Improving the Literacy of Medical Students: A Collective Knowledge Management Effort by the University for Development Studies Medical School in Ghana and the Community Surrounding the University

Augustine Aduko Alu
St John Bosco’s College of Education, Accra, Ghana

Roland Bardy
Florida Gulf Coast University, Florida, USA

Perpetua S. Dadzie
University of Ghana, Accra, Ghana

The purpose of the study is to show how a collective knowledge management effort was undertaken in a low-tech environment yields outcomes that benefit all participants of the effort—students and staff of a medical school, the medical profession in the community, paramedics, and the community at large. It also demonstrates that acquainting students with knowledge management skills early and improving their information literacy. If they can effectively manage their knowledge resources in close connection with all members of the society around their school, the benefits will be improving academic efficiency, diagnostic effectiveness, and feedback from medical institutions and patients. The study descends from the Medical Library Association’s definition of health information literacy. It uses a survey at the University for Development Studies (UDS) in Tamale, Ghana, to examine the information and literacy skills of its medical students. Also, it explores the level of awareness of the various databases to which the university library is subscribed, the benefits of information literacy skills, and the challenges that students face in identifying and using information sources. From there, the paper explores avenues for improving the situation of the students of which the optimal is conjoining resources in and outside the medical school. Linking faculty, students, and medical professionals in the university’s local environment in a collective endeavour for enhancing the literacy skills proper can result in a shared inventory of tools that help to discriminate, which information is needed and which is redundant. From this foundation, students would develop abilities to understand knowledge management and know how to apply it in their specific field of professionalization. The sample was selected from doctoral students in a single institution in the field of education. Also, the sample was self-selected and relatively small. There is a caveat, therefore, for generalizing the findings to other doctoral student populations. This study is useful to health administrators and faculty members, because issues concerning the importance of information literacy skills do not only apply to UDS, Tamale, but to other medical institutions in...
Africa as well. The study provides university libraries with reliable data on the need for and the effectiveness of information literacy instruction and it enables the librarians to strategize how to improve the instructions they provide. The medical profession highly depends on the adequacy of diagnosis and therapy selection, and for this, any medical professional must be capable to access and use state of the art information sources. There are only a few studies around the topic of medical literacy and almost none for developing countries. But the results of the other studies corroborate the findings of this paper to a great extent.

Keywords: literacy skills, community, knowledge management, medical students, universities, Ghana

Introduction

Information literacy is defined by the American Library Association (2000) to be a “set of abilities, requiring individuals to recognize when information is needed and to have the ability to locate, evaluate, and use the needed information effectively.” It entails finding and locating sources, analyzing and synthesizing the material, evaluating the credibility of the source, using and citing ethically and legally, focusing topics, and formulating research questions in an accurate, effective, and efficient manner (Eisenberg, Lowe, & Spitzer, 2004). Information literacy is recognized as one of the important facets in teaching and learning, because it catalyzes individuals to engage in a variety of learning situations and opportunities in optimal ways (Greenhow, Robelia, & Hughes, 2009). With the rapidly changing and expanding information sources available in a networked world, information literacy instruction is needed to provide students with the necessary skills to succeed in this environment (Booth, 2011).

The above definition is closely linked to the definition of health information literacy as provided by the Medical Library Association (2015). It states that health information literacy is the “set of abilities needed to recognize a health information need, identify likely information sources and use them to retrieve relevant information, assess the quality of the information and its applicability to a specific situation, and analyze, understand, and use the information to make good health decisions.”

Both definitions stress the need to build competencies and skills, such as the ability to recognize when information is needed and to have the capacity to locate, evaluate, and use information effectively. Information literacy does not only facilitate engagement with effective decision-making, problem-solving, and research, but also enables the learner to take responsibility for continued learning in areas of personal or professional interest. It is through the effective instruction of information literacy skills that the learner is prepared for college and career success in order to contribute to society (Jacobson & Mark, 2000). It is thus argued that information literacy instruction can help medical students with tools to approach medical literature in an organized and efficient manner to locate, evaluate, and use information effectively to accomplish a specific purpose. Thus, a first research topic of the paper is to examine what can be achieved by purposefully offering and properly following such instruction.

