

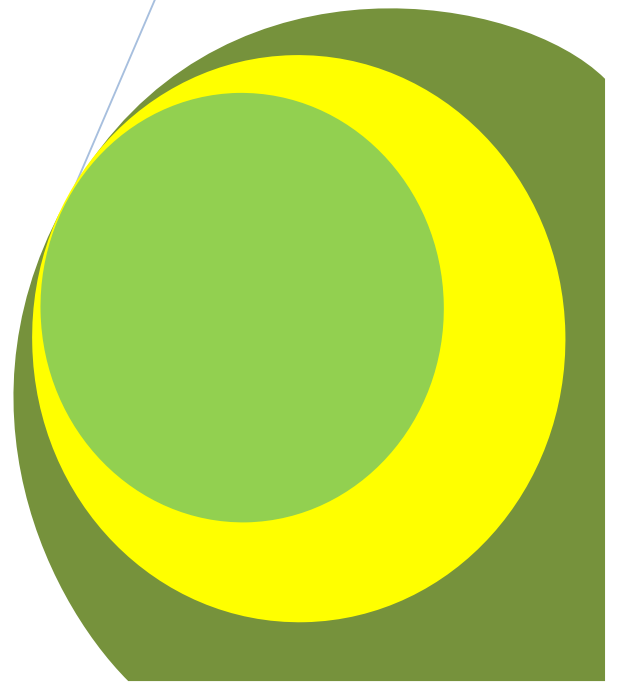
Greener Journal of Educational Research

ISSN: 2276-7789 Impact Factor 2012 (UJRI): 0.7230 ICV 2012: 6.05

Geographic Literacy and World Knowledge amongst Open Distance Learning Students in Zimbabwe

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Research Article

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ABSTRACT

In order to succeed in a globally competitive world, it is imperative to acquire knowledge and an understanding of the places and cultures outside the borders of one's country. Zimbabwe has one of the highest literacy rates in Sub-Saharan Africa but despite this, large gaps exist in the knowledge about the levels of geographic literacy among Zimbabwean students. A survey, adapted from the National Geographic –Roper Global Geographic Literacy Survey, was administered to 103 students (11%) in the Diploma in Science Education programme at Bindura University of Science Education (BUSE). The survey assessed knowledge of geography and world events as well as information about various factors that may influence the participants' geographic literacy. The data were statistically analyzed using Microsoft Excel and SPSS 17.0. Research findings revealed that the participants had high levels of geographic literacy with a mean score of 82 percent. Some of the factors found to influence the scores were sex, frequency of news media access and type of news accessed. While students majoring in the Agriculture, Biology and Geography Option had higher mean scores than other students, having passed Geography at O' Level and age has insignificant influence on the mean score.

Keywords: Geographic literacy, geography education, geography knowledge, globalisation.

INTRODUCTION

In today's globally competitive world, distance is no longer a formidable barrier as the erstwhile 'distant lands' are no longer so distant. Events occurring in one place of the world now easily affect our global village neighbours. The Internet, telephones, the ease of intercontinental travel and television all provide almost instant access to the cultures, politics, religions, economies, languages and also problems of the world. Language terms like tsunami and karaoke may not require any translation into English. Disputes over resources and borders, political instability, terrorism, climate change and natural disasters all have international repercussions and can easily receive global sympathy. A plethora of economic and political groupings formed worldwide aims to bring together the politics and economic aspects of the different countries, while the goal of the United Nations is to bring together all the countries of the world. In such a global society with increased cultural and global economic interdependence, the need for understanding the world in which we are citizens becomes imperative. Clinton (2000) and De Blij (2005) concurred that in order for any country to survive and successfully compete in the global economy; its citizens must develop a broad understanding of the world, be proficient in other languages and learn the cultures of other nationalities. However, it is not just cultural literacy that matters but more importantly geographic literacy.

In a globalised society, it is important to understand the places and cultures outside our own so that we can make informed decisions and form intelligent opinions about the activities around us. One major purpose of attending college is to prepare students for entering the workforce, both locally and internationally, so it is important that students graduate with the global knowledge they will need to be productive global citizens. Assessing the level of geographic literacy among college students at Bindura University of Science Education (BUSE) assists educators and administrators in determining whether educational deficiencies in Geography do exist. This will help establish a plan of action at primary and secondary school level to ensure that all students are geographically literate before they get to tertiary education.

