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Evaluation of radiography careers information on the Internet☆

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Abstract The purpose of this paper was to investigate whether information about radiography careers that was placed on the Internet was accessible, accurate, understandable, comprehensive, abundant and attractive to a sample of school children. Additionally this paper investigated whether the sample of school children had access to the Internet and whether they knew how to use it. A self-administered questionnaire was used to assess views on the radiography information, Internet access and knowledge of how to use the Internet. Questionnaire data were then analysed and the Websites were ranked. Thirty-three Websites were evaluated; these gave varying qualities of information with questionnaire scores ranging from 188 to 76. This investigation showed that there are many Websites available about radiography as a career. The site that performed most successfully overall in this evaluation was the NHS Careers Website. This site was ranked highest for the design section but the University of Salford's Website performed top for content.

Introduction

The radiography profession is experiencing a staffing crisis[1,2] and the workload of medical imaging departments is rising in line with technological developments and government quality initiatives.[3] This crisis indicates a need to attract more recruits to the profession. As the popularity and usage of the Internet increases in schools,[4,5] this medium could prove a useful tool for improving awareness and interest in radiography. The Internet has the potential to supply very current information,[6–8] however, the information may be misleading, unavailable or difficult to find.

Background to the study

A survey of all health trusts in England reported by the Department of Health[1] showed an overall diagnostic radiographer vacancy rate of 4.4%. The highest rate, with 7.1% of positions vacant, was

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shown to be in London. A survey in Synergy[2] indicated a diagnostic radiography vacancy rate of 6% overall in the United Kingdom. The highest vacancy rate was shown at the radiographer grade, which seemed to indicate that more students need to be trained to fill these posts. This was supported by 27% of the surveyed diagnostic and therapeutic department managers who thought their recruitment problems were partly due to insufficient students being trained. Possible causes of the shortage of students were not explored.

The NHS Plan[9] could exacerbate the recruitment crisis in radiography. For example, the introduction of 24 h one-stop services will increase demand for out of hours services in MRI and CT. Not surprisingly the Royal College of Radiologists[3] reported that the workload of radiology departments had risen greatly in the last few years. The NHS Plan states that an additional 4450 therapists, which include radiographers, will be trained by 2004. This indicates that more training places will be available—additional recruits, therefore, will be required to fill them.

One way to aid the attraction of new recruits into the profession would be through the provision of accurate and comprehensive careers information. Careers guidance can benefit individuals, education providers, employers and the government.[10] Also, with such guidance, people might be more likely to choose a suitable career and less likely to abandon it during their basic training. This in turn may lead to less financial wastage on training.[11,12]

Access to high-quality careers information is perceived as necessary for decision-making.[8,10,13] This suggests that careers information must be comprehensive, accurate and widely available to aid informed choice. The Department for Education and Employment[12] suggests that changes to the careers work curriculum are likely to mean that potential [radiography] students will gather some careers information from the Internet. The amount of information available on the Internet is perceived by careers professionals as valuable.[14,15] It may, however be a disadvantage as potential [radiography] students may become distracted or confused by too much information.[14–18]

Out of date careers information can be unhelpful,[8] so an advantage of using the Internet is the ease of updating information—on a daily basis if necessary.[6–8] It can also be accessed at a time and place convenient to the reader.[19]A study using focus-groups of year 11 pupils (15/16 year olds) and those in post-16 education revealed that potential students wanted a wide range of accessible careers information and welcomed the use of information technology to research for themselves.[20] This indicates that Internet sessions may offer a productive way of researching careers.

The government is highly supportive of Internet use in schools. ''Super Highways for Education''[4] promotes the importance of Internet connection for secondary schools, and ''Connecting the Learning Society''[5] introduces the National Grid for Learning as a tool for pupils to gather Internet-based information. This indicates that, with government support, school children and therefore potential [radiography] students are likely to be using the Internet more and more in lessons.

Specific to radiography, information produced during Radiography Awareness week was used to update the NHS Careers Website indicating that the Internet is valued as a tool for raising awareness. On television, 'Channel 4' supported Radiography Awareness week and promoted radiography on their Website via a link to Brilliant Careers—a Website aimed at the 14 plus age group.[21] Luckett[22] also recommends the use of a Website to represent radiography organisations to help improve recruitment.

