Benefits of Adopting Problem-Based Learning in Geography Education: Standpoint of Students and Instructors

Samuel Bentil & Bethel Tawiah Ababio (PhD)
Department of Business & Social Sciences Education,
University of Cape Coast, Cape Coast, Ghana.
PMB, Cape Coast
Samuelbentil899@gmail.com, bethel.ababio@ucc.edu.gh

Abstract

Problem-based learning (PBL) is recognised to be a more suitable and efficacious instructional method or strategy for improving students' knowledge in various levels of Geography education. This study investigated the views of students and instructors on the benefits of adopting PBL method in Geography education at the University of Cape Coast (UCC), Ghana. The convergent parallel design under mixed method approach was used for the study. Census and purposive sampling techniques were used whilst questionnaire and interview guides were employed to collect the data. The study revealed that Geography instructors define or present the PBL problem to geography students to solve, specify the context in which the problem should be solved and guide them to form groups to work on a particular problem. Also, the study found that PBL in Geography develops geography students' intellectual/critical thinking skills, observation and problem-solving skills, promotes students' self-directed and life-long learning, nurtures the leadership qualities in students and reinforces student communication and interpersonal skills. It was recommended that the instructors using PBL method should adopt PBL assessment system such as evaluating students'/groups creativity, self-management, teamwork, presentation skills, problem solving outcome among others, rather than the traditional assessment system.

Keywords: *Problem-based learning (PBL), Benefit, Process, Geography Education.*

1.0 Introduction

Geography education makes special contribution to the encouragement of multi-perspective, systematic and problem-solving thinking. Thus, it is a powerful medium for promoting the education of individuals and a major contributor to international, environmental and development education (Ababio, 2007). Through studies in Geography, students are encouraged to explore and develop knowledge, understanding, skills, attitudes and values which constitute the holistic process of education. Bork, Hemmer and Czapek (2012) indicate that the main goals of geography lessons are to provide insights into the connections between natural conditions and social activities in different parts of the world, and to teach an associated spatially-oriented competence that can be applied. In addition, students can also learn to understand the resulting structures, processes and problems involved with these interactions and to consider solutions for these problems. Hence, Helmke (2009) opines that Geography lessons must be viewed as a dynamic process in which teachers perform in complex situations with manifold interactions, and in which the effects of a specific teacher's intervention vary depending on location, time, pupils` individual dispositions and class composition.

The dynamic and complex nature of the discipline (Geography) makes it imperious for the teacher to possess a special body of knowledge, skills and characteristics. According to Ababio (2009), the Geography teacher needs to understand the materials he/she teaches, how

to teach it and why he/she should teach it. That is, he/she should have adequate subject matter, pedagogic and curriculum knowledge. This infers that the pedagogical knowledge and strategies to teach the subject are very essential in order to achieve an effective and efficient teaching and learning process. Considering the pedagogical knowledge and strategies, problem-based learning (PBL) has been revealed to be a more suitable teaching approach for the Geography curriculum (Spronken-Smith, 2005; Tulloch & Graff, 2007; Golightly & Muniz, 2013; Quain, 2014). For instance, Spronken-Smith indicated that "Geography education has strong traditions of small-group work, both through laboratory and field teaching, and is well placed to try such teaching methods as problem-based learning" (p. 203). This submission concurs with Mayer (2013) who defined PBL to consist of a multi-phased collaborative approach to education where students gain knowledge as they work in small groups (3-5 students) and attempt to solve a problem carefully-designed by the instructor. He further indicates that throughout the problem-solving process, students work together, integrating existing knowledge and seeking out new knowledge, all with the help of the instructor. Tulloch and Graff (2007) pointed out that PBL enquiry represents a student-focused approach that is also an effective instructional strategy to improve geographic content knowledge. Furthermore, Quain (2014) indicated that PBL promotes self-directed and lifelong learning resulting in developing positive attitudes among Geography students in Geography education. Gleaning through these studies, it appears most of these studies on problem-based learning as a method of instruction in Geography education were conducted outside Ghana (Spronken-Smith, 2005; Pawson et al., 2006; Golightly & Muniz, 2013; Quain, 2014). For example, Spronken-Smith's (2005) study on "implementing a problem-based learning approach for teaching research methods in Geography" was done in New Zealand. Pawson et al.'s research on "Problem-based learning in Geography: Towards a critical assessment of its purposes, benefits and risks" was conducted in New Zealand. Besides, Golightly and Muniz's (2013) study "Are South African Geography education students ready for problem-based learning?" was also conducted in South Africa, while Quain's (2014) study "Assessing students' attitudes towards Geography in a problem-based learning environment" was done in Illinois, USA.

This shows a geographical gap so far as the use of PBL in a Ghanaian context is concerned. Hence, this study sought to assess the process and the benefits of adopting Problem-Based Learning approach in Geography education within the Ghanaian context especially in the University of Cape Coast. Geographical context for the implementation of PBL is critical due to its resource intensiveness (time, personnel, materials) and the extent of its use which will transcend to the benefits learners and instructors would achieve. The revelations and recommendations from this investigation would help Geography instructors and learners within and outside Ghana to appreciate the benefits PBL offer and encourage various Geography Departments in Ghana to officially adopt its use as an instructional approach to meet Geography students' cognitive, affective and psychomotor needs. In addition, the findings from the study would contribute to the existing knowledge on the topic under study from Ghanaian learners and instructors' perspectives, and serve as a reference point for further investigation into the use of Problem-Based Learning in Geography education.