There is a second research issue that beyond the topic of information literacy instruction, the effort has to extend beyond just providing the appropriate technical skills. The challenge lies with making faculty aware that merely teaching technical skills fall short of the mission to provide a holistic education. It is crucial in all areas of science, but even more important in the field of medicine, because insufficient knowledge of physicians may directly affect human life. The solution that is studied in this paper would be to link faculty, students, and medical professionals in the university’s local environment in a collective endeavour for enhancing both the
awareness for developing appropriate literacy skills and the literacy skills proper. In consequence, a shared inventory of techniques would be built that help to discriminate, which information is needed and which is redundant. This raises the question, both from a theoretical and a practical perspective, which nexus exists or should be established between information literacy and knowledge management and how to apply a combination of both in the specific field of medical professionalization. With regard to the area of medical studies, this would not only enable students and graduates to make better use of library resources, internet resources, and other suppliers of information, but also better prepare them for their professional career as physicians were retrieving and sharing information is of the essence.

The paper uses the example of medical students who are enrolled in the University for Development Studies (UDS) in Tamale, Ghana. Research on information literacy in higher education in Ghana has been conducted by various scholars (Dadzie, 2009, 2007; Anafo & Filson, 2014). These researchers largely examined information literacy in general. By contrast, this paper examines information literacy skills from the perspective of the medical students’ ability to recognize a health information need, to identify likely information sources, and to use them for retrieving relevant information in order to make good health decisions. This part of the analysis is intended to determine the proficiency level of medical students in accessing information from both print and electronic sources, to make informed decisions, and to develop solutions for improvement.

A preliminary study conducted by the authors revealed the shortcomings of the medical students’ ability to utilize the library resources and especially the electronic databases. The question was whether this is due to inadequate information literacy skills or to the propensity for using easily available tools, such as Wikipedia and Google to satisfy information needs. As it was found out that it is this propensity which results in a low patronage of medical students to the Tamale Campus Library (2014) in UDS, the necessary remedies needed to be explored.

Therefore, the outcome will be reported below in a second survey and the objective was to:

1. Determine the challenges students face in identifying and using information sources;
2. Investigate the awareness of the library resources including various databases available to students and to analyze which formats and which sources they use;
3. Ascertain the relevance and benefits of information literacy skills to students.

From the findings of this analysis, the paper develops recommendations for improvement, which are based on the following questions:

1. How can the students approach the challenges they meet?
2. Which support is needed by faculty and librarians?
3. Which resources can be activated from the university’s relations to the professional community?

Embarking on the possible causes for low literacy, a line of remedies is drawn from literacy training to developing a notion of knowledge management. For this, the paper explores theoretical avenues that conjoin the two concepts and exhibits some best practice cases. Applying this to the case of the medical students at UDS, the solution that is presented here would be that faculty, students, and medical professionals in the university’s local environment join in a collective endeavour to build a shared inventory of tools that help to discriminate which information is needed, which is redundant, and how to deploy it in their profession.
Literature Review

There are two streams of literature, which are relevant to the research topics of this paper. One is on the practice of information literacy instruction, and the other is on the nexus between information literacy instruction and knowledge management. Information literacy instruction is not only relevant but also beneficial to students. Jacobson and Mark (2000) affirmed that the development of information literacy does not only facilitate engagement with effective decision-making, problem-solving, and research, but also enables medical students to take responsibility for continued learning in areas of personal or professional interest. Information literacy programmes, without doubt, equip students with the skills to find, evaluate, and manage the information they need for their academic work. This is evident in a study by Secker and Macrae-Gibson (2011) at the London School of Economics and Political Science, in which student confidence on finding published literature was 2.9% before attending the programme and became 4.3% after the programme. Other studies exhibit how information literacy instruction can help students to appropriately use digital resources to succeed in their academic endeavors. The need for effective instruction in information literacy is stressed among others (Jacobson & Mark, 2000). Not only, they said, will instruction of this type prepare the students for college and career success, but also for becoming contributing members of society. All researchers agree that information literacy creates the foundation for lifelong learning through the process of students assuming control for their own learning (American Association of College and Research Libraries [ACRL], 2000; Lakos & Phipps, 2004; Phillips & Kearley, 2003). Ani, Ngulube, and Onyancha (2014) and Sivathassan and Velnampy (2013) had reported both faculty and students’ use of e-resources to access information available worldwide for teaching, learning, and research. Ani, Ngulube, and Onyancha (2014) drew a result between electronic and information resources (EIRs) accessibility and utilization on the productivity of academic staff in surveyed universities and reported a positive correlation. It explained that increase in access and use of e-resources will lead to increased productivity of academic staff. Information literacy helps to find ones way through many sources of information without becoming overwhelmed and overloaded. A specific prerequisite is awareness.