Firstly, geography education is the starting point for our understanding of the world. Through geographic literacy, we can understand the impact of current events that affect the international community. Geography education should, therefore, prepare students to navigate the world around them and become informed members of our global village through the teaching of right attitudes, increased respect, sympathy, and understanding for others in this world currently threatened by hate, terrorism and an ecology of fear (Standish, 2009; IGU; 1992). It is generally accepted that world peace depends upon sympathy between nations whilst antagonism and

prejudice lead to friction and war (McDougall, 2003; Davis, 2001; Graves, 1984). It is therefore pertinent that a solid education, providing geographic literacy as well as the skills needed to become responsible global citizens be prioritised in schools (Paige, 2002; Keeling, 2003).

Secondly, geography is basic to education in its role as a springboard to every other subject in the sciences and humanities. Geography education provides linkages between contemporary issues like climate change and historical events, natural phenomena and political developments and between the environment and behaviour (De Blij, 2005; Siddall; 1979). In studying Geography, the students' curiosity is aroused by the diversity of its area of study ranging from landforms, physical environments, varying country sizes to land uses that will prompt them to ask the what, where, when, why and how of different phenomena. Asking such questions opens a world of inquiry which requires answers from Geology, Physics, Meteorology, Anthropology, Ecology, Economics, Sociology, History and Biology (McDougall, 2003).

These characteristics of Geography more than in any other discipline equips it with the necessary tools to provide the knowledge and skills needed to understand the world in which we live. This is evident in the widespread consumption of geographic products of remote sensing, global positioning systems (GPS) and geographic information systems (GIS) that include satellite images, street navigation, weather report charts, street maps, land suitability maps and tourism guides to mention but a few. A sound geographic education offers perspective and information to understand ourselves, our relationship to the Earth and our interdependence with other peoples of the world. Geography provides the base on which global understanding and knowledge is built. Its importance seems to be so obvious in that we are all geographers from the moment, as young children we play hide and seek, explore our neighbourhood or the banks of a nearby river. We all require very little encouragement to go and discover what is just round the corner. According to McDougall (2003), Geography is the context in which we live and move and have our being. It allows us to know who we are, where we are and how to get where we want to go. Geography is our daily life. The moment we wake up and watch the morning news (local and international), drive to work, execute our daily routines and discuss business or casual talk, we are involved in geographic literacy.

According to UNESCO (2010) reports, Zimbabwe boasts of one of the highest literacy rates in Sub-Saharan Africa. In spite of enjoying such a privileged position, there is a lack of knowledge and a dearth of research on the geographic literacy of its population. In a study carried out at A' level schools in Makonde District, Zimbabwe, Mavhura et al (2008) noted that students' performance in Geography was poor. This is despite a pronounced need for geographic knowledge and importance of a greater understanding of the world through being geographically literate. This research therefore sought to:

1. Assess the level of geographic literacy among Virtual and Open Distance Learning (VODL) students in the Diploma in Science Education at BUSE within the context of current events and world issues.
2. Find out the factors which may influence the levels of geographic literacy.

Literature Review

Many definitions of geographic literacy are found in the available literature showing a lack of consensus among geographers. One school of thought equates geographic literacy with an ability to locate places on a map, that is, place location knowledge (PLK) arguing that it provides the foundation upon which the study of geography is rooted (Torrens, 2001; Saarinen and MacCabe, 1995; Marran 1992; Hise, et al. 2000; Donovan, 1993). On the other hand, there are those who argue that PLK alone does not reveal a full extent of geographic knowledge. According to these researchers, perceiving geographic literacy simply as learning place names is a misconception of global proportions which needs rectification (Eve et al., 1994; Gallup Organization, 1990; Keeling, 2003; Bein, 1990 and National Geographic, 2006).

Geography as a discipline is composed of three interrelated and inseparable components all of which are necessary to being geographically literate, namely; subject matter, skills and perspective. The subject matter is divided into several broad elements: the world in spatial terms, places and regions, human and physical systems, the environment and society and the uses of Geography. Geographic skills include the tools and techniques used to think geographically; the ability to ask geographic questions and collect, organize and analyze geographic information; and the development of critical thinking skills.

