Development Education Journal of
Multidisciplinary Research

Assessing Undergraduate Research Competence: Readiness for Research-oriented Jobs

ELVIRA L. ARELLANO*, LOURDES N. MORANO, CHERRY T. NEPOMUCENO
**elvie_a2001@yahoo.com*
West Visayas State University
Iloilo City, Philippines

Abstract
This descriptive research conducted among 963 graduating students in a state-funded university in the Philippines, AY 2011-2012, aims to determine proficiency level of students in basic research skills. A two-part 25-point examination was used to determine their research skills proficiency. Results showed that students are able to identify factors when choosing a research problem, formulate the conclusions from research findings, apply sampling techniques, correctly choose data gathering instrument, and identify variables as the majority of students correctly answered the respective items. Less than half are able to state hypothesis, choose appropriate scale for qualitative variables, identify appropriate statistical test, identify research design, and state elements of the introduction of a research proposal. Students performed poorly in outlining the general steps and procedure for carrying out a research project. Majority of the students is not proficient in the lower order research competencies. Despite research exposure of college students starting from secondary education, results seem to reveal that students who will soon join the labor market are not fully equipped with research skills for them to engage in research-oriented jobs.

Keywords: basic research skills, research proficiency assessment, research competence, undergraduate students

It is widely accepted that the workplace is changing, and skills necessary for success in the 21st century workplace are different from those of the past. To be competitive in the global economy, the country's education system must prepare students to participate in the fast-paced, technology-driven workplace. Students also need to attain proficiency in science, technology, and culture, as well as gain a thorough understanding of information in all its forms (NCREL and Metiri, 2003). Higher education can provide high-level academic, technical, behavioral, and thinking skills, by building on the essential life skills learned from basic education. Economies need these skills to increase their human capital and produce a strong labor force to apply the technology of today to reach higher productivity. At the same time, mathematics, science, and technological knowledge and skills, such as the ability to think critically and spur creativity, improve the country's capacity to assimilate, adapt, and develop new technology. Universities can also directly contribute to research and development. These two processes increase productivity through innovation (The World Bank, 2011). In fact, Australian government's research vision for 2020 is a strong and productive Australian research workforce comprising the scale, breadth and depth of skills required to support innovation, educate the next generation of Australians, and ultimately drive productivity improvements across the economy (Australian Government Department of Innovation Industry Science and Research-AGDIISR, 2011).

Workplace projections indicate that demand for research qualified people is set to grow at a faster rate than overall employment demand in Australian economy over the decade to 2020 (AGDIISR, 2011). This strong demand for research skills can be expected to be further magnified as the government's aspiration for research, innovation, and higher education in Australia are fulfilled. This trend

does not only apply to Australia and other Western countries. In the book Putting Higher Education to Work: Skills and Research for Growth in East Asia, World Bank (2011) reports that East Asian countries rely on universities provide research skills. Universities should also produce research that will strengthen their labor force primarily in the areas of technology and innovation of their business sectors.

Is higher education meeting the demands of the labor market? The World Bank (2011) examined how much higher education in East Asia is producing skills for productivity and innovation. Are universities producing sufficient number of graduates who meet the industry's proficiency standards and have higher order training, research and entrepreneurial skills to deepen domestic technological capabilities? Survey results show that the poorer performance of middle-income countries in East Asia (which includes China, Indonesia, Malaysia, Mongolia, Philippines, and Thailand) highlights the failure of higher education to match what employers demand and what employees supply and to conduct the research needed for an innovation-driven economy. Even Australia has recognized that they may not have sufficient research qualified people to support an innovation economy (AGDIISR, 2011).

While Philippine education is still struggling with its quality efforts, the global economy continue to demand from higher education, highly skilled and technologically-advanced workforce as there is much evidence of the positive relationship between higher education and economic development. As reported by World Bank (2011), the two key drivers of the productivity will be skills and research. Higher education will continue to be its primary source. To contribute to research productivity, tertiary level graduates should first be equipped with research skills.

The Philippine Commission on Higher Education (CHED) emphasized the importance of research skills by integrating in almost all HE curricular programs, research courses and activities. The benefits of students' exposure to research reported by Thangiah and Dorairaj (2008) include, but not limited to, supplementing class learning by improving undergraduates' ability to analyze critically given information, understanding and applying appropriate research methods and communication skills that are important in academics and the job market. However, there is evidence that students are displaying less confidence with their research skills (Leggetter and Sapsed, 2011; Thangiah and Dorairaj, 2008). Preliminary findings of Leggetter and Sapsed (2011) suggest that knowledge and understanding of the research process is a challenge for a large number of students regardless of where they were educated. When asked about the skills they felt they had not achieved, all respondents identified a lack of understanding and confidence with data analysis. Now, because of the perceived importance of acquiring these research skills, a study was conducted to ascertain how far Philippine universities have gone in terms of research training of students.