Awareness of any library service or activity is of paramount importance as patronage would be impossible when there is lack of awareness. Many scholarly works have been done on awareness of the various electronic databases offered by many university libraries worldwide. Studies by Nisha and Ali (2013), Chirra and Madhusudhan (2009) all revealed that clients were aware of and used the electronic databases available to them. In their study, for instance, Chirra and Madhusudhan (2009) confirmed the use of electronic journals by doctoral research scholars of Goa University, India. It revealed that 100% respondents were aware of the electronic journals of the consortium and accessed them. Awareness can be improved by marketing efforts of libraries. Marketing by the libraries, which serves to convince students of the attractiveness of library resources is also a field of research (Manda 2005; Ibrahim, 2004). Ibrahim’s (2004) study on “Use and user perception of electronic resources in the United Arab Emirates University (UAEU)” makes an attempt to measure the use and perception of the UAEU faculty members of electronic resources. Ibrahim (2004) opined that the frequency of use of electronic resources was low because of the time needed to focus on teaching, lack of awareness to electronic resources provided by the library, ineffective communication channels, and language barrier. Other researchers report similar results (Mohammadi & Abdolhoseinzadeh, 2008; Habibi, Farzy, & LotfollahZade, 2008; Rasool, 2007).
What has also been reported in the literature is the challenges, which students face in identifying and using information sources. In their study of undergraduate students at Ashesi University, Ghana, Anafo and Filson (2014) reported that students have difficulty in identifying the citation to a journal article. The study also found that the majority of the students were not able to access information because of lack of skills in terms of concept identification, search strategies, information sources, and ethical and legal use of information. Similar findings were noted in another study by Sasikala and Dhanaraj (2010), which was conducted at Andhara University to assess the information literacy skills among science students, and two others on Kenyan students (Tilvawala, Myers, & Andrade, 2009), and students in Nigeria (Baro, Endouware, & Ubogu, 2011) and Zambia (Akakandelwa & Makondo, 2008). Our research discovered that more than 50% students did not have knowledge about citation styles. One reason may be that the “digitally savvy” (Jones & Flannigan, 2006) or the “Google generation” (those born after 1993 with little or no recollection of life before the web) are searching for and researching content in new ways and very often do not account for what they believe to be unnecessary formalism (Rowlands et al., 2008). This sometimes jeopardizes the advances that can be accomplished through using the World Wide Web. Sellen (2002) asserted that information, which previously had been difficult to access or entirely inaccessible is changing the paradigm of scholarly communication (p. 120). Therefore, she stated that information literacy can be a helpful tool when trying to make sense of the new ways, in which information is being created and disseminated. Through this understanding, students gain a framework to evaluate the impact of these technologies on the decisions and choices they make, but they also tend to refrain from adhering to formalities (Sellen, 2002). Likewise, Koch (2001) indicated that information is often not evaluated before use. He stated that users need to have the ability to critically assess and evaluate the needed information. Hawes (1994) opined that the base for effective problem-solving and decision-making lies in the ability to effectively and efficiently access and evaluate information.

With regard to this paper’s second research question, i.e., on the linkage to knowledge management, writings that explicitly connect information literacy instruction to knowledge management are astonishingly scarce in the literature. While this linkage is depicted to be a major concern (Ferguson, 2009, Davenport, 2004, Loon & Al-Hawamdeh, 2002; Marcum, 2002; Chowdhury, 2004), the practice of incorporating knowledge management into library and information science education is not very well documented (Roknuzzaman & Umemoto, 2008).

### The Assessment

Assessing information literacy is a rapidly growing focus of institutions of higher education. If libraries intend to remain relevant on campus, they must demonstrate their contributions to the mission of the institution by becoming involved in understanding and improving student learning. This is particularly true in the area of information literacy instruction and librarians in developed countries have adopted various frameworks of assessment, in order to enable them to facilitate learning, increase instructional quality, and answer calls for accountability (Oakleaf, 2009). Cyclical models have been developed, e.g., for the United States (U.S.) Association of Student Personnel Administrators (Bresciani, Zelna, & Anderson, 2004), self-efficacy scales were suggested and tested by teachers’ associations (Serap Kurbanoglu, Akkoyunlu, & Umay, 2006). There have been attempts by United Nations Educational, Scientific, and Cultural Organization (UNESCO) to develop information literacy indicators (Catts & Lau, 2008). However, any assessment process must be adapted to the practicalities of the institution, which carries them out. Many sophisticated procedures have not grown
beyond testing phases (Williams & Coles, 2007). For the purpose of this paper, the idea was to deploy a simple survey that would answer the question as to how proficient are the medical students with regard to awareness, usage, and valuation of their information retrievals and how far this is based on the literacy skills instructions that are provided by the school.

The next sections will present the survey environment, the methodology, and the findings. Then, in discussing the findings, reasons for the situation will be gleaned, which will then lead to the second part of the research, i.e., determining the best possible avenue for improvement.