Broadly, Geography involves both spatial and ecological perspectives. A location where something occurs refers to the spatial perspective and an analysis of how life forms interact with the physical environment is the ecological perspective. It is therefore apparent that geographic literacy should go beyond simply locating place names on a map (Geography for Life, 1994).

Whilst a definition of geographic literacy, encompassing all the above components may accommodate the requirements of educators as well as to provide a guideline for Geography curricula, it may be too cumbersome to fully measure. On the other hand, PLK studies are too narrow on their definitions of geographic literacy. In this study, a definition of geographic literacy that is both broad enough to encompass the various dimensions of geographic knowledge, yet narrow enough to be easily measured was required. Incorporating the common concepts from the varied definitions, the following definition of geographic literacy adapted from the

National Geographic – Roper survey (National Geographic, 2002) was used. In this survey, geographic literacy is portrayed as the ability to express knowledge of basic geographic subject matter, that is, the ability to (i) demonstrate map reading skills, (ii) knowledge of place locations and (iii) an understanding of human systems, society and the physical environment.

Various surveys assessing geographic knowledge in the USA and other nine countries demonstrated the geographic ignorance of people where undergraduate students were unable to locate major countries and cities on a map. Only one-quarter of high school seniors were able to interpret maps, describe regional features and socioeconomic and political factors. One-third of fourth graders could not identify the state where they lived. (Gallup Organization, 1990; Helgren, 1983; National Geographic, 2002). A study by Saarinen and MacCabe (1995) supported the 1988 National Geographic survey on the USA and went further to point out that geographic illiteracy is a worldwide phenomenon.

Approaches to studies on geographic knowledge commonly include sketch mapping, place location knowledge and all encompassing tests of geographic knowledge. Sketch mapping as a technique for assessing factual geographic knowledge is often related to studies of mental mapping and place perception (Saarinen, et al. 1996). An advantage to using sketch maps for geographic knowledge assessment is the ease of administration and comparability across cultures (Chiodo 1993; Saarinen and MacCabe 1995). In addition, sketch mapping, unlike other methods of assessing geographic knowledge, is not restricted by a sample of test items selected by researchers (Wise and Kon, 1990). There are however, disadvantages to using sketch maps, for example, the complexity of analysis. Because sketch mapping is unconstrained, it often results in highly irregular maps that lead to difficulty in assessing and quantitatively analyzing the results (Torrens, 2001). The “correctness” of a sketch map can be assessed in numerous ways, such as by the inclusion or exclusion of places, the size and shape of places, spatial relationships of places and or the use of map conventions (such as the equator line and compass rose) (Wise and Kon, 1990). Furthermore, critics of sketch mapping contend that the method assesses a person’s drawing ability rather than geographic knowledge (Downs and Stea, 1977). Nevertheless, sketch mapping has been used in many studies to assess geographic knowledge (Chiodo 1993; Saarinen and MacCabe 1995; Bunin, 2001).

Studies of place location knowledge provide another avenue to assess geographic knowledge. Place location knowledge (PLK) is the ability to identify places such as countries, cities, bodies of water and other phenomenon on a map. Unlike in sketch mapping where participants are expected to draw maps to show their proficiency, in PLK the participants simply label places on an already provided map outline. While most Geographers realize that geographic knowledge encompasses a broader array of skills than the ability to memorize places on a map, PLK is highly regarded as the foundation within which the discipline of geography is established (Torrens, 2001; Hise, et al., 2000). In realisation of its importance, several academic researchers have focused on PLK as the sole measure of geographic literacy (Cross, 1987; Wood, et al., 1988; Hise, et al. 2000; Torrens, 2001).

The use of multi-dimensional tests in assessing geographic literacy is viewed as the most complex approach since there is no unified prescription for the elements of geography that should be included (Bascom, 2011). More often than not, such tests vary greatly in their content, scale and objectives. While most of these types of studies include map identification sections, that is PLK, they may also include questions covering other dimensions of Geography, such as human and physical Geography. Still, other studies do not assess any specific educational standards at all concentrating instead on content that is reflective of what one would read in the press, popular magazines and view on television (Nolan, 2002).

The objectives included for assessment also vary across surveys. A study by McKinney, et al. (1989) focused solely on physical geography and map reading skills with no attention paid to human geography. On the other hand the study by Eve, et al. (1994) did not cover physical geography at all, concentrating on human and cultural geography as well as PLK, including a section on icon recognition.