Information about radiography presented on the Internet cannot be guaranteed as being useful for those seeking careers information. The quality and utility of information on the Internet is identified as a potential problem by a number of authors.[8,10,14,17,24,25] A possible solution could be to supply a list of quality Websites.[9,24] This provides the justification for Website evaluation. This list could be posted on, for example, the Society of Radiographers' Website with external links to the sites. Such a link has now been included with a link to the Department of Health careers Website.[23]

Information on the Internet may not be attractive to those seeking careers information. Schneiderman[26] suggests that Websites should be targeted at user groups in the same way as marketing but Abels et al.[27] feel this is not often considered. Desirable features for accessible and attractive Websites have been identified.[25,28] It stands to reason that some features will be more important to some users than others. This indicates that Websites about radiography/radiography careers may not be interesting to the people who access them, thus justifying evaluation of such sites.

Aims of the study

The aim of this paper was to investigate whether radiography careers information placed on the

Internet was accessible, accurate, understandable, comprehensive, abundant and attractive to the sample of school children. The paper also investigates whether these school children had access to the Internet and also whether they knew how to use it.

Target population

Section 43 of the Education Act 1997[29] states that school pupils must receive careers education between the ages of 14 and 16. School pupils aged 14–17 years were therefore identified as the target population as they may be considering their career choice and would have experience of using the Internet within school.

The research tool

A self-administered questionnaire was used to investigate the views of the school children. Their ages ranged between 15 and 16 years. The questionnaire offered speed of completion and reduced interviewer bias on comparison with interviewer-administered questionnaires.[31,32] The availability of the interviewer to answer questions reduced the chance of respondents making mistakes.

Likert scales were selected for use in the questionnaire as they can be used to measure opinions[32] and they can be easier to construct than other attitude scales. The ability to check for internal validity of results[33] is also an advantage. Likert scales give a closed response format which can introduce bias if the respondent's views are not represented in the responses offered.[34] However, completion can be quick, which was important because the school children would have to complete the questionnaires within lesson time. On the Likert scale a sixth column was included to allow the school children to indicate if they had not heard of the subject. This approach is suggested by Oppenheim[33] for questionnaires designed for children.

Questionnaire design validity

The categories under which Likert items were designed were taken from literature about Website design, careers information and from the researcher's knowledge about radiography (Table 1). The scales were developed using the method described in the literature.[30,34] Research[30] suggested the inclusion of up to 20 items for each section in the questionnaire allowing triangulation of responses between items that assessed the same opinion area. It was not possible to include such a large number so eight items for each section were incorporated. This risked compromising the internal validity of the questionnaire but was necessary to allow completion of the questionnaire within a reasonable time. The items were arranged in random order, as recommended. Problems with respondents tending to agree with items and with habitual use of one response[36] were addressed by including both positive and negative affirmation bias.[32]

The internal consistency of the items was calculated for each section using coefficient alpha with SPSS. This measured how well the items in a section intercorrelate to allocate a score.[37] Likert scores are ordinal, but use of such tests on high quality ordinal data has been condoned as results do not vary greatly from non-parametric tests.[32] Demographic data were also acquired from the children.

Pilot results

The pilot was conducted on a sample of 17 'first year college students' of similar age and experience to the target population. The coefficient alpha was calculated for each section and items deleted accordingly to raise the score. Nunnally[38] suggests an alpha score of above 0.7 is necessary for internal consistency but it was not possible to obtain this score in all sections. Alpha coefficients between 0.485 and 0.851 were achieved. This questionnaire was not re-piloted, as would be ideal,[35,37] due to the timescale of the project.

Table 1 Categories for questionnaire construction

Internet subjects	Career information subjects
1. Download time of Websites	1. Money earned
2. Sound on the Internet	2. Image of profession
3. Video on the Internet	3. Qualifications necessary
4. External links	4. Career prospects
5. Graphics on the Internet	5. Job description
6. Navigation of Websites	
7. Searching the Internet	
8. Access to the Internet	
9. Contacting authors	
10. Skills to use the Internet	

Data collection

A convenience sample of 45 year 11 pupils (15 and 16 year olds) was surveyed. Twenty-seven (60%) were from one school and 18 (40%) from another. As only two schools were sampled the transferability of the results is questionable. Sixty-seven percent of the sample was female which was representative of the gender distribution of the classes sampled as the response rate was 96%.