Methodology

The authors conducted a survey, distributing a questionnaire to all the fourth-year medical students numbering 150 students out of which 100 useable responses were obtained (the response rate is 66%). The data collected were analysed by using the Statistical Package for the Social Sciences (SPSS) version 2014.

All respondents were fourth-year medical students who are majoring in human biology. The researchers used this category of students, because they require a lot of information to be abreast of new trends in the medical field. Also, the fourth-year human biology students have been in the university for four years and might have some amount of knowledge in information literacy skills. The questionnaire comprised open and closed questions. The major sections investigated were the respondents’ awareness level of the various databases, identification of various formats in which the information was available, benefits of information literacy skills to students, identification of the various sources for needed information, and identification of the challenges in identifying and using information sources. For the collection of data, the researchers visited the respondents at the various classrooms 15 minutes before lectures or immediately after lectures.

With regard to the response rate of 66%, we are close to what Baruch (1999) noted about an average response rate for questionnaires of significantly less than 100% for surveys published academically in studies. While we should not expect a full response in studies where responding is voluntary (Demaio, 1980), scholars utilizing questionnaires aim to have return rates as high as possible.

Out of the 100 respondents, 71 (71%) were male and 29 (29%) were female. The majority (92%) of the respondents were at the ages of 20-29 years old, while 8% respondents were at the ages of 30-39 years old.

Findings

Awareness and use of library resources. The analysis sought to confirm the frequency of use of the library. Thirty-two percent of the respondents visited the library frequently, 48% did not visit the library frequently, while 19% respondents stated “Rarely.” Respondents were asked whether they had any experience in using the library resources, such as Online Public Access Catalogue (OPAC), e-resources, etc. The results revealed that 36% human biology students use the library resources, while 64% of them did not patronize the resources. A related question on respondents’ competency revealed that more than half (64%) of them did not feel competent or felt somehow competent in using library resources. Only 14% were very competent and competent. Table 1 portrays the findings.

The respondents were asked if they are aware of the databases of the library. The library subscribes to Medline, PubMed Central (PMC), Hinari, Science Direct, Educational Resources Information Center (ERIC), and Educational Literature. To this, 28% responded in the affirmative, while the majority (72%) of the respondents answered “No.” This implies that most of the medical students were not aware of the library’s databases. A follow-up question was asked on how respondents would grade the UDS library databases. The
results show that 14 (14%) of the respondents graded the databases “Very competent” and “competent” respectively, while 34% respondents indicated “Somehow competent.” However, 52% respondents indicated “Not competent” and “No response”

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very competent</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Competent</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Somehow competent</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Not competent</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>No response</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Benefits of information literacy skills.** On a scale of 1-4 (1 = “Strongly disagree,” 2 = “Disagree,” 3 = “Agree,” and 4 = “Strongly agree”), respondents were asked to indicate their views on the benefits of information literacy skills.

Students were first asked to confirm who an information literate person was. Regarding the statement that an information literate student is one who knows, when and why they need information, where to find it, and how to evaluate, use, and communicate it in an ethical manner. Thirty percent of the respondents strongly agreed, while 64% agreed to the statement. However, 4% and 2% disagreed and strongly disagreed respectively with it. Generally, the results show that majority of the respondents believed that information literacy skills helped them to know where to search for information, how to evaluate, use, and communicate such information in an ethical manner.

In a follow-up statement, the researchers sought to find out how important information literacy skills were to students. The study revealed that almost all, 98% affirmed that information literacy skills were very important, while 2% indicated somehow important.

Respondents were also asked whether information literacy competencies were important to students’ research and life-long learning. The results clearly show the opinion of the majority of the respondents to this question—98% respondents affirmed the question, while 2% respondents disagreed with it.

With regard to one of the benefits of information literacy, virtually all respondents, 96% agreed that the skills acquired assisted students in learning to find, use, and evaluate information, becoming information literate.

A further statement sought to ascertain whether information literacy competencies provided students with a framework for gaining control over how they interact with information in their environments. With regard to this, 88% agreed that information literacy skills enabled skills to evaluate and communicate information in an ethical manner. On the other hand, only 11% disagreed.

**Formats, levels, and sources of information.** Respondents were asked to indicate the format in which they wanted the information. The result of the study reveals that 61% respondents wanted information in the print form whereas 39% respondents needed information online. This may be a result of unawareness of the databases or the lack of skills to assess information electronically or the lack of equipment to assess information.

A related question was for the respondents to indicate the level of information needed. The study observed that 16% respondents needed information at the basic level, while 48% respondents needed it at the moderate
level. However, 36% respondents needed information at the advanced level.

Respondents were then asked to indicate the format they wanted information. The results of the study reveal that 61% respondents wanted information in the print form whereas 38% respondents need information online.