The scale of the content also varies from one study to another. Whilst some surveys focus on local Geography (Donovan, 1993), other studies, such as one conducted by Nolan (2002), specifically removed local references from the survey. As is apparent from these few examples, there is little consistency in studies of geographic literacy.

The National Geographic – Roper Surveys of Geographic Literacy (henceforth to be referred to as the National Geographic Surveys), from which this study is adapted combines various elements of geographic knowledge in order to provide a more comprehensive assessment. Unlike other surveys used by some authors, The National Geographic Surveys was preferable for two main reasons. First, the complete survey instrument was easily accessible through the National Geographic website and secondly, it examines geographic literacy in the context of current events and general knowledge, which is the thrust of this study. This is a departure from the majority of geographic literacy surveys which were developed for use as standardized educational post-tests (Bein, 1990; Laughlin, 1985).

Borrowing from the idea that a broad and integrated geographic knowledge is critical in understanding global events, the survey sought to assess general geographic knowledge that emphasized geography for understanding the context of current events, in addition to PLK and developing a spatial perspective.

On individual variations that influence students' acquisition of geographic knowledge, studies showed that even controlling for education, gender was a significant factor (Kitchin, 1996; Bein, 1990; McKinney, et al., 1989; Eve et al., 1994). Males scored better than females, and that students at private schools scored higher than those at public schools. In these researches, age was not a significant factor overall, though in some parts of physical and human geography, older people scored higher. The studies also examined several school-related factors. Results revealed that students whose teachers reported more classroom use of the Internet and ICT technologies scored higher than students whose teachers reported less use (Nolan, 2002).

Limitations of the Study.

The survey adapted from the National Geographic – Roper 2002 & 2006 Global Geographic Literacy Survey was simplified, modified and new questions added to assess the most basic and readily measurable components of geographic knowledge. It was not meant to assess higher-level thinking skills, such as the ability to apply geographic knowledge to understand a world event. Furthermore, the modification of the questions and the addition of new ones may have reduced the reliability and validity of this study as compared to the original study. Thus, caution should be taken when interpreting the results.

These data were collected from a single University, the Bindura University of Science Education's Virtual and Open Distance Learning (VODL) students, therefore results of this study cannot be assumed to be applicable to the entire Zimbabwean undergraduate population in general nor even to the BUSE studentship as a whole. In this regard, it has to be noted that many external variables influence a student's choice to attend this University, especially under the VODL mode where enrolment is closely linked to such factors as grades, proximity to their workplaces, affordability, flexibility of the programme and courses it offers (Mhishi, et al, 2012).

Lastly, the results of the study cannot be used to determine causal relationships between geographic literacy skills and the various factors investigated. By identifying differences in geographic literacy rates in relation to a variety of characteristics, the study is merely identifying factors that may have influenced geographic literacy.

In spite of these limitations, this study is an important step towards examining geographic literacy among Zimbabwean university students.

METHODOLOGY

The survey instrument used for this project was adapted from the National Geographic – Roper 2002 and 2006 Global Geographic Literacy Survey (National Geographic 2002; 2006). These instruments were expertly designed by RoperASW, an international survey research and consulting firm. This provides assurance that the questions were well written and the design was well researched and tested thereby providing international validity and reliability. Although modifications were done and new questions added to this project, a lot of effort and great care were taken in order to maintain the essence and meanings of phrases and words as given in the National Geographic – Roper 2002 and 2006 Global Geographic Literacy Survey. This, to an extent allows the comparison of the present results to that study.

The survey instrument was divided into three sections. Section A looked at the students' background information including age, subject majors at university and province of origin among others. Section B sought to collect information on the students' attitudes and opinions. Aspects asking for the value the students attached to the need for skills or abilities to read the map, know where certain countries of the world are located and the need to keep up with current global events amongst other skills were collected in this section. A four category Likert Scale was used to rate the students opinions. Responses on these attributes could help in interpreting some factors related to geographic literacy. Section C comprised of questions on the world and world events. The questions tested the most basic level of geographic knowledge. The majority of the questions were taken directly from the National Geographic Surveys though some of the questions were modified, a few eliminated and other new ones added.