2.0 Research Questions
The study was guided by the following research questions.
- What are the processes or stages involved in the implementation of the Problem-Based Learning method in Geography education?
- What are the benefits of effective implementation of the Problem-Based Learning method in Geography education?

3.0 Theoretical Framework: 3C3R PBL Problem Designing Model

Hung (2006a) introduced the 3C3R model as a framework for systematically designing optimal PBL problems. This model is a systematic method specifically designed to guide instructional designers and educators to design effective PBL problems for all levels and across disciplines of learners. Figure 2 is a diagram of this model.
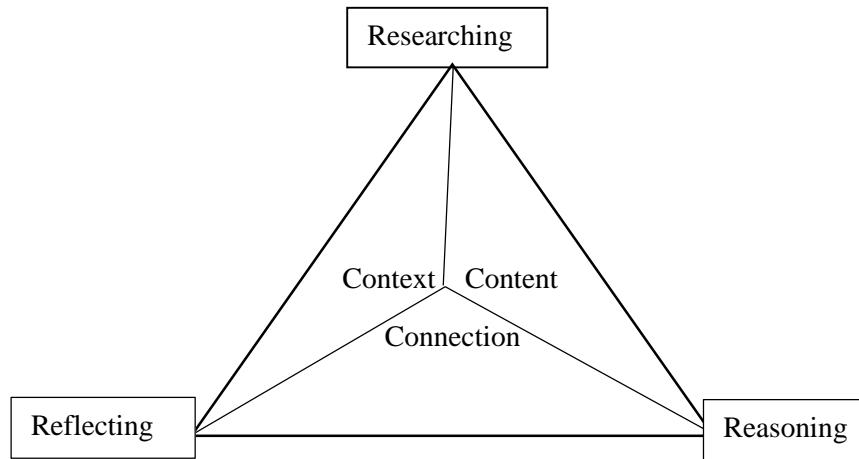
Figure 1: 3R3C Problem Designing Model
Source: Hung (2006a)

The 3C3R model has two classes of components namely, core components and processing components. The core components include content, context, and connection. Furthermore, the core components are primarily concerned with the issues of appropriateness and sufficiency of content knowledge, knowledge contextualization, and knowledge integration. On the other hand, the processing components include researching, reasoning, and reflecting, which deal with students' acquisition of content knowledge and the development of problem-solving skills and self-directed learning skills. From the 3C3R PBL problem designing model, it implies that the instructor using PBL method should determine the content knowledge and the context in which the knowledge should be explored as well as how they can draw on ideas or knowledge to solve the problem. In addition, the instructor or the facilitator should be guided by the fact that the problem presented to the learners to inquire into will trigger students to critically reason, research and reflect on the problem or the topic given. This will determine the kind of knowledge the student will acquire, skills they will develop and how it influences students' self-directed learning skills.

Hence, a Geography tutor employing Problem-Based Learning as a method of instruction in Geography must ensure that the content, context and connection analysis of the problem or topic are done. This is important because there are a lot of things in our environment that can attract the attention of the learners, hence, outlining the context in which the problem should be dealt with will help learners to be focused and integrate their previous knowledge with other experiences to solve the problem. Also, the problem or issues presented to students to inquire into should challenge students to reason critically, research and reflect in order to acquire the right knowledge, develop their problem solving and self-directed learning skills.

Following the creation of the 3C3R model, Hung (2006b) further developed a nine-step problem design process to operationalize the conceptual framework into a step-by-step process:

Step 1. Set goals and objectives.
Step 2. Conduct content/task analysis.
Step 3. Analyze context specification.

Step 4. Select/generate PBL problem.
Step 5. Conduct PBL problem affordance analysis.
Step 6. Conduct correspondence analysis.
Step 7. Conduct calibration processes.
Step 8. Construct reflection component.
Step 9. Examine inter-supporting relationships of 3C3R components
Also, Hung, Jonassen and Liu (2008) outlined four steps in PBL designing process

1. Students in groups of five to eight encounter and reason through the problem. They attempt to define and bound the problem, set learning goals by identifying what they know already, what hypotheses or conjectures they can think of, what they need to learn to better understand the dimensions of the problem, what learning activities are required and who would perform them.

2. During self-directed study, individual students complete their learning assignments. They collect and study resources and prepare reports to the group.

3. Students share their learning with the group and revisit the problem, generating additional hypotheses and rejecting others based on their learning.

4. At the end of the learning period (usually one week), students summarize and integrate their learning.

The prior submissions imply that a well-designed problem should first define the objectives of the problem process, specify the content and the context in which students should work to solve the problem before students go out to explore or find solutions to the problem. This step is necessary for students to appreciate and comprehend the problem concept very well and know what they are expected to do as they work on the problem. This may minimise or prevent the confusion or uncertainty that may arise from students' groups concerning the problem studied. In addition, grouping of students in the PBL process should fall between five to eight in order to ensure effective task accomplishment. This is because forming large groups of students (ten and above) may result in a situation where some students would not participate in the task given.