With regard to the various sources of information, respondents were asked to indicate the various sources students consulted frequently for information. The results show that 26 (10%) of the respondents consulted journal articles, while 94 (36%) of the respondents referred to books. The encyclopedia and Google were consulted by 41 (15%) and 89 (34%) respectively for information. Other sources were cited by 14 (5%) of respondents were permitted to choose multiple answers (see Table 2).

Table 2
Sources of Information (Source: Field Data in 2014).

<table>
<thead>
<tr>
<th>Sources</th>
<th>Frequencies</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal article</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>Books</td>
<td>94</td>
<td>36</td>
</tr>
<tr>
<td>Encyclopedia</td>
<td>41</td>
<td>15</td>
</tr>
<tr>
<td>Google</td>
<td>89</td>
<td>34</td>
</tr>
<tr>
<td>Other sources</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. N = 100. (There were more than one response allowed)

Search strategies for identifying and locating information. The respondents were asked to indicate the search strategies they use in identifying and locating information. The results show that 89 (35%) of the respondents use “the title” in the search for information, while 83 (33%) use “the subject” in the quest for information. However, 65 (26%) and 10 (6%) of the respondents use “the author” and “the International Standard Book Number (ISBN)” respectively to seek for information. Respondents were permitted to choose multiple answers. A summary of the results is shown below (see Table 3).

Table 3
Search Strategies (Source: Field Data in 2014)

<table>
<thead>
<tr>
<th>Search option</th>
<th>Frequencies</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The title</td>
<td>89</td>
<td>35</td>
</tr>
<tr>
<td>The subject</td>
<td>83</td>
<td>33</td>
</tr>
<tr>
<td>The author</td>
<td>65</td>
<td>26</td>
</tr>
<tr>
<td>The ISBN</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>251</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. N = 100. (There were more than one response allowed)

Challenges of identifying, using, and evaluating information sources. Use of Boolean operators (And, or, not). Another tool used in locating information is the Boolean operators. Respondents were asked to indicate their awareness of the Boolean operators. The results revealed that 73 (73%) of the respondents answered “No” when they were asked whether they were aware of the Boolean operators, while only 27 (27%) of the respondents were aware of this operators.

A follow-up question on the tools students use in locating information in the library revealed that 65 (46%) of the respondents use the library catalogue in locating information in the library, while 27 (19%) and 40 (28%)
of the respondents respectively use bibliographies, and abstracts and indexes, while 11 (7%) of the respondents indicated OPAC (see Table 4).

Table 4

<table>
<thead>
<tr>
<th>Information Location Tools (Source: Field Data in 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location Tools</strong></td>
</tr>
<tr>
<td>Library catalogue</td>
</tr>
<tr>
<td>Bibliographies</td>
</tr>
<tr>
<td>Abstracts and indexes</td>
</tr>
<tr>
<td>OPAC</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

*Note. N = 100. (There were more than one response allowed)*

A follow-up question was asked of respondents to indicate which operator when combined with keywords will retrieve the greatest number of records. The study revealed that 12% respondents indicated “And,” while 14% respondents indicated “Or.” However, 65% respondents did not respond. The implication is that a large majority of the students did not understand the Boolean operators. This supports Ali et al. (2010) who surveyed engineering students and found that most do not know which Boolean operators to use are not aware of the use of a database thesaurus and search indexes to use in an OPAC system.

**Copyright and fair use.** With regards to respondents’ knowledge of copyright and fair use, results in Table 5 were obtained—52 (52%) responded “Yes,” while 48 (48%) responded “No.” This result clearly indicates that students have knowledge of copyright and fair use law (see Table 5).

Table 5

<table>
<thead>
<tr>
<th>Knowledge of Copyright and Fair Use (Source: Field Data in 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

**Plagiarism.** Respondents’ awareness of plagiarism was also solicited. The study, therefore, revealed that 71 (71%) of the respondents are aware of plagiarism, while 28 (28%) of the students were not aware of it. There was only one (1%) no response (see Table 6). This result gives a fair idea that a lot of the respondents are aware of the plagiarism.

Table 6

<table>
<thead>
<tr>
<th>Awareness of Plagiarism (Source: Field Data in 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Response</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>No response</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

**Evaluating information resources.** To assess the ability of students to evaluate the quality of resources retrieved, respondents were asked to rate their responses. The data reveal that 37% respondents have the ability
to evaluate the quality of resources, while 53% respondents opined “Fair.” However, 9% students indicated “Poor.” The results are shown in Table 7.