Data analysis

Coefficient alpha was generated for each section of the questionnaire. These gave scores below 0.7 for all sections except money, suggesting poor internal consistency.[38] Failure of items to intercorrelate suggests they do not measure the same construct,[37] therefore it was not possible to analyse the data in sections as planned. The responses from the most appropriate items were instead selected for use in the results. This negated the benefits of triangulation of results usually offered by Likert scales so findings were treated cautiously.

Website evaluation

The Websites were assessed to ascertain their suitability for supplying careers information to secondary school pupils by allocating a numerical score against set criteria for design and content. This allowed the results to be statistically analysed and compared between Websites. The criteria used were the same as the categories in the questionnaire as it was planned to compare the scores. This could not be done due to the low internal consistency achieved in the Likert scales. The abundance and utility of the information was commented on once the evaluations were complete.

In an attempt to increase the objectivity, a method similar to that demonstrated by Everhart[39] and Langan[40] was employed. Evaluation criteria were given quotas, which the Website must fulfil in order to gain a particular score. The Websites to be evaluated were selected with inclusion and exclusion criteria—these are identified in Table 2. The Website evaluations were conducted between February 22nd and March 29th 2002.

The rationale for the inclusion criteria was that the three search engines were the most visited UK search engines.[41] The four search terms were fairly straightforward as this is the crux of the research and research shows[42] that people accessing the Web only look at around the first 100 sites in a results list. Information from other countries may not be relevant for the UK, e.g. salary, hours. Sixty seconds was considered a reasonable time to wait for the information to download and three attempts were made to allow for connection variation on different days.

The rationale for the exclusion criteria was to exclude sites which would have little or no relevant information to the subject. Access to veterinary or industrial Websites may be interesting and distract the searcher from his/her task and the focus of the research is on diagnostic imaging.

Discussion of the results

Thirty-three Websites were evaluated in total and gave varying qualities of information and

Table 2 Inclusion and exclusion criteria used for Website selection

Inclusion criteria	Exclusion criteria
• Must appear in a search/searches conducted in: MSN.co.uk Yahoo.co.uk Ask.co.uk • And using the terms: radiography careers + radiography careers careers + healthcare • Must appear in the top 100 results of these searches. • Must be a UK based Website. • Must contain more than a brief reference to radiography. • Must download in less than 60 s in three attempts on different days.	Must not be: • Pure advertising. • A recruitment orientated Website. • Purely a portal for other sites. • Dedicated to postgraduate or extended roles. • About industrial radiography. • About veterinary radiography.

presentation—the scores ranged from 188 to 76. The Websites achieving the 10 highest scores are shown in Table 3.

Figs. 1 and 2 show the percentage of the available score for each category that was achieved by the highest scoring and the ranked tenth Websites. This highlights the variable quality encountered.

The results were analysed under the section headings as identified in Table 1.

Internet subjects

The majority of the children felt that they would not look at a Website that was taking too long to download. Nine of the top ten Websites scored well in this section. Websites did not score as well with regard to sound and video use—only one included sound and one video. This was unfortunate as most of the children thought the use of these features improves the interest of a Website. This indicates a shortfall in existing sites aimed at school leavers.

The opinions given on external links indicated that they are considered useful for finding more information, but may take the reader to unhelpful sites. With the exception of one site, the top 10 Websites scored highly in this area with relevant and well-labelled links. There was variation in the scores of the top 10 sites for graphics. There was consensus amongst the children that graphics make a Website more interesting but some sites, with large areas of text and little graphical enhancement, scored poorly.

Although the children agreed that being unable to find a way around a Website was annoying, the result should be treated cautiously as examination of the item showed it was worded in a way that deterred disagreement. The top 10 Websites scored highly for navigation with ease of use, consistency and speed being key factors. Most respondents felt that looking through different Websites to find information took too long, so searchability could be an important factor in Website design for school children. Indeed, if a Website performs badly in search engines it may not be accessed by potential users at all. One of the highest quality Websites scored very disappointingly in the searchability analysis, indicating that it may not be identified by many users of the Web.

