2] point out how long, complex checklists can be self-defeating, as students do not use them, and I suggest that they may be equally off-putting for faculty. Reviewing the research done on users' ability to evaluate online information, Metzger notes that 'research has clearly indicated that the best strategy for educating Internet users will be one that is easy to use and/or is transparent to them'. I suggest that participant responses indicate that RADAR fulfills both these requirements.

A further advantage of RADAR is its palindromic nature. An evaluation of electronic resources (and, for that matter, sources in any format) may be directed by any one of the criteria, in any order, depending on the searcher's particular purpose at any given time. For example, the date of a source or its appearance may provide criteria for instantaneous decision-making.

RADAR also has the potential of wide usability and expandability. All user ages and levels of sophistication can be catered for as its level of sophistication can be ratcheted up according to need and user willingness. I have used it with students ranging from pre-college to final-year levels, but I believe that it can be adapted to all levels of the academic continuum, from school children to postgraduates. Within its framework of developed critical awareness, other well-trying and valuable approaches such as Meola's contextual one can also be accommodated and applied.

A final benefit is that RADAR is not just a mechanical, checking-boxes technique. Instead, it is an approach, an understanding on the part of the information-searcher of the need for a heightened awareness of what is 'out there', for a deliberate scanning device that is constantly working to probe their information surroundings. It meets Metzger's requirement to 'think beyond the checklist model' and fulfils Calkins and Kelley's need for the regular critical evaluative frame of mind [4] that is so important for students to develop if they are to function effectively in the online research world that they all inhabit.

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