Table 7

<p>| Ability to Evaluate the Quality of Resources Discovered (Source: Field Data in 2014) |
|---------------------------------------------|---------------------------------------------|</p>
<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Good</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Fair</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Poor</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Citation. The knowledge about citation is a vital trait of information literacy. Thus, the awareness of citations among the students was solicited. The data indicates that 47% students have the ability to cite resources appropriately. However, 45% respondents indicated “Fair,” while 8% students rated poorly. It is clear that majority of the students do not have a full understanding of how to cite resources appropriately (see Table 8).

Table 8

<p>| Ability to Cite Resources Appropriately (Source: Field Data in 2014) |
|---------------------------------------------|---------------------------------------------|</p>
<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Good</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Fair</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Poor</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion of the Findings

The study revealed that a total of 52% respondents indicated they do not feel competent in using the library resources. Also, 72% respondents answered “No” when they were asked whether they were aware of the databases of the library. This implies that most of the doctors/medical students are not aware of the library’s databases. When respondents were asked whether they have any experience in using the library resources, the answers showed that 36% students use the library resources while 64% of them do not patronize the resources. Regarding the usage of various electronic information resources, the answers on awareness about online and offline databases indicated that despite their usefulness and easy access, these resources were not known. Lack of sufficient awareness of electronic resources and not being familiar with the electronic resources retrieval methods are the other important obstacles.

This coincides with results reported by Manda (2005) and Dadzie (2005) who also found that respondents were not aware of most of the electronic resources provided for them in their respective institutions and therefore did not use them. This may also be due to insufficient “marketing” by the respective library. For instance, Manda (2005) stated for educational and research institutions in Tanzanian that Programme for the Enhancement of Research Information (PERI) resources, providing Internet access to the Global Health Website were underutilized, because potential users were not aware of the resources, but not the libraries did not make them known properly.
What is more, students were very knowledgeable about the benefits of information literacy skills. The majority of the respondents believed that information literacy skills help them to know where to search for information, how to evaluate, use, and communicate such information in an ethical manner. They acknowledge that information literacy skills give them the opportunity to know how to search and handle information and that these skills equip them with a framework for gaining control over how they interact with information in their environments. They accept the fact that lifelong learning has become a must and the information widely used in teaching, learning, training, and research activities are steadily growing in electronic environments (Sofia & Lazaros, 2011). They also accept that these are challenges they must meet.

With regard to the formats of information and the information level to be chosen by the students, the responses suggest that 48% respondents need moderate level information and 36% respondents need advanced level information. This may explain why a majority of respondents want information in the print format rather than online. But they are also often unaware of the databases that the library offers or they do not have the skills to access materials from the Internet. This finding is supported by Rafique (2014) who analyzed faculty in Pakistan, not students. He reported that 50% faculty members need information at a moderate level. Also, 64.3% faculty members gave responses that they want information in print format and 34.5% want their required information in an online format. It may seem, then, that guidance is not only used for the students but for faculty as well. This may also be the case with regard to search strategies and the tools used for locating information in the library. The respondents were asked to indicate more than one answers the search strategies students’ use in identifying and locating information. The results show that respondents use “the title” and “the subject” in the quest for information. Sixty-five percent respondents indicated that they use the library catalogue in locating information, only 27% and 40% respondents use bibliographies and abstracts/indexes respectively, while 11% respondents indicated OPAC. Rafique’s (2014) findings for the faculty members are similar.

The results do not depict a clear view of why there are differences among students. However, the responses lead to believe that there is a relationship here between personality types and Internet information-seeking behavior as characterized in an earlier study by Heinström (2003). Heinström (2003) distinguished between three dominant approaches to Internet information-seeking—fast surfers, broad scanners, and deep divers. The fast surfers take minimum time and effort to search and rate the ease of access to the quality of information. The broad canners access a wide range of sources, are flexible browsers, and tend to acquire information by chance. The deep divers offer a stereotype for the strategic learner, being highly systematic in approach and effort, driven by only gathering high-quality information. It has been said that too often information literacy programs aspire to create deep divers (Markless & Streatfield, 2007). It is more important to allow all three types of searchers to enhance and develop their skills. This would especially apply to an environment like UDS with students coming from very diverse backgrounds with varied levels of learning skills. As will be shown in the next section, a majority of the respondents expressed the desire to receive better instruction and to get connected to practitioners on the issue of where to find the best sources of information.

