

ASSESSING THE RESEARCH CAPABILITY OF SENIOR HIGH SCHOOL STUDENTS OF A GOVERNMENT LABORATORY HIGH SCHOOL

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ABSTRACT

The main objectives of this research are to assess the research capability of the first batch of Senior High School graduates and identify the strengths and areas for improvement of the curriculum being offered in the Laboratory High School to best prepare them to higher level researches. The study used methodological triangulation of the samples' self-assessment, experts' and researcher's assessment on the research paper output to compare if similar results are found so that validity is established. Descriptive method was used in the analysis of the research wherein the mean from variables were utilized to compare and identify the strengths and areas for improvement of the curriculum. A questionnaire was devised and used to measure the students' capability in writing a research paper. The samples of this research were 149 students who were available during the conduct of the study. They were among the 170 graduates of Senior High School from the academic year 2017-2018. It was very evident from the three sets of assessment made that choosing appropriate sample of the study is a strong capability while presenting reviews of related literature (8-10 pages) is an area the requires improvement. A one-way ANOVA supported and strengthened the validity and reliability of the assessments made on the research capability of the respondents. A follow-up study on the performance of the students in their undergraduate research is recommended to further strengthen the result and use of the present study.

Keywords: *Research Capability, Strengths and Areas for Improvement, Senior High School, Triangulation, Sample of the Study, Review of Related Literature*

INTRODUCTION

Research improves the quality of life. Regardless of the specialization the researcher has, there are always areas that need to be improved. The world is not perfect but it keeps on developing. Through research we can see the improvement around us, from an instant coffee that people love to drink every morning to the convenience that technology provides in everyone's life. Almost everything is a product of research.

Research is defined as an original investigation undertaken in order to gain knowledge and understanding as cited by Brower (2010) in the Higher Education Funding for England. Students at their young age are now being developed to be research-oriented. Research subjects are being offered in the curriculum to enhance the students' cognitive skills enabling the transfer of capability from one situation to another. Research activity by its nature provides opportunities for innovation that develop higher cognitive capabilities and foster creativity (WARWICK,

2006).

Changes are made constantly in the Philippine curriculum by adding subjects and replacing other topics to a more relevant one. Research as a subject is used to be offered only to the tertiary level and in the graduate school as one of its major requirements. When Senior High School was added to the Basic Education curriculum through the K to 12 educational reform, general subjects from the tertiary level have been offered and these include Research. As a matter of fact it is not only offered once - there is Practical Research 1 (Qualitative Research), Practical Research 2 (Quantitative Research), and Research Project which serves as a final output for the application of learning in Research. Hence, Senior High School students are expected to be research-oriented and must have the capability to write quality research papers in their area of specialization.

Research, being one of the tri-focal functions of a university, requires individuals capable enough in producing quality researches that would substantiate academic achievement and excellence. Research capability means the ability of individuals, organizations and systems to undertake and disseminate high quality research effectively and efficiently (DFID's Research Strategy 2008-2013). Senior High School, being offered as one of the programs of Bulacan State University aims to develop students' competencies to write researches that is focused in responding to the immediate needs of the community.

Practical Research 1 develops critical thinking and problem-solving skills through qualitative research. Practical Research 2 develops critical thinking and problem-solving skills through quantitative research. Research Projects as a subject is expected to enable the students to apply all that they learned from both Practical Research 1 and 2. Quality output is expected at the end of each subject. Due to the number of research subjects, research conducts and writing exposures, the graduates are therefore expected to have gained the significant level of knowledge and skills to undertake quality researches.

Objective of the Study

The main objectives of this research are to evaluate the research capability of the first batch of Senior High School graduates, and identify the strengths and areas for improvement of the curriculum being offered in the Laboratory High School to best prepare them to higher level researches.

Statement of the Problem

The study made an assessment on the research capability of the Senior High School graduating students and identified the strengths and areas for improvement of the curriculum.

The researcher sought answers to the following questions:

1. What is the research capability of Senior High School graduates based on their own perspective?
2. What is the research capability of Senior High School graduates based on their research paper output as evaluated by the experts?

3. What is the research capability of Senior High School graduates based on the assessment of the researcher of this study?
4. Based on the result of the survey, which of the competencies are most significant to be considered as the strengths and areas for improvement of the Senior High School research curriculum?
5. Is there a significant difference between the assessment made by the students, experts and researcher?