In a state university, in the Philippines, a quality assurance initiative through learning assessment was undertaken. One of the areas assessed was research competence of graduating college students. Other areas assessed include critical thinking, historical perspective, civic responsibility, technological facility, scientific literacy, information literacy and effective communication. In its initial stage of assessment, lower order research competencies were evaluated. From the results, the research team can design and develop research competency assessment that can jibe with the labor market requirements. Results can be utilized for curricular reviews as well as to plan teaching and learning activities that can enhance research competencies needed in the workplace.

Review of Related Literature

The role that research competence plays in the future abilities of a student has not been researched comprehensively other than the emphasis to provide research courses in the curriculum (Jamieson, 2002). With this background, Indiana University developed an assessment and evaluation procedure to assess research competence of undergraduate and graduate students who have taken introduction to research courses. The first step in the process of assessment consists of a series of laboratory assignments designed to test research competence in both quantitative and qualitative research. The second step is the presentation of research techniques. In addition, students take a competency examination in introductory research. On the other hand, lecturing staff on the Public Health Master's Program of the University of Bedfordshire, UK perceived that a significant number of international students were entering the course without the underpinning knowledge-base or experience of research methods. Hence, the quality of their work are assessed as less satisfactory (Leggetter and Sapsed, 2011). In fact, preliminary findings of studies on assessing research skills indicated that students felt they still lack understanding and confidence with data analysis after taking a research course.

Because of similar observations on inadequate research skills of students, particularly, in areas such as data interpretation, data analysis, and critical thinking, the University of Scranton build research competence in nursing through mentoring (Byrne and Keefe, 2002). They have identified mentoring relationship models as traditional mentor and protégé, team, peer, inclusive and mentoring forward. E-mentoring strategies facilitate interactions for long-distance relationships. Choices among mentoring models were influenced by resources, priorities, and objectives that are congruent with a given

nursing setting and time. Likewise, the University of Western Sydney Hawkesbury build research competence by offering Research, Philosophy and Methodology (RPM) as a core course introducing the different paradigms found within science to students, and develops their understanding of different approaches to problem solving and extending knowledge (Halford, et al., 1999). They are changing the content of the subject over the years by getting informal feedback from students through a questionnaire. A good improvement in the subject was adopting different forms of expression for scientific communication. All students reported that the course improved their writing skills and ability to absorb information from journal articles.

Another strategy of developing research skills is by the use of STARS – The Scientific Training by Assignment for Research Students Project. It is comprised of an internet-based learning resource that has been designed to help undergraduate students develop a number of fundamental skills associated with conducting scientific research (Finn and Crook, 2003). It aims to improve the ability of students to plan, design, manage, and execute scientific research while providing opportunities for formative assessment and rapid feedback.

Why should we be interested in the research profile of the undergraduate students? High research skills strongly support a more highly skilled and productive workforce especially in today's innovation economy. In the Philippines, we can rarely find published studies on research skills assessment. What is available are unpublished thesis of limited scope and are self-perceived research competencies. Understandably, it is difficult to measure research competence, at least to construct an assessment instrument.

Objective

This study was conducted to determine research competence proficiency level of graduating college students in a state-funded university in the Philippines for AY 2011-2012. The proficiency level of students classified by course/academic program/specialization in the basic research skills test was determined.

Method

This section describes the subjects, the instrument used, and the data analysis procedure.

The Participants

All graduating students for AY 2011-2012 were asked to participate in the 2012 Terminal Competencies Assessment. Research Competence is one of the areas assessed. A total of 963 students taking different academic programs took the test. The distribution of student-participants in this study is shown in Table 1.

Instrument

A two-part 25-point examination was designed and developed by the WVSU Research Competence Assessment Team. The test was based on the indicators specified in the West Visayas State University Student Learning Assessment Plan 2010-2015 (WVSU-Learning Assessment Center, 2010) for Research Competence. The first part is a 10-item multiple choice test. It covers the essential skills in research that include identifying factors when choosing a research problem; stating hypothesis; identifying research design; applying sampling techniques; identifying variable, and choosing appropriate scale for qualitative variable. It also covers choosing data gathering instrument; identifying appropriate statistical test; formulating conclusion from research findings; and stating elements of the introduction of a research

proposal. Part 2 includes outlining the general steps and procedures for carrying out a research project and identifying components of the method section. The test was subjected to face and content validity evaluation by a team of research faculty in the university.