The Websites scored poorly regarding the information supplied to allow contact with the author. The results indicate that children may wish to obtain information from experts that could be facilitated if contact information was supplied. Eighty-two percent of the children had their own e-mail address which could indicate that many of them have Internet access and the majority of the children felt they possess the necessary skills to use the Internet adequately.

Career information subjects

Most Websites did not provide information on the salary of a radiographer and only one site scored well with regard to information on career prospects. The results of the survey indicated that

Table 3 The scores achieved by the top 10 Websites

Website	Design score	Content score	Total score
Non-university Websites			
NHS careers: http://www.nhscareers.nhs.uk	126	62	188
X-ray 2000: http://www.xray2000.f9.co.uk	121	32	153
British Broadcasting Corporation (BBC): http://www.bbc.co.uk/education/work	102	38	140
University affiliated Websites			
University of Hertforshire (by Martin Vosper): http://www.mvosper.freeserve.co.uk/Radiography/Page_3x.html	122	64	186
Queen Margaret University College (QMUC): http://www.qmuc.ac.uk/rad/	110	65	175
University of Salford: http://www.healthcare.salford.ac.uk	102	73	175
University of Wales College of Medicine (UWCM): http://www.uwcm.ac.uk	114	55	169
City University: http://www.city.ac.uk	119	40	159
Kingston University: http://www.healthcare.ac.uk	99	55	154
Portsmouth University: http://www.port.ac.uk	104	35	139

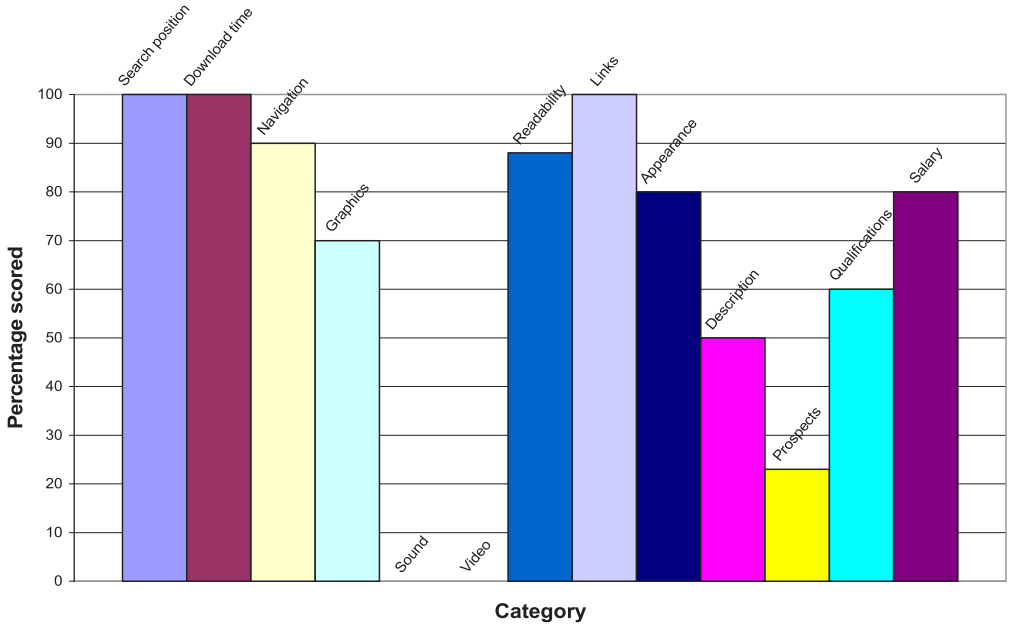

Figure 1 The percentage of the available score achieved in each category by the highest scoring Website.

salary and prospects were important to the school children that could highlight a deficiency in the information available. The children felt that a full job description was necessary to decide on the suitability of a job. However, a job description without the inclusion of career prospects information could be misleading.

Most children would like a job that makes them respected. This is of significance to the appearance of a Website as it affects the impression a reader might form of the organisation represented. The top 10 Websites were presented professionally and consistently which could influence the image school children form of radiography.