METHODOLOGY

Research Design

The study used methodological triangulation. Methodological triangulation involves the use of multiple quantitative methods to study the program (Guion, et al., 2012). The study used results from the samples' self-assessment of their capability, and the experts' and researcher's assessment of the samples' capability based on their research output. Comparisons were made to establish validity using a one-way ANOVA. Descriptive method was used in the analysis of the research wherein the mean from variables were compared to identify the strengths and areas for improvement of the curriculum.

Population and Sample

The respondents of this research were the 149 out of 170 first batch of the Senior High School graduates of school year 2017-2018. The study evaluated students' research output in their culminating research subject which is Research Project offered on the Second Semester, S.Y. 2017-2018. The researcher decided not to include and analyze the research output in other research subjects since those subjects are the starting period of the students' development of their research skills.

Instrumentation

To gather the data, a questionnaire was devised to measure the students' capability in writing a research paper. This questionnaire was anchored on the Curriculum Guide Learning Competencies of the subject Research Project from the Department of Education. The same questionnaire was used by the experts and the researcher in evaluating the research output of the samples to determine their research capability. . It was used to measure the competencies of the students using the 4-point Likert scale: Highly Competent (4), Competent (3), Somewhat Competent (2), and Not Competent (1). To interpret the result of the questionnaire, the scale below was utilized:

3.25 - 4.00	Highly Competent;
2.50 - 3.24	Competent;
1.75 - 2.49	Somewhat Competent;
1.00 - 1.74	Not Competent

The result of this study will serve as an assessment of the first implementation of Senior High School of Department of Education in terms of research. This will also be a big help in

enhancing and enriching the Senior High School Curriculum especially the subjects involving research.

Hypotheses of the Study

There is no significant difference between the self-assessment made by the sample of the study, assessment made by the experts and assessment made by the researcher, on the research capability of the students.

RESULTS AND DISCUSSION

The students made a self-assessment of their research capability based on their knowledge and skills acquired from their Practical Research 1 (Qualitative Research) and Practical Research 2 (Quantitative Research). Table 1 shows the level of competencies of the students in each strand based on their self-assessment.

Table 1
Research Capability of Students based on self-assessment

Competencies	ABM	HUMSS	STEM	MEAN	VERBAL INTERPRETATION
C10	3.61	3.64	3.34	3.53	Highly Competent
C7	3.57	3.45	3.52	3.51	Highly Competent
C12	3.46	3.55	3.35	3.45	Highly Competent
C4	3.46	3.45	3.3	3.41	Highly Competent
C15	3.63	3.27	3.32	3.41	Highly Competent
C1	3.35	3.45	3.22	3.34	Highly Competent
C11	3.33	3.45	3.13	3.30	Highly Competent
C3	3.43	3.25	3.16	3.29	Highly Competent
C9	3.30	3.36	3.20	3.29	Highly Competent
C6	3.43	3.27	3.05	3.25	Highly Competent
C8	3.33	3.27	3.05	3.22	Competent
C13	3.28	3.27	2.98	3.18	Competent
C14	3.26	3.27	2.9	3.15	Competent
C2	3.22	2.82	2.98	3.0	Competent
C5	3.04	2.91	2.79	2.92	Competent
MEAN PER STRAND	3.38	3.31	3.15	3.28	Highly Competent

Note: Code of Competencies (Please see Appendix A.)

Table 1 presents the research capability of the Senior High School students in the BulSU-Laboratory High School based on their self-assessment. Having the highest mean of 3.53 (Highly Competent), the students confidently answered that they are capable of gathering and analyzing data with intellectual honesty using suitable techniques (C10). This is similar to the result of the study of Davidson and Palermo (2015) in his study on the Developing Research Competence in Undergraduate Students through Hands on Learning, which states that self-perceived competence of the students increased in a small degree in specific research skills such as

information gathering and handling, information assessment, ability to work independently, and critical thinking.

Next in rank is choosing appropriate sample (respondents) for the study (C7) having the second to the highest mean of 3.51 which is also interpreted as Highly Competent. This result is one of the lowest in the findings of Mizany, Khabiri, Sajadi (2012) on the capabilities of graduate students in writing thesis and the advising quality of faculty members to pursue the thesis which only got 2.15 in the whole research methodology.

Presenting written review literature (8-10 pages) (C5) got the lowest mean of 2.92 although still interpreted as Competent. The study in Africa on building research capability in higher education found out that students thought they knew how to find and use information, because they could ‘use’ the internet. In fact, students made poor use of ICT and were not information literate; they were seldom aware of freely available sources and made little critical analysis of what was found (Hepworth, M., & Duvigneau, S. (2012). The students also find it hard to formulate clearly the statement of research problem (C2), having the mean of 3.0 (Competent) which ranks 14th. This is one of the critical part of research development. Failure to formulate effective research problem will result to difficulty of identifying the real essence of the study.