Table 1

Distribution of Students by College by Academic Programs/Course

College	**Academic program/course**	**Number of students**	**Total by College**
Arts and Sciences	AB English	42	161
	AB Political Science	48	
	BS Biology	41	
	BS Applied Mathematics	30	
Business & Mgt	BHotel & Restaurant Management	66	109
	BCooperative Management	43	
Education	BSEd English	33	328
	BSEd Mathematics	30	
	BSEd Physics	13	
	BSEd Physical Science	11	
	BSEd Biology	15	
	BSEd Filipino	19	
	BSEd Social Studies	13	
	BSpecial Education	88	
	BEEd ECE	33	
	BEEd General Education	73	
Info & Comm Tech	BS Information Technology	36	67
	BS Information Systems	31	
Communication	BJournalism	26	128
	BBroadcasting	60	
	BS Dev Communications	42	
Nursing	BS Nursing	113	113
PESCAR	BPhysical Education	49	57
	BMusic Education	8	
Total		**963**	

Data Analysis

Student scores for each part of the Research Competence test were obtained. In part 1, items represent certain research skill hence scores for these items were also obtained. The total score was converted to percentage, and the following scale was used to determine proficiency level. See Table 2.

Table 2 Proficiency Level by Percentage Test Score

% Score	Proficiency level
Below 25 %	Novice
25 - 49.99 %	Basic
50 - 74.99 %	Proficient
75 % and above	Advanced

Means, standard deviations, proportions, cross tabulations and a bar graph were used to describe the data. Employing 0.05 level of significance, analysis of variance was used to compare group means when students were grouped by academic program/course/specialization. Scheffe's test for pairwise comparison of means was used as post hoc analysis for significant ANOVA.

Results and Discussions

This section includes presentation of students' performance in specific basic research skills when they were taken as a whole, and when they are grouped by academic program/course.

Figure 1 presents the mean score of students in each item in the test representing certain basic research skills. These mean scores indicate the proportion of students who correctly answered each item. Results show that

mean scores ranged from 0.29 to 0.88. When given options, students are able to identify researchable problem as indicated by a mean of 0.88 implying that 88% of the 963 students correctly answered the corresponding item. When asked to choose a conclusion for particular research findings, 78% of the students identified the best option. Likewise, 74% of the students were able to identify the applicable sampling technique given a research situation.

On the other hand, many students seem to have difficulty with stating the hypothesis as there are only 29% of them who correctly considered the most appropriate hypothesis given the research problem. Also, only 30% of the students are able to identify the scale that would describe responses qualitatively.

Identifying appropriate statistical test given research problem, situation, and assumption seem to be a problem among students since corresponding item was correctly answered by only 31% of the students.

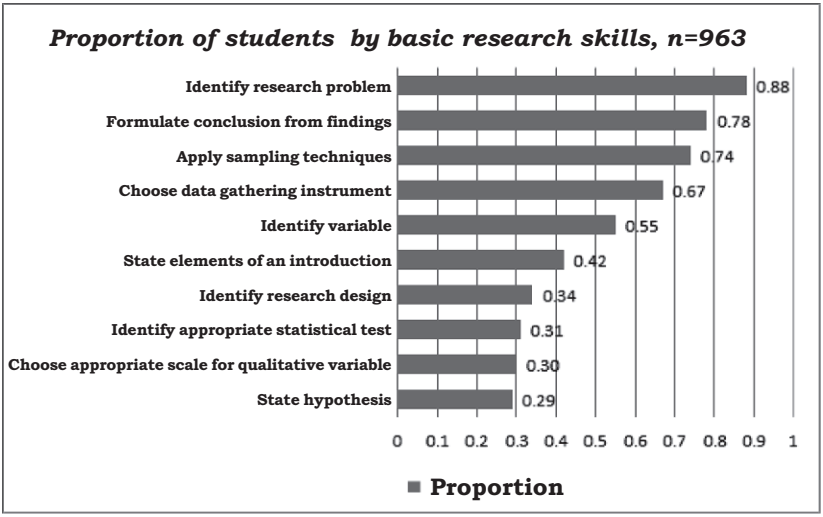

Figure1. Proportion of students who correctly answered the test item on certain basic research skill.