Addressing the Challenges

The View of the Respondents

Respondents were asked to make recommendations to address the challenges they face in identifying and using information. Ninety-five percent of respondents opined that an information literacy awareness program
will be useful to them and only 5% respondents responded negatively. Those who wish instruction would have to receive guidance on elementary issues first, for which the Boolean operators are a good example. As a great number of the respondents were not aware of the Boolean operators, their effectiveness in retrieving information must necessarily be low and make them desperate. Boolean operators connect keywords to create a logical phrase that the database can understand. This makes the database search for multiple terms/concepts at once, which will make the search more precise, or one may allow the database to search for alternative terms that will bring back more results. When students learn that using Boolean operators creates a more precise and powerful search, with a higher percentage of relevant results, they will also approach advanced databases more frequently.

Another area where respondents’ awareness can lead to a quick remedy is plagiarism. Students sometimes copy and paste the work of other people without acknowledging the source of the information. According to Brody (2008), this does not just have trivial consequences. In some contexts, it can be fatal for an academic career. Students who fully understand that plagiarism can ruin their expectancies for pursuing the medical profession will not only refrain from it and they will also spread the word to their community of colleagues. An area where a “quick fix” is not possible would be the lack of the ability to evaluate the quality of resources retrieved (only 30% respondents said they have this ability).

The respondents suggested that it should be the library that organizes the training programs, like searching open access journals, and using Boolean logic searches and other searching aids. This instruction could then be delivered in a format preferred by the students and in collaboration with a faculty member for the course or program. It would make the use of the electronic resources with which UDS is equipping its students more effective and efficient. And upon that it would raise students’ prospects for being successful in an online course or program and raise their skills for the use of digital resources in any environment. There also was some expression for the need of guidance from the medical profession, as this would lead to learning from practice.

The Authors’ Recommendations

The assessment analysis was not designed to gain feedback from faculty or library staff. However, the topic resonated with faculty and it is understood that activities will be designed to improve the situation. They would first have to look at the reasons for the low literacy skills. One reason might lie with the motivation of students to get on with their literature searches quickly, forgetting that it is through research that produces the best outcomes. Also, young people are used to trial and error procedures in all that relates to information technology and they would think that this approach is sufficient for literature research as well. The library staff might be too busy to attend each and every knowledge need of a particular student. It was found that throughout the university, the issue of knowledge management does not get enough attention in the curricula.

What was brought up in the first place, before looking at knowledge management instruction, was the idea of creating more awareness. The UDS library has awareness campaigns concerning the availability of electronic databases, but they need to be intensified by using e-mail alert system, text messages, and social media tools, such as Facebook, Twitter etc. as marketing tools and a method of promotion. But the effort has to extend beyond this. Information literacy instruction is about technical skills and soft skills and this is what the students require in the short term. The challenge lies with making faculty aware that by merely teaching technical skills the university falls short of the mission to provide a holistic education. Providing holistic
perspectives is crucial in all areas of science, but it is even more important in the field of medicine, because insufficient knowledge of physicians may directly affect human life.

**Complementing literacy instruction with instruction on knowledge management tools.** Connecting knowledge management with library and information science is a major concern both in scholarly research and in practice (Davenport, 2004; Loon & Al-Hawamdeh, 2002; Chowdhury, 2004). While Broadbent (1998, p. 24) describes knowledge management not to be about managing or organizing books or journals, searching the Internet or arranging for the circulation of materials. It has been acknowledged that there is a need to incorporate knowledge management into library and information science education and practice (Roknuzzaman & Umemoto, 2008). This is where the users of libraries come into place (in the case: the medical students). Academic libraries serve hundreds of users. While it is not possible for a librarian to remember and recall everything when answering a reference query, there are knowledge management tools available that do the job.

An example of a knowledge management tool—Ask a Librarian, is an online reference service available 24 hours a day with seven days a week, by phone, email, and using a live online reference service. “Question Point” is a virtual reference service, generally in real-time, where patrons employ computers or other Internet technology to communicate with reference staff without being physically present (Jain, 2013). When reference librarians share with their users how to use knowledge management tools to become more effective, information literacy will rise substantially. The point is that for sharing this technology with their users, librarians must be motivated to extend their service beyond the mere fulfillment of duties. They must be left with space for making their own decisions, and they should be encouraged to be as communicative as possible (Alqudsi-ghabra & Mansouri, 2010, Kumaresan & Swrooprami, 2013).

**Incorporating knowledge management topics into the course curricula.** Getting acquainted with specific tools for information retrieval is just one issue of knowledge management. From its inter-disciplinary nature, knowledge management draws upon theories and practices of a number of subjects belonging to the disciplines of management, library and information science, and information/communication technology. Inter-disciplinary activities transfer, export and integrate concepts, theories, methods, or practices from one discipline to another, which is at the core of medical science with its many ramifications.