In general, the students rated themselves as highly competent with a mean of 3.28. As students who are new to research, this rating is a good start. They will bring all the learning in their undergraduate studies.

The experts evaluated the research capability of the students based on the submitted papers of the students by group. Below is the summary of the experts’ assessment.

Table 2
Research Capability of Students based on the experts’ assessment

Competencies	ABM	HUMSS	STEM	MEAN	VERBAL INTERPRETATION
C6	4	4	3	3.67	Highly Competent
C7	4	4	2.5	3.5	Highly Competent
C14	4	4	2.5	3.5	Highly Competent
C9	4	3	3	3.33	Highly Competent
C11	4	3	3	3.33	Highly Competent
C12	4	3	3	3.33	Highly Competent
C15	4	3	3	3.33	Highly Competent
C1	4	3	2.5	3.17	Competent
C3	4	3	2.5	3.17	Competent
C13	4	3	2.5	3.17	Competent
C4	4	3	2	3.0	Competent
C10	3	3	3	3.0	Competent
C2	3	3	2.5	2.83	Competent
C8	4	2	2.5	2.83	Competent
C5	3	3	2	2.67	Competent
MEAN PER STRAND	3.8	3.13	2.63	3.19	COMPETENT

Note: Code of Competencies (Please see Appendix A.)

The experts rated the students highest in describing adequately research design (either quantitative or qualitative) (C6) having 3.67 mean and interpreted as Highly Competent. Students having prior knowledge to qualitative and quantitative types of research were able to apply their knowledge and skills in their final paper. This result is in the 5th and 7th in rank of the Maritime Faculty Members and Senior Students in Lyceum International Maritime Academy (Formeloza and Patenan, 2013) to the study which is rated as Moderately Competent. This clearly shows that the students in the Laboratory High School of Bulacan State University were trained to describe competently research design (either quantitative or qualitative).

Experts also evaluated the students as highly competent in choosing appropriate sample (respondents) for the study (C7) which is also similar to the result of the self-assessment of the students (mean=3.5; Highly Competent). According to Martinez-Mesa, et.al. (2016) researchers need to decide during the planning stage of the study if they will work with the entire target population or a sample. Choosing appropriate sample for the study is a very crucial part of the research process because this will determine the generalization of the result of the target population.

Having the same rank with choosing appropriate sample (respondents) for the study, students can defend written research report with accuracy. This was proven when selected Senior High School students were invited to the Research Colloquium sponsored by the College of Education of the University last April 13, 2018. Select students from the different academic strands showed confidence and trust among themselves that they knew their research and proud to share the results.

Students can present written review literature (8-10 pages) (C5) (mean=2.67; Competent) got the lowest rating. This is also the lowest in rank in the self-assessment of the students (mean=2.92; Competent). It is not easy to present a comprehensive written review of literature. Even graduate students are having difficulties on this part of research According to the article published by University of Liecester (2010), it is a showcase of talents of: understanding, interpretation, analysis, clarity of thought, synthesis, and development of argument.

The students can formulate clearly the statement of research problem and the students can formulate their own instrument of the study are both in the 13th rank having the mean of 2.83 (Competent). These are also in the lowest rank in the self-assessment of the students. To a beginner researcher, developing an instrument for the study is very complicated. Developing and testing questionnaires posits five sequential steps involved in the formulation and testing a questionnaire: research background, questionnaire conceptualization, format and data analysis, and establishing validity and reliability. Systematic development of questionnaires is a must to reduce many measurement errors. (Radhakrishna, 2007)

The students can formulate clearly the statement of research problem and rated themselves competent but this is in the 13th rank out of 15 competencies. The experts observed that students are having a hard time to focus on the specific questions to be asked aligned to the general questions of the study.

The experts rated the students competent with a mean of 3.19 in general. With their experience in doing research, they have this high standard, but still rated as competent.

The table below summarizes the assessment made by the researcher on the research capability of the sample based on the submitted research output.