Research competencies included in Part 1 of the research test are basic and considered as lower order skills. Other than research skills and techniques, UK Research Councils identified other key research skills areas as knowledge and understanding of the research environment, research management, personal effectiveness, communication skills, networking and team working, and career management through the Joint Statement of the UK Research Councils' Training Requirements for Research (UK Grad Programme, 2001). The results indicate that research instruction in the university still has to address the inadequacy in the lower order research competencies. It appears that it is still a long way to go to aspire for students to have gained higher order research skills.

Summary results of student scores in Part 1 of the test are shown in Table 3. Overall mean of 52.75 was computed when students were taken as a whole, with a standard deviation of 16.02. This indicates that, on average, the whole batch is Proficient in the basic research skills included in the test. These results seem congruent to that of Chavez (2014) when students appraised themselves to have good knowledge and skills in research but with much room for improvement. Similar result was noted by Chapman (2010) that students still lack basic research skill. When grouped by course/specialization, mean scores are arranged from highest to lowest. BS Nursing posted the highest group mean of 67.52 (SD=14.18); the group's lowest score is 30 and at least one student obtained perfect score of 100. Again as a group, BS Nursing is Proficient in basic research skills. The BSEd English group has a mean almost the same as that of BS Nursing (67.27%), hence is also Proficient in basic research. The group is relatively homogenous with scores ranging from 50 to 90 and standard deviation of 13.06. On the other end is the BPhysical Education group with mean 41.63 and standard deviation of 13.13; their lowest is 10 and their highest score is 70. The group has attained only Basic level of proficiency.

Table 3
Summary Statistical Analysis of Student Scores in 10-item Research Competence Test by Course

Course	Mean Percentage	SD	Minimum	Maximum
BS Nursing n=113	67.52[a]	14.18	30	100
BSEd English n=33	67.27 [a]	13.06	50	90
BSEd Biology n=15	58.67 [a,b]	13.02	30	80
BSEd Social Studies n=13	57.69 [a,b]	15.89	30	80
BSpecial Education n=73	57.40 [a,b]	16.42	20	100
BS Applied Mathematics n=30	56.67 [a,b]	14.46	20	90
BS Information Technology n=36	53.89 [a,b]	17.28	20	90
BS Biology n=41	53.66 [a,b]	16.85	10	100
BSEd Mathematics n=30	51.67 [a,b]	20.19	10	100
BEEd General Education n=88	51.59 [a,b]	13.03	20	80
BS Information Systems n=31	50.32 [a,b]	13.78	30	80
BSEd Physical Science n=11	50.00 [a,b]	14.83	20	70
AB Political Science n=48	49.38 [a,b]	11.56	20	70
BCooperative Management n=43	48.84 [a,b]	12.95	20	80
Bbroadcasting n=60	48.50 [a,b]	12.33	20	70
BSEd Physics n=13	48.46 [a,b]	19.51	20	80
BHotel &Restaurant Management n=56	47.88 [a,b]	15.34	10	80
AB English n=42	47.86 [a,b]	11.80	30	80
BMusic Education n=8	47.50 [a,b]	15.81	30	70
BS Dev Communications n=42	46.43 [a,b]	12.26	20	70
BEEd Early Childhood Education n=82	46.36 [a,b]	13.65	10	70
BSEd Filipino n=19	44.74 [a,b]	14.29	20	70
BJournalism n=26	44.62 [a,b]	15.29	10	70
BPhysical Education n=49	41.63 [b]	13.13	10	70
Total n=963	**52.75**	**16.02**	**10**	**100**

F value = 10.976 P value = 0.000 *a,b Significant differences at 0.05 are indicated by letters.*

The same table presents the F statistics from the Analysis of Variance to compare group means. The computed p-value of 0.000 led to the rejection of the hypothesis of equal means. Different letter superscripts a and b indicate significant differences in means at 0.05 level of significance generated from Scheffe's test of pairwise comparison of means. Results revealed that there is a significant difference in mean scores of BS Nursing and BPhysical Education and also between BSEd English and BPhysical Education students. All other groups means are statistically equal.