Students should learn about knowledge management early on. In the medical disciplines, knowledge transfer is the most important element for advancing both state-of-the-art research and state-of-the-art techniques for healing and for preserving health (Szalma, Koka, Khasanova, & Perakslis, 2010; Berka, 2009). Still, knowledge management is not in the curriculum of many schools of medicine. According to a study by Chaudhry and Higgins (2004) who reviewed 37 knowledge management courses worldwide, 40% are about information systems, 35% is about business management, 14% are about computer science/engineering, and 11% are about application to medical science ranks under others. Filling this gap in a university, like UDS, would be a great achievement. Support might be available through the WHO’s knowledge management strategy as it also focuses on facilitating knowledge transfer to developing countries (WHO, 2005).

**Involving the community of medical professionals.** This suggestion relates to the issue of how best to exploit the community-university relationships. Conceiving and developing local partnerships have been a task in many universities worldwide. This has created a new concept for the definition of a university. Work across academia and practice has been developed in a meaningful and inclusive way, with many fruitful outcomes. The emphasis is two-fold: making university resources available to the community and finding ways in which universities can benefit from community resources (Hart & Wolff, 2006).
Building campus partnerships and campus-community partnerships for improving the literacy of students, faculty, and practitioners has been one scheme to better integrate library resources and services with other means of knowledge provision by deploying learning management systems (Jackson, 2007), building foundation course portals (Hiscock & Marriott, 2003), sharing experience with search engines (Mager, 2012), and through the inclusion of librarians in collaborative teaching (Kuhlthau, Maniotes, & Caspari, 2007). A best practice case in the medical field is reported from an information literacy framework in Scotland (Craig, 2009). It was intended for the staff of National Health Service Scotland staff and its partner organizations, extending to patients, nurses and careers, paramedics, and pharmacists (Thomas & Rutter, 2008), and conjoining with research institutions. Linkages between university libraries and virtual communities of medical professionals were set up by U.S. clinics. Zobitz et al. (2006) reported the positive effects of an experiment conducted at the Mayo Medical School where a virtual community was created to facilitate exchanges between medical students and teams of educators. This proved that it not only be a way to keep abreast of the exponential growth of information in the medical field, but also a way to mobilize individual and collective skills to find solutions to health problems (Kwankam, 2004).

UDS has also engaged with external professionals in many ways. Faculty, students and medical professionals in the university’s local environment collectively enhance both the awareness for developing appropriate literacy skills and the literacy skills proper in reviving the engagement with the medical profession. This could continue with building a shared inventory of tools. Professionals, from their practical experience, would have a good notion to discriminate which information is needed and which is redundant. Vice versa, the university could support professionals with tools to apply knowledge effectively in their specific field. A good case is reported from Semmelweis University in Hungary where health professionals went back to attend a specifically designed course program furnished with constant evaluation-based feedback to learn state-of-the-art skills for the massive use of the Internet, social media platforms, and digital technologies (Mesko, Gyorffy, & Kollar, 2015). Support with state-of-the-art technologies and references to good practice are becoming more and more available, from the U.S. Medical Library Association (2005) and Wood (2014) with which UDS can establish a partnership. If UDS pursues with its efforts and integrates the community surrounding it, the school may become a model for Ghana and other African countries.

Conclusions

Information literacy is a key element in the information age. Acquiring information literacy skills at higher education will not only help students in their academic progress, it will also contribute to coping with lifelong learning which has become a must. The information widely used in teaching, learning, training, and research activities is steadily growing in electronic environments (Sofia & Lazaros, 2011), and therefore, a command of the tools at hand for this environment is crucial. By creating awareness for the topic, students will be led to become more appreciative of library resources, increasing their retention in online programs and their overall satisfaction with online learning. If the university provides pertinent instruction, students will acquire skills in accessing, using, and evaluating quality digital resources, which will help them succeed in their academic endeavors and in other professional contexts. Practical instruction on library tools should be complemented by teaching the fundamentals of knowledge management and activating the resources that lie in the university’s relation to the local community of medical professionals.
This study is useful to health administrators and faculty members, because issues concerning the importance of information literacy skills do not only apply to UDS, Tamale, but to other medical institutions in Africa as well. For Tamale itself, the study provides the university library with reliable data on the need for and the effectiveness of information literacy instruction and it enables the librarians to strategize how to improve the instructions provided. It is hoped that the study adds to the body of knowledge in the field of librarianship.

There are several limitations of this study. The sample was selected from doctoral students in a single institution in the field of education. Also, the sample was self-selected and relatively small. There is a caveat, therefore, for generalizing the findings to other doctoral student populations. But the results of the other studies mentioned in this paper corroborate the findings to some extent. Still, research with larger samples of doctoral students in different fields of study and in different types of doctoral-granting institutions is needed. Also, more examples of university-community networks need to be studied.

References
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