Table 3

Researcher's assessment based on the output of the students

Competencies	ABM	HUMSS	STEM	MEAN	VERBAL INTERPRETATION
C7	4	4	4	4.00	Highly Competent
C6	4	4	4	4.00	Highly Competent
C15	3	3	3	3.00	Competent
C13	3	3	3	3.00	Competent
C11	3	3	3	3.00	Competent
C9	3	3	3	3.00	Competent
C10	3	3	3	3.00	Competent
C4	3	3	3	3.00	Competent
C1	3	3	3	3.00	Competent
C12	2	2	3	2.33	Competent
C14	2	3	2	2.33	Competent
C8	2	2	2	2.00	Somewhat Competent
C5	2	2	2	2.00	Somewhat Competent
C3	2	2	2	2.00	Somewhat Competent
C2	2	2	2	2.00	Somewhat Competent
MEAN PER STRAND	2.73	2.80	2.80	2.78	COMPETENT

Note: Code of Competencies (Please see Appendix A.)

For stronger and valid analysis of the previous result of the tables, the researcher evaluated the research output of the students. This action completed the triangulation of variables to effectively come up with a reliable result of the data analysis. Table 3 shows the competencies rated as highly competent. Top in rank is choosing appropriate sample (respondents) for the study (C7) and describing adequately research design (either quantitative or qualitative) (C6) having the same mean of 4.00. Next in rank are revising written research report based on suggestions and recommendations of panelists, writing, and present clear report and form logical conclusions, having the same mean of 3.0, interpreted as competent. Capacity to interpret research reports, engage in practitioner-based research and conduct literature searches were most highly rated as important (Gleeson, Sugrue and O'Flaherty, 2017). Though, students rated themselves as competent in the said areas, improvement of the curriculum offering will make them more capable in writing researches.

Meanwhile, competencies such as formulating their own instrument of the study (C8), presenting written review literature (8-10 pages) (C5), selecting, citing and synthesizing properly related literature (C3) and formulating clearly the statement of research problem (C2) are rated

somewhat competent. This result is consistent from the self-assessment of the students and expert.

The researcher’s assessment of the research capability of the students is competent having the mean of 2.78. Students as Senior High School graduates are starting to imbibe the nature of research. From the number of research subjects included in the curriculum, they have made themselves familiar to the different parts of it. The research subjects brought out the curiosity of the students to start taking actions in every problem they are encountering.

Strengths and Area for Improvement

The study revealed the strengths and area for improvement of the research offerings in Senior High School Program of Bulacan State University-Laboratory High School. Table 4 presents the summary of these competencies: mean from students, experts and researcher’s assessment, verbal interpretation and remark. All competencies rated highly competent and competent were considered the strengths while the competencies rated as somewhat competent and below were considered the areas for improvement.

Table 4
Summary of Competencies

Competencies	Students	Experts	Researcher	MEAN	VERBAL INTERPRETATION	REMARK
C7	3.54	3.25	4.00	3.60	Highly Competent	STRENGTH
C1	3.33	3.00	4.00	3.44	Highly Competent	STRENGTH
C6	3.22	3.50	3.50	3.41	Highly Competent	STRENGTH
C9	3.28	3.25	3.50	3.34	Highly Competent	STRENGTH
C12	3.44	3.25	3.25	3.31	Highly Competent	STRENGTH
C11	3.28	3.25	3.25	3.26	Highly Competent	STRENGTH
C10	3.50	3.00	3.25	3.25	Highly Competent	STRENGTH
C15	3.40	3.25	3.00	3.22	Competent;	STRENGTH
C14	3.11	3.25	3.00	3.12	Competent;	STRENGTH
C13	3.15	3.00	3.00	3.05	Competent	STRENGTH
C4	3.40	2.75	3.00	3.05	Competent	STRENGTH
C3	3.28	3.00	2.50	2.93	Competent	STRENGTH
C8	3.20	2.75	2.00	2.65	Competent	STRENGTH
C2	3.02	2.75	2.00	2.59	Competent	STRENGTH
C5	2.89	2.50	2.00	2.46	Somewhat Competent	AREA FOR IMPROVEMENT
MEAN PER STRAND	3.28	3.19	2.78	3.08	COMPETENT	

Note: Code of Competencies (Please see Appendix A.)

The summary of competencies presented in Table 4, shows the strengths and area for improvement of the curriculum. The first in rank is choosing appropriate sample (respondents) for the study (C7) (mean=3.60). It is followed by preparing a plan and a focus on issues and ideas in respective field (C1) (mean=3.44); can describe adequately research design (either quantitative or qualitative) (C6) (mean=3.41); can present written research methodology (C9) (mean=3.34); can form logical conclusions (C11) (mean=3.26); make recommendations based on conclusions (C12) (mean=3.31); and gather and analyze data with intellectual honesty using

suitable techniques (C10) (mean=3.25). These are the competencies considered as the strengths of the offered research subjects.