Part 2 of Research Competence test includes outlining the general steps and procedure for carrying out a research project and identifying components of the methodology section. Table 4 presents the summary statistics for student scores in outlining the general steps and procedures. An overall mean percentage score of 24.39% (SD=19%) was computed. This classifies the batch as Novice in outlining the steps and procedures in doing research. Chapman (2010) reported that 84% of the students say that when it comes to course-based research, getting started is their biggest challenge indicating that students lack skill in outlining general steps to carry out research. When classified by course/specialization, the students of BJournalism, BSEd English, BSEd Biology, BEEd General Education, BS Biology, BS Nursing, BSped Education, BSEd Physics and Mathematics obtained a mean rating of at least 25% hence appeared to attain Basic level of competency in carrying out the steps and procedures in research. No group attained Proficient level. The highest mean percentage of 32.3% (SD=19.77) for the BSEd Mathematics students seems to show that students can hardly grasp the overall structure of a research paper. Despite academic requirements that include a research proposal preparation, thesis writing, exposure to research articles through reports on trends and issues, and other research related activities, students have not fully gained skills on how to go through the organization of the content

of a research paper. However, there are also students who scored 80 and higher which may be evident that the concepts were taught in the classroom where others were able to retain them. Almost all groups have students who scored 0 that practically pulled down the group mean score. Scheffe's test for pairwise equality of means at 0.05 level revealed that there is no significant difference between any two groups of students.

Table 4
Summary Statistics of Student Scores in "Outlining the General Steps and Procedures for Carrying Out a Research Project" by Course

Course	Mean Percentage	SD
BSEd Mathematics n=30	32.33	19.77
BSEd Physics n=13	31.54	23.75
BSpecial Education n=73	30.82	19.49
BS Nursing n=113	30.71	21.70
BS Biology n=41	30.49	22.36
BEEd General Education n=88	29.77	21.71
BSEd Biology n=15	27.33	16.68
BSEd English n=33	26.36	17.11
BJournalism n=26	25.77	17.01
BSEd Social Studies n=13	24.62	21.06
BSEd Filipino n=19	23.16	18.87
BS Dev Communications n=42	22.62	21.42
BEEd Early Childhood Education n=33	22.42	12.75
BSEd Physical Science n=11	21.82	10.79
AB Political Science n=48	21.67	18.37
BPhysical Education n=49	21.02	16.99
AB English n=42	20.48	15.29
BCooperative Management n=43	20.47	18.64
BS Information Technology n=36	20.28	17.32
BBroadcasting n=60	18.50	15.05
BMusic Education n=8	17.50	18.32
BS Information Systems n=31	17.10	10.06
BS Applied Mathematics n=30	17.00	10.88
Bhotel &Restaurant Management n=66Total n=963	15.91	18.64
	24.39	19.18

As shown in Table 5, a relatively lower order competency of "identifying components of the methodology section of a research paper" was nearly mastered by each group since almost all groups obtained a mean percentage rating of 50% and above. As a whole, the students obtained a mean score of 61.1% (SD=23.38) indicating that the batch is Proficient. When classified by course, students taking BSEd Social Studies posted the highest mean of 75.82% (SD=1.797) indicating an Advanced level of Proficiency in this competency. All the rest are Proficient with only BBroadcasting missing the 50% mark, that is, having attained only Basic level of proficiency. The programs under Institute of Information and Communications Technology (BS Info Tech and BS Info Systems) and the College of Communication (BS Dev Com, BJournalism, and BBroadcasting) allow students to have thesis/research paper whose methodology does not follow the regular sections like that of Software Development and Production, respectively. However, Scheffe's test for pairwise equality of means at 0.05 level revealed no significant difference between any two group means. The relative high mean score tends to indicate that students are able to identify what should be included in the Methodology section of a research paper, although there are students who obtained a score of 0.

Table 5

Summary Statistics of Student Scores in "Identifying Components of the Section on Methodology" by Course

Course	Mean Percentage	SD
BSEd Social Studies n=13	75.82	25.68
BSEd Physics n=13	74.73	15.60
BS Nursing n=113	74.21	22.90
BS Applied Mathematics n=30	70.48	19.11
BSEd English n=33	70.13	22.69
BSpecial Education n=73	69.67	13.46
BSEd Biology n=15	69.52	20.82
BEEd Early Childhood Education n=33	68.40	15.47
BSEd Mathematics n=30	65.71	21.75
BS Biology n=41	63.07	19.94
BEEd General Education n=88	61.20	20.54
BS Information Technology n=36	60.71	24.48
BJournalism n=26	59.89	16.17
BS Information Systems n=31	58.06	24.17
AB Political Science n=48	57.14	24.83
BSEd Physical Science n=11	57.14	16.90
BPhysical Education n=49	55.39	15.33
AB English n=42	54.76	21.84
BCooperative Management n=43	53.82	19.68
BMusic Education n=8	53.57	23.84
BS Dev Communications n=42	51.70	23.60
BSEd Filipino n=19	50.38	29.50
BHotel &Restaurant Management n=66	49.57	26.66
BBroadcasting n=60	44.52	27.97
Total n=963	61.10	23.38