Most of the children acknowledged the importance of taking A-levels related to their chosen career. Only one site achieved full marks in the qualifications section and a number of universities scored quite poorly considering they offer radiography courses. It was realised after the survey

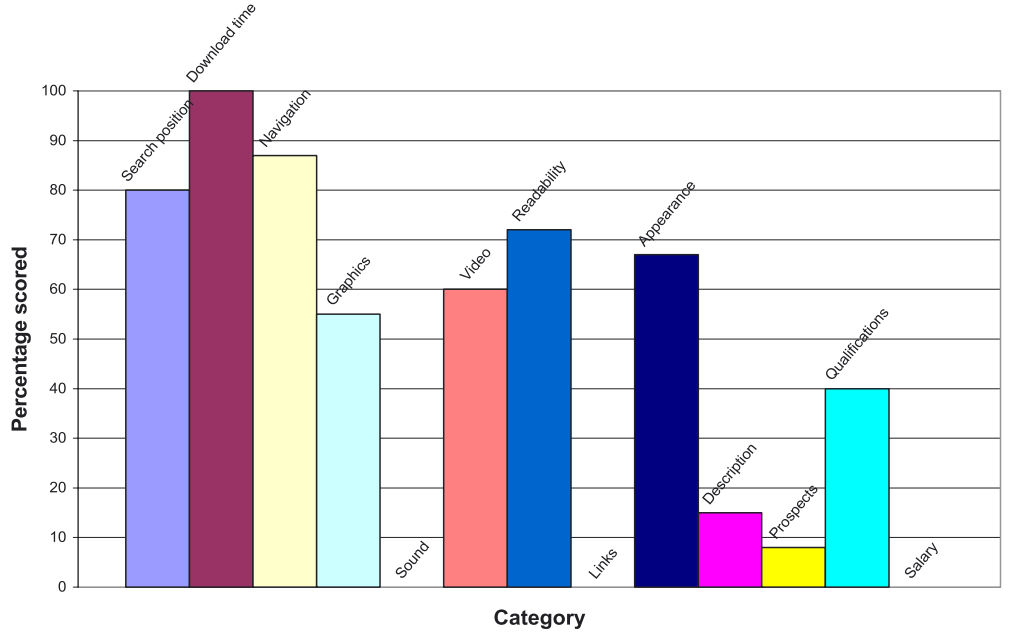

Figure 2 The percentage of the available score achieved in each category by the Website ranked tenth.

was conducted that no allowance was made in the section on qualifications for those not wishing to do A-levels. It is possible that such pupils may enter radiography through an access course. It is unknown how these pupils responded to the items.

Limitations

As in all studies there are limitations to this study. The researchers have identified some limitations which may have affected the results. Although they were identified as the most popular in a survey by Jupiter MMXI,[41] the search engines used in the evaluation may not be those preferred by teenagers and they may have used dissimilar search terms.

Another, unavoidable, limitation is that this evaluation is already out-dated, as the Internet changes so quickly.[6] Since this appraisal was conducted new Websites may have been introduced containing higher quality information than those seen in this evaluation. Indeed, the Society of Radiographers Website—a notable absence from the list of best Websites with its rank 23—has recently been updated.

Conclusion

This investigation has shown that there were many Websites available about radiography as a career. The sites were, however, of variable quality and consequently have varying degrees of accessibility, accuracy, comprehension and utility. The site which performed most successfully in this evaluation was the NHS Careers Website. This could be expected due to the high profile NHS recruitment drive currently underway. Its strongest aspect was its design. Vosper's site (from Hertford University) performed well in both the design and content sections. The University of Salford's Website, however, performed top in the content section, perhaps indicating this would be the most useful of the sites due to its accuracy and comprehension.

Although numerous Websites were identified as containing radiography information, it is felt that only the top five contained enough information to be useful alone. The other Websites, of course, serve a purpose of raising awareness of radiography and eliciting initial interest—particularly encouraging was the inclusion of the profession on the BBC Website. Links from the less comprehensive Websites to NHS Careers were common and highly appropriate.

The evaluation highlighted common shortfalls in existing Websites. It seemed that sound and video clips could improve interest for school children but these were under-utilised in the Websites. There was a lack of information on earnings of radiographers, career prospects and the qualifications necessary for entry without A-levels.

In conclusion, information about radiography careers is available on the Internet in a variety of forms. It may, however, be necessary for people to search fully and visit a number of sites to gain adequate information presented in a manner considered attractive.

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