Meanwhile, presenting review of related literature (8-10 pages) is considered as area for improvement (C5) (mean=2.46). For the graduates of early childhood education in the study of Dunn, Harrison and Coombe (2008), they considered the review of related literature as their “learning curve” which help them to gain experience and new knowledge. This is the main reason why presenting review of related literature should be improved in the part of the future researchers.

Combining the result of the triangulation, having the mean of 3.08 rated the research capability of the sample as competent.

To test if the assessment of the students, experts and researcher differs significantly from each other, the data was subjected to a One-Way ANOVA. Below is the table summarizing the test.

Table 5
Summary of Data Using One-Way ANOVA

<i>Treatments</i>	Self-assessment	Experts	Researcher	Total
N	15	15	15	45
$\sum X$	49.04	45.75	45.25	140.04
Mean	3.2693	3.05	3.0167	3.112
$\sum X^2$	160.7748	140.5625	142.4375	443.7748
Std.Dev	0.1786	0.2706	0.651	0.4256

Table 6
Result Details of One-Way ANOVA

<i>Source</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	
Between-treatments	0.5653	2	0.2826	<i>F</i> = 1.60312
Within-treatments	7.405	42	0.1763	
Total	7.9703	44		

The *f*-ratio value is 1.60312. The *p*-value is .213338.

The result is *not* significant at $p < .05$.

Results of the analysis revealed that no significant difference exists between the three assessments made on the research capacity of the sample. It only strengthen the validity and reliability of the assessments.

CONCLUSIONS AND RECOMMENDATIONS

It is very evident from the assessment of the students, experts and researcher that choosing appropriate sample (respondents) of the study is the students' strongest capability. Presenting review of related literature (8-10 pages) on the other hand is the lowest in rank which means it is the area that needs further improvement.

The rating of "somewhat competent" cannot be considered a weakness but only points for consideration. The teachers of research subjects came from different colleges in their own area of specialization. Research teacher of ABM is from the College of Business and Administration, while the research teacher of HUMSS is from the College of Social Sciences and Philosophies, and the research teacher of STEM is from College of Science, who are all Master Degree holders. In the study of Kazarina, Khasanshin and Smyshlyaeva (2015), they cited that not every teacher is capable of forming pupils' research competence even if he or she possesses the method of sequential adaptation of pupils to conducting research. Teachers have serious difficulties at organization of their research activity since they are not ready to shift focus from usual professional activity. Thus, nowadays we should have in mind a teacher with professional culture where such personality traits and qualities prevail as specific cognition (combination of knowledge and notions necessary for a teacher for setting and solving research tasks in professional activity); creative activity; system of values; motivation (supposing interest in research activity aimed at development and realization of research tasks, projects with pupils, cooperative participation in contests, conferences, seminars etc.). The Senior High School Program should continuously look after the professional and personal attributes of teachers who are going to handle research subjects.

The result of the one-way ANOVA only proves that the self-assessment made by the students coincides with the assessment made by the experts and the researcher. It only means that the students were able to make a good judgement of their own capability and that they know what they really know.

With these results, it is appropriate to say that the first batch for Senior High School graduates in BulSU are developing to be future researchers in their own field of specialization. The curriculum in general offers a commendable delivery of research as a significant subject in Senior High School.

The result of the study would be of great help in improving the offerings of research subjects to the Senior High School students of Laboratory High School. Competencies rated "Somewhat competent" must be given extra focus to improve the research writings of the students. Detailed discussion on this topic and more examples related to their strand is recommended. For future research, a follow-up on the performance of the students in their undergraduate studies on how they apply their learning in writing a research paper is hereby recommended.

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APPENDIX A. Code of Competencies

Code	Questions
C1	I can prepare a plan and a focus on issues and ideas in my respective field.
C2	I can formulate clearly the statement of research problem.
C3	I can select, cite and synthesize properly related literature.
C4	I use sources according to ethical standards.
C5	I can present written review literature (8-10 pages).
C6	I can describe adequately research design (either quantitative or qualitative).
C7	I choose appropriate sample (respondents) for the study.
C8	I can formulate my own instrument of the study.
C9	I can present written research methodology
C10	I gather and analyze data with intellectual honesty using suitable techniques.
C11	I can form logical conclusions
C12	I make recommendations based on conclusions.
C13	I can write and present clear report
C14	I can defend written research report with accuracy.
C15	I revise written research report based on suggestions and recommendations of panelists.