Overall research competence was assessed using the total score of students in Part 1 and Part 2 summing up to 25 points. Scores were converted to percentage, and the summary statistics is presented in Table 6. On average, the batch obtained a mean score of 48% (SD=14.6) indicating a Basic proficiency level in their research competence, with 4% as the lowest score and 88% is the highest score. These results may not be surprising because even "teachers in special science high schools who are teaching research need further training and so with their students (Chavez, 2014). When classified by the course the students take, the BS Nursing group posted the highest mean percentage score of 60% (SD=14.5%) followed by BSEd English with a mean score of 57% and SD of 12.6%. It is possible that nursing students develop beginning competencies because research findings in their coursework have implications for their practice. This finding conforms with Redman, Lenburg and Walker (1999). Cruser, Dubin, Brown, Bakken, Licciardone, Podawiltz and Bulik (2009) further reported that biomedical research for clinical researchers develop along a continuum that begins in preprofessional year by exposing them to the culture of research. The same practice was undertaken at the University of Pittsburgh to prepare for the introduction of evidence-based practice (EBP) into the curriculum across the Bachelor of Science in Nursing, Master of Science in Nursing, and Doctor of Philosophy programs (Burke, Schlenk, Sereika, Cohen, Happ and Dorman 2005). The BBroadcasting students has the lowest mean of 39% (SD=12.6%). The BSEd Physical Science group of students is relatively the most homogenous group with respect to research competence. The group posted the lowest standard deviation of 8.2% obtained from scores ranging from 36% to 64%. However, Scheffe's Test of pairwise equality of means at 0.05 level revealed no significant difference in any 2 group means.

When it comes to curricular exposure that are assumed to contribute directly to research skills development of students, all academic programs have subjects in Statistics, Writing in the Discipline or Technical Writing, Fundamentals of Research, and Thesis Writing. In addition, BS Nursing maintained its regular proposal defense and final defense in the presence of panel of evaluators, a practice not observed by all units. The College of Nursing instituted a unified Ethics Review Committee for students and faculty research. The Committee gives comments not only on ethical standards for human research subjects but also on essential and technical research issues. As early as a second year, students of community health nursing are exposed to demographic survey and vital statistics collection. Likewise, the College of Education offering BSecondary Education, BElem Educ (General Educ and Early Childhood Educ), and BSpecial Educ conducts Annual Research Colloquium that highlights the best thesis output through a competition. Winners of the contests are published in the students' research journal. Probably, these are some of the best practices of these colleges that contributed to the relatively better performance of their students in research competency assessment. While other programs are starting to establish practices that encourage quality of research like recognizing best thesis by academic program and giving cash awards, the university still has to evaluate the impact of these practices on students' research skills.

Table 6

Summary Statistics of Student Scores in Overall Research Competence Test by Course

Course	Mean Percentage	SD	Minimum	Maximum
BS Nursing n=113	60.07	14.472	12.00	88.00
BSEd English n=33	57.09	12.620	20.00	80.00
BSpecial Education n=73	54.80	12.359	28.00	80.00
BSEd Social Studies n=13	54.15	11.618	24.00	72.00
BSEd Biology n=15	53.87	11.300	32.00	76.00
BSEd Physics n=13	52.92	14.801	36.00	88.00
BSEd Mathematics n=30	52	17.703	4.00	84.00
BS Biology n=41	51.32	13.112	24.00	76.00
BEEd General Education n=88	49.68	12.761	20.00	84.00
BS Applied Mathematics n=30	49.2	8.672	32.00	68.00
BEEd Early Childhood Education n=33	46.67	10.755	16.00	60.00
BS Information Technology n=36	46.67	14.215	8.00	68.00
BJournalism n=26	44.92	11.720	16.00	68.00
BSEd Physical Science n=11	44.73	8.162	36.00	64.00
AB Political Science n=48	44.42	12.682	16.00	76.00
BS Information Systems n=31	43.23	11.239	16.00	60.00
BCooperative Management n=43	42.79	13.339	20.00	80.00
AB English n=42	42.67	11.337	12.00	76.00
BS Dev Communications n=42	42.1	14.334	12.00	76.00
BSEd Filipino n=19	41.26	16.224	12.00	68.00
BMusic Education n=8	41	16.801	20.00	76.00
BPhysical Education n=49	40.57	10.955	8.00	68.00
BHotel &Restaurant Management n=66	39.39	14.688	8.00	84.00
BBroadcasting n=60	39.27	12.595	12.00	72.00
Total n=963	47.97	14.609	4.00	88.00