Further, regular reports should be given by the student to collectively ascertain the progress of the problem resolution. This may enable students and the facilitator to offer constructive criticism and guidance to arrive at the problem solution. So, Weiss (2003) notes that a well-designed problem guides student to use course content and methods, illustrates fundamental principles, concepts, and procedures, and perhaps induces the students to infer those things for themselves instead of getting them directly from the instructor.

Also, it engages the students in the types of reflection and activities that lead to higher-order learning. Problems may vary significantly in scope, from single-topic and single-discipline problems that can be solved in a matter of days to multidisciplinary problems that may take an entire semester to solve (Weiss, 2003; Tan, 2003). Hence, for PBL to be used effectively in Geography education, the lecturer (facilitator) must be well-equipped with these steps and skills of the problem designing process in order to guide his/her students with the right information to get right feedback from the problem task and vice versa. This is because Schmidt, Rotgans and Yew (2011) and Hung (2011) on their elaboration of cognitive constructivist process of PBL indicate that the facilitator provides scaffold, a framework on which students can construct knowledge relating to the problem. It is this scaffold provided which helps student groups to develop possible theories or hypotheses to explain the problem and also identify learning issues to be researched.

4.0 Benefits of adopting Problem-Based Learning (PBL) in Geography Education

PBL approach to learning according to Savin-Baden (2001) is characterized by flexibility and diversity in the sense that it can be implemented in a variety of ways in different subjects and disciplines in diverse contexts. Şendağ and Ferhan-Odabasi (2009) argued that PBL can promote the development of critical thinking skills. Thus, in PBL learning, students learn how to analyze a problem, identify relevant facts and generate hypotheses, identify necessary information/ knowledge for solving the problem and make reasonable judgments about solving the problem. That is why Hung et al. (2008) pointed out that one of the essential promises of PBL is improving students' problem-solving skills. Since PBL starts with a problem to be solved, it allows students to actively solve realistic problems similar to those faced by people outside the classroom every day (Mergendoller, Maxwell & Bellisimo, 2006). Also, PBL helps students develop deeper analytical skills (Utecht, 2003). Gentry (2000, p. 13) identifies "self-confidence, desire to achieve, analytical skills and teamwork abilities, as intellectual skills students learn that might not be prevalent in a traditional classroom format". All of these skills assist students in becoming lifelong learners.

Furthermore, Schmidt, Rotgans and Yew (2011) pointed out that PBL addresses the need to promote lifelong learning through the process of inquiry and constructivist learning. In addition, Schmidt, Loyens, Van-Gog and Paas (2007) indicate that PBL emphasises collaborative and self-directed learning being supported by flexible teacher scaffolding. Vernon and Blake (1993) indicate that students themselves resolve the problems that are given to them, they take more interest and responsibility for their learning. In addition, they themselves look for resources like research articles, journals, web materials etc. for their purpose. This equips them with more proficiency in seeking resources in comparison to the students of traditional learning methods.

Project-Based Learning involves more teamwork and collaborative learning. The teams or groups resolve relevant problems in collaboration; hence it fosters student interaction, teamwork and reinforces interpersonal skills like peer evaluation, working with group dynamics etc. (Vernon, 1995). It also nurses the leadership qualities in them, teaches them to make decision by consensus and give constructive feedback to team members etc. (Tricia & Moore, 2007). Furthermore, by working in a team, students learn to be responsible to other learners. They learn to set both long- and short-term goals as they relate to the problem. Students learn to communicate effectively with other members of a team and learn the importance of effective communication. These skills are what, according to the business world, students lack when entering the workplace; facilitating exchange of opinions and insight, creating positive social interactions, exerting a combination of diverse strengths and backgrounds in teams, sharing workload, fostering debate and compromise, building trust relationship between group members and enhancing leadership skills (Keeling, 2008), the importance of self-control of the study schedule (Cheong, 2008), having flexibility which enables them to complete tasks (time, presentation, focus and pace) and sharing opinions and perspectives (Pepper, 2009). Spronken-Smith (2005) studied problem-based learning in Geography at the college undergraduate level and the results included increasing positive attitudes towards Geography through Problem-Based Learning instruction. Additionally, Drennon (2005); Tulloch and Graff (2007) also tested students' geographic attitudes using Problem-Based Learning instructional approach and found that students' attitudes towards Geography education improved through the use of these PBL strategies.