An amalgamation of the National Geographic – Roper 2002 and 2006 Global Geographic Literacy Survey was done mainly due to the realisation that the National Geographic – Roper 2006 Global Geographic Literacy Survey did not carry any PLK questions thereby limiting its scope. This necessitated the inclusion of such questions from the 2002 Survey as well as the construction of new relevant ones. This saw the total number of questions reduced from 51 in the National Geographic Survey to 33 in the current survey. These were categorised as follows: 39.4% on PLK, Map reading/interpretation skills 12%, climate and climate change 12% and the remainder (36.6%) was on a variety of current and past events in Africa and the world. In order to remain relevant to what the students 'know', more questions on Africa were added to the current survey.

The survey questionnaires were printed and delivered to a randomly selected sample of 103 students constituting 11% of BUSE and VODL Diploma in Science Education students. The survey data were numerically coded allowing for their analysis via SPSS Version 17. General descriptive statistics, such as frequency and mean, were used to describe the data. The scores from the questions were calculated in Excel. The data were statistically analyzed using the Mann-Whitney U and Kruskal-Wallis tests for differences in means.

RESULTS AND DISCUSSION

Most students did well on the survey as shown in Fig 1 below. Scores ranged from a minimum of 5 and a maximum of 30 out of a possible score of 33. The mean score for the 103 students was 20.06 equivalent to 61 percent. Sixty three students (61%) scored above the mean while 40 students (39%) scored below the mean.

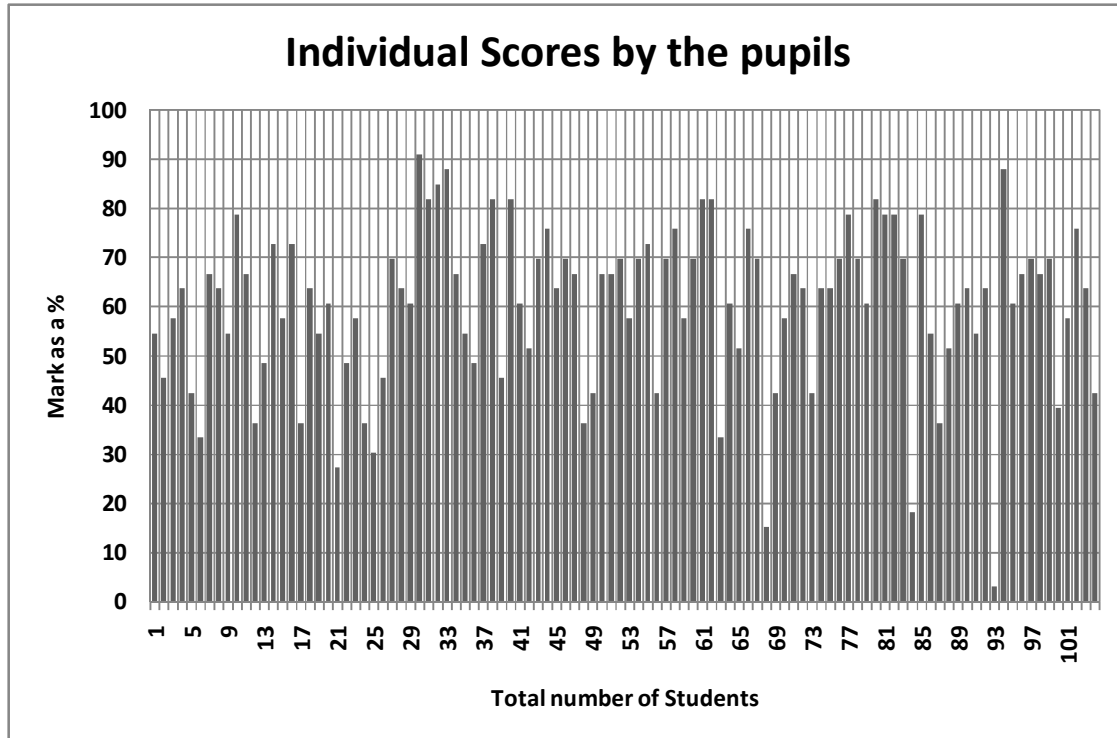


Figure 1: The individual scores by the students.

a) Primary Sources of News for the students

An overwhelming majority (98%) of students who participated on this research perceive that it is important to keep abreast of the current World events. Only two percent thought that this attitude is not important. For these students, 38% indicated their major source of world news as being the Internet. Newspapers, radio and Satellite Pay TV (DSTV) were accessed by 21%, 16% and 15% respectively. Free to Air (FTA) Television Channels were preferred by seven percent of the students whilst the local public Television Station was the least popular source of news (3%). These results are consistent with the students' views on the importance of having the ability to use and access the Internet in today's world. Ninety-nine percent of them indicated that it is absolutely important to have Internet skills.

b) Frequency of accessing the news by the students

Outcomes from the students' views on their frequency of accessing news reveal that a majority (42%) accessed the news on a daily basis, 31% once or twice a week and 20% accessed it three to four times a week. The figure below shows the mean scores for those students who access news on different frequencies.