When overall research competence scores of students were converted to descriptive equivalent of competence level such as Novice (scores below 25%), Basic (25%-50%), Proficient (50%-75%) and Advanced (above 75%) levels, the percentage distribution of students by course is shown in Table 7. Of the 963 students, 6.4% are Novice and 51% only attained Basic proficiency level in Research; 38% are Proficient and less than 5% attained Advanced level. Of the different groups, BS Nursing has relatively more students with Advanced level of research competence (17.7%) compared to other groups while 62.8% of them are Proficient. BSEd Math has 16.7% of the 30 students who belong to the Advanced level and 30% are Proficient. The BSEd English group has 72.7% of the 33 students who are Proficient in Research. Percentage-wise, the BSEd Filipino group has the most number of students who are Novice. Worth noting is the relatively poor performance of BS Biology graduating students in Basic Research skills test. Of all the programs offered by the University, BS Biology has a higher probability to be engaged in research as a profession. However based on results, barely half (46.3% + 2.4%) of the 41 BS Biology students have at least attained Proficient level of the simple research skills. This should be the concern of all other students who plan to be in the teaching profession since research is one major component of faculty selection and promotion. Also, teachers need to be able to integrate their research goals with their goals for teaching and service (Myers, 2012)

It has been a common observation in the university that graduating students encounter problems of meeting deadlines when submitting bound thesis copies, a requirement for graduation. Time constraints, delayed consultations with advisers, unavailability of timely assistance from statisticians, and poor students' research skills were assumed to be crucial factors to thesis writing problems. The results of this study strengthen the assumption that noncompliance of students' research requirements on time could be due to poor students'

research competence. This supports the findings of Leggetter and Sapsed (2011) that even after taking a research course, students still felt they lack the necessary skills and knowledge for them to be confident in pursuing research work.

Table 7

Percentage Distribution of Students by Overall Research Competency Level by Course

Course	Proficiency Level			
	Novice	Basic	Proficient	Advanced
BS Nursing n=113	1.8%	17.7%	62.8%	17.7%
BSEd English n=33	3.0%	18.2%	72.7%	6.1%
BSpecial Education n=73		38.4%	54.8%	6.8%
BSEd Social Studies n=13	7.7%	23.1%	69.2%	
BSEd Biology n=15		26.7%	66.7%	6.7%
BSEd Physics n=13		69.2%	23.1%	7.7%
BSEd Mathematics n=30	3.3%	50.0%	30.0%	16.7%
BS Biology n=41	4.9%	46.3%	46.3%	2.4%
BEEd General Education n=88	2.3%	52.3%	40.9%	4.5%
BS Applied Mathematics n=30		53.3%	46.7%	
BEEd Early Childhood Education n=33	3.0%	48.5%	48.5%	
BS Information Technology n=36	5.6%	47.2%	47.2%	
BJournalism n=26	3.8%	65.4%	30.8%	
BSEd Physical Science n=11		81.8%	18.2%	
AB Political Science n=48	8.3%	58.3%	31.3%	2.1%
BS Information Systems n=31	9.7%	61.3%	29.0%	
BCooperative Management n=43	9.3%	65.1%	23.3%	2.3%
AB English n=42	7.1%	71.4%	19.0%	2.4%
BS Dev Communications n=42	11.9%	66.7%	16.7%	4.8%
BSEd Filipino n=19	21.1%	42.1%	36.8%	
BMusic Education n=8	12.5%	75.0%		12.5%
BPhysical Education n=49	10.2%	75.5%	14.3%	
BHotel &Restaurant Management n=66	16.7%	65.2%	15.2%	3.0%
BBroadcasting n=60	15.0%	65.0%	20.0%	
Total n=963	6.4%	51.0%	37.7%	4.9%

Conclusions and Recommendations

Research competence is one area assessed in the Annual Terminal Competencies Assessment for graduating college students of a state-funded university considered in the study. This can hopefully provide information on the readiness of college graduates to engage in research-related jobs. Of the research competencies assessed, students are more comfortable with identifying factors when choosing a research problem as relatively more students correctly answered the test item. Likewise, students were able to connect findings with conclusions. Statement of hypothesis is discussed and illustrated in two subjects, namely, Statistics and Fundamentals of Research. Despite of this, more students cannot identify the appropriate statement of hypothesis given a research problem. When asked to outline the general steps and procedure for carrying out a research project, results showed that students played relatively poor performance as revealed by low mean scores across all courses and relatively high variability. The batch performed well in identifying components of the Method section.