5.0 Research Methods

The Convergent parallel design under the mixed method approach was employed. In convergent parallel design, the results or data are merged by comparing, interpreting and

discussing them by stating the degree to which they converge, diverge or are related (Plano-Clark & Creswell, 2011). The study employed this design in order to merge both quantitative and qualitative data for discussion and interpretation to get an in-depth information about the topic under study. The accessible population was Level 300 and 400 B.Sc. Geography and Regional Planning students of the Department of Geography and Regional Planning (DGRP) and Level 300 and 400 B.Ed. (Geography Major) students of Department of Business and Social Sciences Education (DoBSSE). Geography lecturers using PBL method were also involved in the study. The records from the two Departments revealed that there were 44 level 300 and 57 level 400 B.Sc. Geography students in the DGRP and 43 level 300 and 42 level 400 education geography students in the DoBSSE. Hence, all the 186 Geography students were included in the study. Thus, census approach was used to get the respondents of the study. Bhanu (2011) held the view that however accurately a sample from a population may be generated, there will always be margin for error, whereas in the case of census, whole population is taken into account and as such it is most accurate. Besides, purposive sampling techniques was used to sample two (2) lecturers (one each from DGRP and DoBSSE). The lecturers were selected on purpose because they were using the PBL method in teaching Geography.

Questionnaire and interview guides were the instruments used in this study. The questionnaire was designed on five-point Likert scale responses in a descending order from "Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree". The use of questionnaire provided a wider coverage and guaranteed confidentiality and anonymity of the respondents since it was generally self-reporting (Leedy & Ormrod, 2005). Besides, semi-structured interview guide was used to conduct two focus group discussions for selected students from the two departments (one focus group discussion for each department) to probe further into some issues which the questionnaire was not able to provide. Another semi-structured interview guide was used to conduct in-depth interview for the two lecturers. This was done in order to have much information and broader overview of the topic under study to draw informed conclusions. Referring to Twumasi (2001), interview provides the interviewer the flexibility and certain confidential information which might not have been obtained from using questionnaires. The use of these two tools was to enable the investigator to overcome the limitations associated with the use of single data collection instrument. The data collection was done by the investigators and out of the 186 questionnaires administered on the students, 170 were retrieved and this had a return rate of (91%). According to Dillman (2000), return rate from seventy percent (70%) is classified as a good and acceptable return rate. In addition to the questionnaire, eight (8) students each from DGRP and DoBBE were selected for two different focus group discussion and the two lecturers using the PBL method were interviewed. In terms of data analysis, the questionnaires were sorted, edited, coded and analysed using the IBM SPSS (version 22.0). Descriptive statistics tools were used in analysing the data into frequencies and percentages, means and standard deviations. The qualitative data recorded from the focus group discussion and the lecturers' interview were transcribed. Creswell (2008) notes that "transcription is the process of converting audiotape recordings or field notes into text data" (p.246). Thematic analysis was used to analyse the qualitative data. Thus, text data was generated in pre-set themes according to the research questions/hypotheses and discussed.

6.0 Results and Discussion
6.1 Demographic Data of Respondents
Regarding the demographic data of the respondents (students), it was found that 109(64.1%) of the respondents were male whilst 61(35.9%) were female. This denotes that most of the students involved in the study were male. This difference could be ascribed to the fact that

there are more males than females in both departments reading B.Sc. Geography and Regional Planning as well as B.Ed. Social Sciences (Geography Major) and in the University of Cape Coast at large. With regards to the departments and the programmes students are reading, 87(51.2%) of the respondents were from the Department of Geography and Regional Planning [DGRP] and reading B.Sc. Geography and Regional Planning whilst 83(48.8%) of the respondents were from the Department of Business and Social Sciences Education [DoBSSE] and B.Ed. Social Sciences (Geography Major). This implies that majority of the respondents involved in the study were from DGRP and reading B.Sc. Geography and Regional Planning. This difference could be attributed to the fact that the number of level 300 and 400 students reading B.Sc. Geography and Regional Planning from the DGRP was more than respondents reading B.Ed. Social Sciences from the DoBSSE.

6.2 Main Discussion
The analysis and discussion of the study findings focused on mean and standard deviation values which had the following interpretations: For mean values, responses between 1.0–2.4 were concluded to be Strongly Disagree, 2.5–2.9 to be Disagree whilst 3.0–3.4 denoted Not Sure. In addition, 3.5–4.4 signified Agreed whilst 4.5–5.0 indicated Strongly Agreed. Concerning the standard deviation, values below 1 then means the responses are homogenous but in case the values are above 1, then there is a heterogeneous response.

Research Question One: What processes or stages are involved in the employing of problem-based learning in Geography education?
Research question one sought to find out from the respondents their views on the processes or stages involved in employing problem-based learning method in Geography education. Table 1 represents the results.

Table 1 - Processes or Stages Involved in PBL Implementation in Geography

Statement *Preamble:* The instructor………………	Mean	SD
Defines or presents the PBL problem to students to solve.	4.26	0.796
Specifies the context in which the problem should be solved.	4.28	0.792
Guides students to form groups to work on a particular problem in the PBL implementation process.	4.38	0.722
Organises brainstorming sessions with groups before students start solving the problem.	4.00	1.049
Guides students/groups to give regular reports on the problem-solving process.	4.04	0.996
Serves as a facilitator providing guidelines for students in the PBL process.	4.21	0.791
Guides students to individually assume responsibility in the PBL implementation process.	4.06	0.918
Guide students/groups to evaluate their own learning in the PBL implementation process.	4.04	1.040
Total	4.15	0.604

Source: Field survey, Scale: SA=5, A=4, NS=3, D=2, SD=1.