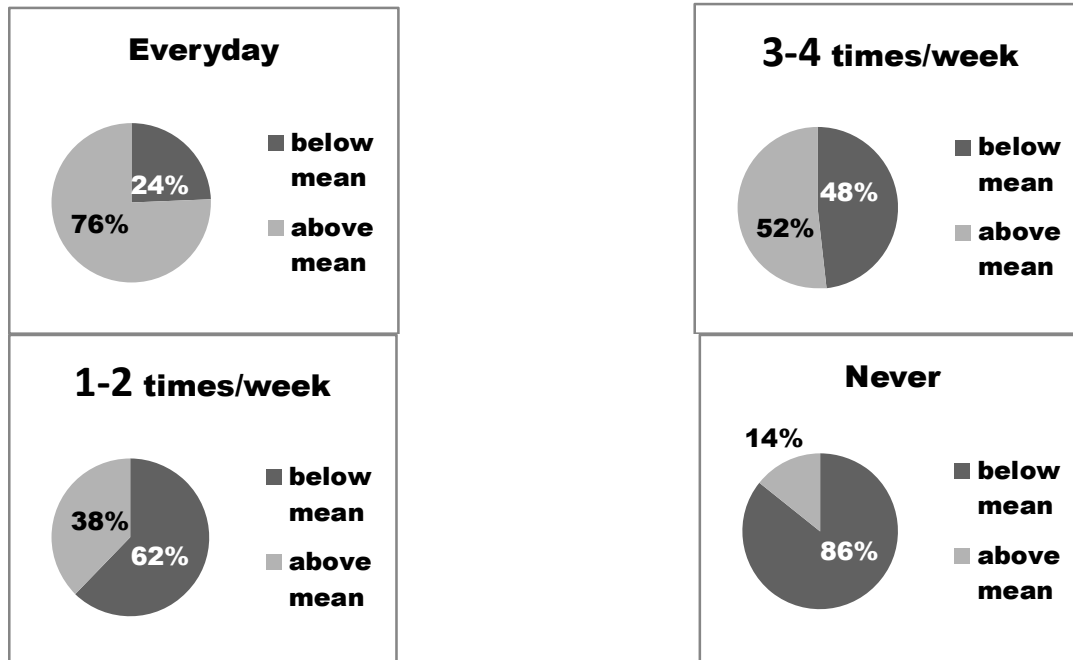


Figure 2: Percentage of scores above and below mean Quiz Score by frequency of news media usage

The above results show that the frequency of news media usage turned out to be a strong predictor of geographic literacy in which more frequent news readers obtained higher scores than the infrequent users. This shows consistency with Donovan's (1993) findings where a similar trend was discerned. These results are important because they suggest that regardless of the source of the news, regular access to the news is helpful in gaining geographic knowledge.

c) Students' perceptions on the importance of Map reading and PLK skills.

The acquisition of Map Reading skills was highly valued by 73% of the respondents who argued that this skill is absolutely important whilst 18% opined that whilst this ability may be important, it is however, not absolutely important. Seven percent dismissed it as not important at all. For PLK, 72% of the students suggested that it is absolutely important to have the ability to locate and know places of the World. An overwhelming 97% of the students responded that it is absolutely necessary to keep up with current events. This translates into locating important global events.

d) Subject Major and geographic literacy.

The VODL students in this study were drawn from the following subject major options:

Option 1: Mathematics, Computer Science and Physics; Option 2: Chemistry, Physics and Biology and Option 3: Biology, Agriculture and Geography. Table 2 shows the mark distribution by Option. The tabulated results indicate that students in the Biology, Agriculture and Geography Option had the highest mean scores followed by students in the Mathematics, Computer Science and Physics Option and lastly those in the Chemistry, Physics and Biology Option group.