Overall, the basic research knowledge and skills are hardly acquired by students after years of academic and practical work and exposures in the university. While the employers expect that they only need a little polishing of the workplace essential skills that college graduates are supposed to possess, this study indicates that graduates needed more research trainings if they are to engage in research-related career paths. Even in the field of law, American Association of Law Libraries (2011) affirmed that highly competent research skills, effective problem solving skills, and critical thinking skills are also keys to success in both the law firm practice of today and the future.

Hence, the university should look into the research activities of students provided for in the curriculum to find

out its weaknesses, and why it failed to address the objective of developing students with good research competence, being one of the competencies that would ensure competitive advantage of graduates. It is believed that graduates possessing good research competencies would be motivated to pursue innovative undertakings in their workplace that is grounded on scientific processes, hence contributing to the development of the organization they will be joining.

References

Australian Government, Department of Innovation, Industry, Science and Research (2011). *Research skills for an Innovative future: A research workforce strategy to cover the decade to 2020 and beyond*. Australia: Author

American Association of Law Libraries (2011). *Law student research standards.* Retrived from http://www.researchcompetency.wordpress.com/2011/02/28/26/

Byrne, M. & Keefe, M. (2002). Building research competence in Nursing through Mentoring. *Journal of Nursing Scholarship,* 34(4), 391-396.

Burke, L., Schlenk, E., Sereika, S., Cohen,S., Happ, M., & Dorman, J. (2005). Developing research competence to support evidence-based practice. *Journal of Professional Nursing,* 21(6): 358-63. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/16311231

Chavez, E. (2014). *Research culture in the special science classes of high performing public high schools in Western Visayas: Bais for research (SIP) enhancement program.* Unpublished doctoral dissertation. West Visayas State University, Iloilo City.

Chapman, P. (2010). *Students lack basic research skills, Study finds*. Retrieved from http://www.chronicle.com/blogs/wiredcampus/students-lack-basic-research-skills-study-finds/28112.

Cruser, D., Dubin, B., Brown, S., Bakken, L., Licciardone, J., Podawiltz, A., & Bulik, R. (2009). Biomedical resesearch competencies for osteopathic students. *Osteopathic Medicine and Primary Care*, 3,10. doi:10.1186/1750-4732-3-10. Retrieved from http://www.om-pc.com/content/1/10

Finn, J. A. and Crook, A.C. (2003) Research skills training for undergraduate researchers: The pedagogical approach of STARS Project. BEE-J, Vol 2. Retrieved from http://bio./tsn.ac.uk/journal/vol2/beej-2-1.pdf.

Hagemier, L. (2002). *Teaching research competency at the Sociology Foundation level: Some thoughts and practices.* First Year in Higher Education 2002 Conference Changing Agendas "Te Ao Hurihuri", Christchurch, New Zealand.

Halford, P., Webb, C. Malfrog, J. & Conroy, J. (1999). Enhancing the research competencies of Horticulture Graduates through improved communications skills. *Hort Technology*, 9(2), 267-272.

Jamieson, L.M. (2002). A*ssessing research competence.* Canadian Congress on Leisure Research, Edmonton, Alberta.

Leggetter, S. & Sapsed, S. (2011). *Developing, enhancing and sustaining research skills in a diverse population of students undertaking a Masters in Public Health: An action research study.* E – Leader Vietnam. pp 1-11.

Myers, R. (2012). *Evidence of professional competency in research*. Retrieved from http://webgrok.com/dossier/research.html

NCREL and Metiri Group (2003). enGauge 21st *century skills: Literacy in the digital age*. CA: Author.

Redman, R., Lenburg, C., & Walker, P. (1999) Competency assessment: Methods of development and implementation in Nursing education. *The Online Journal of Issues in Nursing.* Retrieved from http://www.nursingworld.org/nursing competencies

Salcedo, R. (2011). Status and models of SIP practices in the Division of Iloilo. Unpublished doctoral dissertation. West Visayas State University, Iloilo City.

Thangiah, C. & Dorairaj, S. (2008). *Undergraduate research skills: Combining traditional and active collaborative approaches towards maximizing research capacity*. 8th Annual SEAAIR Conference. Surabaya, Indonesia (pp. 426 – 435).

The World Bank (2011) *Putting higher education to work: Skills and research for growth in East Asia. A World Bank East Asia* and Pacific Regional Report.

UK Grad Programme (2001) Joint Statement of the Research Councils' Training Requirements for Research Students. retrieved Jul 24, 2013 from www.vitae.ac.uk/cms/files/RCUK-Joint-Skills-Statement-2001.pdf.

WVSU Learning Assessment Center (2010). WVSU *Student Learning Assessment Plan 2010-2015.*