The results in Table 1 showed that majority of the respondents agreed that their instructor defines or presents the Problem-Based Learning (PBL) problem to them to solve and their responses did not differ much from one another. This is evident from the computed values of mean and standard deviation as 4.26 and 0.79 respectively. This confirms the finding of Padmavathy and Mareesh (2013) who indicated in their seven steps of problem-based learning that the problem should be defined. On the respondents' responses to the second statement, the results showed a mean value of 4.28 and a standard deviation value of 0.79. This implies that majority of the respondents agreed that their instructor specifies the context in which the problem should be solved, and their responses were homogeneous. However, the results from the focus group discussion (FGD) showed otherwise. For instance, the students remarked:

"With respect to objective and context specification, some lecturers do while others do not. Some just tell us to research on a topic of our choice and come and present in class while others give us a specific topic and tell us to research on it and present in class. The difference is that, those who give the topic normally do not specify the objectives but, in some cases, some specify the objective(s). The education lecturer always gives us the objectives" (FGD with B.Ed. Students).

Although there was some disagreement on the extent to which instructors provide guidance to structure the context and objectives of the PBL but it was observed that in general the lecturers were doing well with context specification of PBL. These findings are in line with the views of Hung (2006b) who opined in his nine-step problem design process that context specification analysis should be done by the instructor. In addition, Hung (2006a) in his 3R3C problem designing model pointed context (knowledge contextualisation) as one of the core components of the model.

Furthermore, majority of the respondents agreed that their instructor guides them to form groups to work on a particular problem in PBL implementation process and their responses were homogeneous. This is seen from a computed mean of 4.38 and standard deviation of 0.72 in Table 1. Similar findings came up from the focus group discussions with students offering B.Ed. Social Sciences (Geography Major) and B.Sc. Geography and Regional Planning. For instance, in one of the focus group discussions, the students said this:

"We are normally given the chance to form our own groups with the lecturer limiting us to a specific number of students in each group. For example, the lecturer will say form a group of five members. And we are also allowed to choose our own members" (FGD with B.Sc. Students).

This finding is critical as it promotes teamwork and enables students to think together to address a given problem as Hung, Jonassen and Liu (2008) indicated that in PBL designing process, organising students in groups of five to eight helps them to come together and reason through a problem. It further corresponds with Genareo and Lyons' (2015) observation that PBL research should begin with small-group which encourage brainstorming among students about a given problem and in terms of sharing ideas about what they know about the problem and the issues to be studied.

On the statement of whether the instructor organises brainstorming sessions with groups before students start solving the problem, the results found a mean of 4.00 and standard deviation of 1.04. This implies that majority of the respondents agreed to the statement but their responses were heterogeneous, thus differ much from one another. This difference in their responses could be attributed to that fact that the instructors do not always organise brainstorming sessions for students before they start the problem-solving process. This confirms the finding of the focus group discussion in which one of the students remarked as follows:

"Our lecturer organises brainstorming sessions for us before we start the problem-solving process but it is not always that our lecturer organises brainstorming sessions for us before the start of the problem-solving process" (FGD with B.Ed. Students).

This finding is in consonance with the observation by Briggs (2015) that the first few class meetings in a PBL course should include brainstorming sessions in which issues central to the course are identified for students to know what they are expected to do in the problem-solving process. In relation to the students' responses on the statement that "their instructor guides students/groups to give regular reports on the problem-solving process", most of the students agreed to this statement and their responses were homogenous as the computed mean value was 4.04 and standard deviation value was 0.99. This finding supports Duch's (2001) view that the class time may be devoted to groups reporting out their progress on previous learning issues and listing their current learning issues as well as plans of work.

The results also revealed that the instructor serves as a facilitator providing guidelines for students in PBL process and their responses did not differ much from one another as the computed mean value was 4.21 and standard deviation was 0.79. This discovery is in line with the finding of Hung et al. (2008) who connoted that tutors are facilitators who support and model reasoning processes, facilitate group processes, probe students' knowledge deeply and never interject content or provide direct answers to questions. It further affirms Dahlgren's (2003) assertion that instructors act as facilitators rather than primary sources of information in the PBL process.

Furthermore, majority of the respondents agreed that their instructor guides students/groups to evaluate their own learning in the PBL implementation but their responses differ much from one another as the computed mean value and standard deviation were 4.04 and 1.04 respectively. This finding endorses Padmavathy and Mareesh's (2013) revelation that students report and evaluate on self-directed learning in their group meeting. The overall results of the processes or stages involved in the implementation of PBL method in Geography education had a mean value and standard deviation of 4.15 and 0.60 respectively. It can be deduced that majority of the respondents agreed to the statements that sought their responses on the processes involved in implementation of PBL in Geography education and their responses were generally homogenous. Linking it to the conceptual framework, it implies that the students will enjoy the benefits or outcomes of the PBL implementation in Geography which will make the students develop positive attitude towards the course.