Table 2: Mark distribution by Subject Major/Option.

Study Option	Score (%)		
	Minimum	Maximum	Mean
1. Maths, Computer Science & Physics	15	76	59.5
2. Chemistry, Physics & Biology	33	73	52.9
3. Biology, Agriculture & Geography	18	91	62.6

This performance pattern may be attributed to the assumption that the subject matter included in the quiz is the primary focus of the students' studies especially for those in option 3 where a pass in geography at O' level is a selection requirement. These results compare favourably with findings obtained at Virginia Polytechnic Institute and State University (Winship, 2004) where students majoring in geography had a higher mean score than those from other majors.

e) A pass in O' level geography and geographic literacy.

Whether a student had passed O' level Geography or not was a statistically significant factor in the differing means of quiz scores. Students who had passed geography at O' level had a mean score of 39.41, and those who did not pass the subject had a mean score of 35.11. This translates into an over fourpoint difference between these two groups. Pairwise comparison using the Mann-Whitney U test shows that the differences between those who passed Geography at O' level and those who didn't have the same subject are significant. The statistics are summarized in Table 3 and Table 4 below.

Table 3: Kruskal-Wallis Test for Difference in Scores by Number passing Geography at O' level.

Passed O level Geography	N	Mean Score	Mean Rank
Chi Squared		32.861	
df		2	
Probability		0.000	

Table 4: P-Values from Mann-Whitney U Test for differences in scores by number of students passing Geography at O level. (Significant differences indicated in bold)

	Yes	No
0	0.000	0,360
1	0.000	.

However, while students who had passed geography at O'Level had significantly higher scores than those of students who had failed it, when geography majors were excluded from the analysis, the higher scores were found not to be statistically different. In other words, this result indicates that geography majors had higher mean scores than other students and that among non-geography majors, having passed geography at O' Level has little effect on the mean score.

f) Sex and geographical literacy.

Generally, men in this study showed a greater degree of geographic and world knowledge than women. The mean score for males was 81% whilst that for the females was 67%. The results of the Mann-Whitney U Test in Table 5 below indicate that the difference is highly significant.

This finding is supported by literature on geographic literacy which attributes this gender difference to causes such as differences in exposure to Geography (Bein 1990, Henrie, et al. 1997), socialization differences (Eve, et al. 1994, Henrie, et al. 1997), or cultural acquisition (Donovan, 1993). Winship (2004) opines that a possible explanation to this phenomenon is that when women access the news, they focus on different aspects of the news or different types of stories than men.

Table 5: Mann-Whitney U test for differences in scores by sex (Significant differences indicated in bold)

Sex	N	mean score	mean rank
Male	53	81	255.79
Female	50	67	164.93
Total	103		
Mann-Whitney U		12812.000	
Z-score		-7.640	
Probability		* 0.000	

CONCLUSION AND RECOMMENDATIONS

The students who participated in this study performed well in the assessment of geographic literacy and world knowledge with an overall pass rate of 81%.

This study, apportioned more on the assumption that the formal education system plays a major role in developing geographic literacy. However, the results of this study indicate that formal Geography training may not be the only important factor in raising the levels of geographic literacy. Majoring in college Geography and keeping up with the news on a regular basis were all significant factors determining the level of geographical literacy. Results from this study suggest that those who are interested in Geography and world events, as exemplified by the students who chose Option 3 (including Geography) and keep up with the news on a regular basis, have a greater degree of geographic literacy.

Based on the outcome of this study, the following recommendations are proffered to improve the formal education system. However, this is not the only aspect in geographic literacy as there may be other factors. Therefore, students should be encouraged to learn and cultivate an interest in Geography and world events early in their education. This should be complemented by providing teachers with training in Geography so they are able to teach and encourage interest in the discipline.

In Zimbabwean schools, at primary and secondary school level, geography as a subject could be made a compulsory subject unlike now where at primary school, a diluted version of geography known as environmental science is taught.

Where possible, students should be encouraged to regularly access news, media and teachers should assist students learn how to understand and analyze the news accessed. Furthermore, courses with an international focus, for example, world regional Geography should be developed and encouraged in addition to local content coverage. Finally tertiary institutions should actively promote, or if possible, require their students to participate in study abroad programmes. This may improve students' international knowledge and empathy.

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