Research Question Two: What are the benefits of adopting the Problem-Based Learning method in Geography education?
Research question two sought to find out from the respondents, the benefits derived from adopting Problem-Based Learning method in Geography education. The results presented in Table 2 are as follows:

Table 2- Benefits of Adopting of PBL in Geography Education

Statement *Preamble:* PBL……………….	Mean	SD
Develops student intellectual/critical thinking skills.	5.04	3.883
Develops student observation and problem-solving skills.	4.66	0.473
Promotes students' self-directed and life-long learning.	4.55	0.596
Nurtures the leadership qualities in students.	4.45	0.738
Reinforces student communication and interpersonal skills.	4.59	0.620
Promotes teamwork among students' groups.	4.63	0.584
Develops students' confidence and attitude towards geography positively.	4.49	0.732
Helps students to identify their own deficiencies and progress through self-assessment.	4.42	0.660
Total	4.60	0.619

Source: Field survey, Scale: SA=5, A=4, NS=3, D=2, SD=1.

From Table 2, the results showed that most of the respondents strongly agreed that problem-based learning (PBL) develops student intellectual/critical thinking skills and their responses differ much from one another. This is evident from the computed values of mean and standard deviation of 5.04 and 3.88 respectively. The difference in their responses could be due to the fact that some respondents (especially the B.Ed. students) had not realised the full benefits because of the limited time they work on the problem and the traditional assessment system. This discovery is in consonance with the finding of Sendag and Ferhan-Odabasi (2009) which indicated that the Problem-Based Learning method can promote the development of critical thinking/ intellectual skills. Likewise, most of the respondents strongly agreed that PBL develops students' observation and problem-solving skills and their responses did not differ from one another as the computed mean value was 4.66 and the standard deviation value was 0.47. This finding is critical to the development of students with requisite skills and knowledge to solve societal and national problem. It is in line with the observation of Hung et al. (2008) who revealed that one of the essential promises of PBL is improving students' problem-solving skills.

In relation to the statement that PBL promotes students' self-directed and life-long learning, majority of the respondents strongly agreed to the statement and their responses were homogeneous (M= 4.55, SD= 0.59). The finding affirms the revelation of Schmidt, Rotgans and Yew (2011) that PBL addresses the need to promote lifelong learning through the process of inquiry and constructivist learning. Furthermore, the results in Table 2 depicted that majority of the respondents agreed that PBL nurtures the leadership qualities in students, and their responses did not differ much from one another (M= 4.45, SD= 0.73). This is in agreement with the finding of Tricia and Moore (2007) that Problem-Based Learning nurtures the leadership qualities in students, teaches them to make decisions by consensus and give constructive feedback to team members.

Following the results in Table 2, majority of the respondents strongly agreed that PBL reinforces student communication and interpersonal skills and their responses were homogeneous concerning the statement. This is evident from the computed mean and standard

deviation values of 4.59 and 0.62 respectively. Owing to the statement that PBL promotes teamwork among student groups, the results showed a computed mean value of 4.63 and a standard deviation value of 0.58. This denotes that most of the respondents strongly agreed that Problem-Based Learning promotes teamwork among student groups and their responses did not differ much from one another. Similar findings came up from the focus group discussions organised for both B.Ed. and B.Sc. Geography students. For example, B.Ed. Geography students said this:

> "*PBL is the best because it involves group participation; it enables students to be sociable. It will help students to appreciate what they experience in the real world by knowing the causes of phenomena. It is a way of learning from others and also getting diverse information to analyse as each member of the group may have different information to share. It helps in teaming up when one goes to the field and the group teams up to provide ideas or solution to a problem. It makes students reach the highest taxonomy as the problem-based questions that are given to students sometimes require them to think critically, criticize, analyse and synthesize the problem*" (FGD B.Ed. Students).

These results confirm the study of Vernon (1995) which revealed that PBL fosters student interaction, teamwork and reinforces interpersonal skills like peer evaluation, working with group dynamics as groups resolve relevant problems in collaboration. In addition, the results are in line with the findings of Vardi and Ciccarelli (2008) that employers have appreciated the positive attributes of communication, teamwork, respect and collaboration that PBL students have developed.

In relation to the statement that PBL develops students' confidence and attitude towards Geography positively, majority of the students agreed to the statement and their responses were homogeneous (M= 4.49, SD= 0.73). Lastly, the results in Table 2 showed that majority of the respondents agreed that PBL helps students to identify their own deficiencies and progress through self-assessment and their responses did not differ much from one another. This is evident from the computed mean value of 4.42 and standard deviation value of 0.66. This finding did not differ from the responses from the focus group discussion. The students said this:

> "*PBL helps to clarify doubts or misconceptions held by some students. For example, discussion in problem-based learning where every student brings out his opinion enables students to arrive at a proper understanding of issues at the end of the problem-solving process and help clear any misconception held by any student prior to the discussion. Also, when the number of students in a group is not large, controlling the group will be much easier and everybody get involved in the task given. This teamwork in PBL is important because the explanations offered by colleague group members on a particular topic provide in-depth understanding. Since, students are involved in what they do, they tend to understand it more*" (FGD B.Sc. Students).

These findings are in harmony with the views of Havorson and Wescoat (2002) and Spronken-Smith (2005) who found that Problem-Based Learning instruction in Geography improves students' attitude positively towards the subject. Likewise, other researchers (Lieux, 2001; Schmidt et al., 2006) have found PBL to be effective in enhancing students' confidence in judging alternatives for solving problems, acquiring social studies content to enrich their learning of basic science information among others. The overall responses on the benefits that result from the effective implementation of the PBL method in Geography had a mean and standard deviation value of the 4.60 and 0.61 respectively. The implication is that majority of the respondents strongly agreed that implementation of PBL method in Geography education

is very beneficial to students. These findings are very essential since education seeks to raise generations of problem solvers and positive agents of change in the society, the nation and the world at large.

7.0 Conclusions

Geography instructors using the PBL approach in Workshop Planning and Methods of Teaching Geography go through some of processes in implementing the method in Geography. With regards to the assessment process, a cohort (B.Ed. group) writes exams at the end of the semester which defeat the principles of assessing students' task in PBL environment or instruction. This does not enhance the full appreciation and benefits that the PBL approach offers students in Geography education. It was concluded that effective adoption of the PBL approach in Geography education develops Geography students' critical thinking, observation, problem-solving skills, promotes students' life-long learning, nurtures the leadership qualities in students, reinforces student communication, interpersonal and teamwork skills. This means PBL ensures holistic or comprehensive development of the learners or students since it develops student cognitive domain (mental powers) through critical thinking and logical reasoning. In addition, students' affective needs are catered for through their interpersonal and communication skills, team work spirit as well as nurturing leadership qualities in students. Lastly, the psychomotor skills of students are developed through the field experiences of the hands-on activities. These are virtues needed for societal and national growth and development.

8.0 Recommendations for Practice

The instructors using the PBL method in teaching should focus or adopt problem-based learning assessment system or format which is based on evaluating students'/groups creativity, self-management, teamwork, presentation skills, problem solving outcome among others, rather than the traditional assessment system (i.e. the paper and pen test or exams). This will help realise the full benefits of the PBL approach by both students and instructors. The Departments of Geography and Regional Planning (DGRP) and Department of Business and Social Sciences Education (DoBSSE) should officially adopt Problem-Based Learning approach in teaching Geography courses so that other lecturers within the departments would employ it in their instructional process since it helps students to appreciate their environment. In so doing, the DGRP and DoBSSE should organise seminars or workshops on the use of PBL Method in teaching Geography courses and its related benefits in order to encourage other Geography instructors who do not use the method as a result of inadequate information to use it.

References

Ababio, B. T. (2007). The place of geography in the school curriculum. *Journal of Counselling, Education and Psychology, 1(1)*, 25-35.

Ababio, B. T. (2009). The effective geography teacher. *Ghana Journal of Education and Teaching (GHAJET)* 8(2), 24-28.

Bhanu, S. (2011). *Census and sampling method.* Retrieved from http://bhanusigdel.wordpress.com/2011/11/17census-and-sampling-method/

Bork, L., Hemmer, K. I., & Czapek, L. (2012). *Educational standards in geography for the intermediate school certificate with sample assignments.* U.S.A: National Academy Press.

Briggs, S. (2015). *10 tips for effective problem-based learning: The ultimate instructional solution.* Retrieved from www.opencolleges.edu.au/informed/features/problem-based-learning/

Cheong, F. (2008). Using a problem-based learning approach to teach an intelligent systems course. *Journal of Information Technology Education, 7,* 47–60.

Creswell, J. W. (2008). *Educational research: Planning, conducting and evaluating quantitative and qualitative research.* (3rd ed.). New Jersey: Pearson Education.

Dahlgren, M. A. (2003). PBL through the looking-glass: Comparing applications in computer engineering, psychology and physiotherapy, *Intl. J. Engr. Education*, *19*(5), 672–681.

Dillman, D. A. (2000). *Mail and internet survey: The tailored design method.* (2nd ed.). New York: John Wiley Co.

Drennon, C. (2005). Teaching geographic information systems in a problem-based learning environment. *Journal of Geography in Higher Education, 29*(3), 385-402.

Duch, B. J. (2001). Writing problems for deeper understanding. In B. Duch, S. E. Groh, & D. E. Allen (Eds.), *The power of problem-based learning:* A *practical 'how to' for teaching undergraduate courses in any discipline,* (pp. 47–53). Sterling, VA: Stylus Publishing.

Genareo, R. V., & Lyons, R. (2015). *Problem-based learning: Six steps to design, implement, and assess.* Retrieved from www.facultyfocus.com › articles ›instructional design.

Gentry, E. (2000). *Creating Student-centered, problem-based classrooms.* Huntsville: University of Alabama in Huntsville.

Golightly, A., & Muniz, O. A. (2013). Are South African geography education students ready for problem-based learning? *Journal of Geography in Higher Education, 37*(3), 432–455.

Havorson, S., & Wescoat, J. (2002). Problem-based inquiry on world water problems in large undergraduate classes. *Journal of Geography, 101*(3), 91-102.

Helmke, A. (2009). *Unterrichtsqualitaet und lehrerprofessionalitaet. diagnose, evaluation unterrichtsqualitaet und lehrerprofessionalitaet.* Seelze. Retrieved May 6, 2013 from www.seelze.org.

Hung, W. (2006a). The 3C3R model: A conceptual framework for designing problems in PBL. *Interdiscip. J. Problem Based Learn., 1*(1), 55–77.

Hung, W. (2006b). *A 9-step PBL problems designing process: Application of the 3C3R model.* Paper presented at the 2006 AERA Annual Meeting, San Francisco, CA., April 8–12.

Hung, W. (2011). Theory to reality: A few issues in implementing problem-based learning. *Educational Technology Research and Development, 59*(4), 529–552.

Hung, W., Jonassen, D. H., & Liu, R. (2008). *Problem-based learning: Handbook of research on educational communication and technology.* Mahwah, NJ: Earlbaum.

Keeling, A. (2008). We are scholars: Using teamwork and problem-based learning in a Canadian regional geography course. *Mountain Rise, 4*(3), 1–13.

Leedy, D. L., & Omrod, J. E. (2005). *Practical research planning and design.* (5th ed.). New Jersey: Merrill Prentice Hall.

Lieux, E. M. (2001). A skeptic's look at PBL. In B. Duch, S. E. Groh, & D. E. Allen (Eds.), *The power of problem-based learning:* A *practical 'how to' for teaching under graduate courses in any discipline,* (pp. 223–235). Sterling, VA: Stylus Publishing.

Mayer, R. R. (2013). *How engineers learn: A study of problem-based learning in the engineering classroom and implications for course design.* Unpublished masters' dissertation. Graduate Faculty, Iowa State University.

Mergendoller, J., Maxwell, N., & Bellisimo, Y. (2006). The effectiveness of problem-based instruction: A comparative study of instructional methods and student characteristics. *Interdisciplinary Journal of Problem-based Learning, 1*(2), 49-69.

Padmavathy, R. D., & Mareesh, K. (2013). Effectiveness of problem-based learning in mathematics. *International Multidisciplinary e – Journal, 2,* 45-51.

Pawson, E., Fournier, E., Haigh, M., Muniz, O., Trafford J., & Vajoczki, S. (2006). Problem-based learning in geography: Towards a critical assessment of its purposes, benefits and risks. *Journal of Geography in Higher Education, 30*(1), 103-116.

Pepper, C. (2009). Problem based learning in science. *Issues in Educational Research, 19*(2), 120-140.

Plano-Clark, V. L., & Creswell, J. W. (2011). *Designing and conducting mixed methods research.* (2nd ed.). Thousand Oaks, CA: SAGE Publication.

Quain, A. J. (2014). *Assessing students' attitudes towards geography in a problem-based learning environment.* Unpublished Master's thesis, School of Teaching and Learning, Illinois State University, Illinios.

Savin-Baden, M. (2001). *The problem-based learning landscape: Planet*. (2nd ed.). Retrieved from http://www.gees.ac.uk/planet/p4/msb.pdf

Schmidt, H. G., Loyens, S. M. M., Van Gog, T., & Paas, F. (2007). Problem-based learning is compatible with human cognitive architecture: Commentary on Kirschner, Sweller, and Clark (2006). *Educational Psychologist, 42*(2), 91–97.

Schmidt, H. G., Rotgans, J. I., & Yew, E. H. J. (2011). The process of problem-based learning: What works and why. *Medical Education, 45,* 792-806.

Schmidt, H. G., Vermeulen, L., & van der Molen, H. T. (2006). Long-term effects of problem-based learning: A comparison of competencies acquired by graduates of a problem-based and a conventional medical school. *Med. Educ., 40*(6), 562–567.

Şendag, S., & Ferhan-Odabasi, H. (2009). Effects of an online problem-based learning course on content knowledge acquisition and critical thinking skills. *Computers & Education, 53,* 132–141.

Spronken-Smith, R. (2005). Implementing a problem-based learning approach for teaching research methods in geography. *Journal of Geography in Higher Education, 29*(2), 203-221.

Tan, O. S. (2003). *Problem-based learning innovation*. Singapore: Thomson.

Tricia, S., & Moore, R. D. H. (2007). Implementation of Problem-Based Learning in a Baccalaureate Dental Hygiene Program. *Journal of Dental Education, 71,* 1058–1069.

Tulloch, D., & Graff, E. (2007). Green map exercises as an avenue for problem-based learning in a data-rich environment. *Journal of Geography, 106*(6), 267-276.

Twumasi, P. A. (2001). *Social research in rural communities.* (2nd ed.). Accra: Ghana University Press.

Utecht, R. J. (2003). *Problem-based learning in the student-centered classroom.* Retrieved from *www.jeffutecht.com/docs/PBL.pdf*

Vardi, I., & Ciccarelli, M. (2008). Overcoming problems in problem-based learning: A trial of strategies in an undergraduate unit. *Innovations in Education and Teaching International, 45*(4), 345–354.

Vernon, D. T. (1995). Attitudes and opinions of faculty tutors about problem-based learning. *Academic Medicine, 70,* 216–223.

Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine, 68, 550–563.*

Weiss, R. E. (2003). Designing problems to promote higher order thinking. In D. S. Knowlton, & D. C. Sharp, (Eds.), *Problem-based learning in the information age,* (pp. 25–31). San Francisco, CA: Jossey-Bass.