COMPREHENSION OF GRAPHIC MATERIALS AMONG BSAS STUDENTS

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ABSTRACT

This study on Comprehension of Graphic Materials was conducted from February to December 2008 to Bachelor of Science in Applied Statistics (BSAS) students at the College of Arts and Sciences, Benguet State University, La Trinidad, Benguet, Philippines.

A total of 80 BSAS students served as respondents. A 50 – item test which consisted of 10 items each for tables; graphs and charts; instructions; diagrams, pictorial illustrations, maps; and notices/common signs was administered to determine their proficiency in the comprehension of graphic materials. The test on graphic materials was taken from various reading materials.

Results showed that the most difficult to comprehend by the respondents was the tables while instructions the easiest. Results showed a significant difference in the performance of the students as influenced by their year level. However, it did not show any significant difference in their performance according to gender. The overall level of performance of students in the reading comprehension of graphic materials is competent.

Four recommendations include the following: using authentic materials from magazines and newspapers that will replicate real-life situation in developing comprehension skills; utilization of any graphic materials, multiple media, art, multidisciplinary thematic units, and even games in designing classroom tasks to promote reading comprehension skills; language teachers provide interesting language lessons using newspapers, magazines or any graphic materials as input in developing reading comprehension skills; and instructional tasks or activities should be concerned with building comprehension strategies especially the use of print media like newspapers and other sources of graphic materials.

Keywords: comprehension, graphic materials, applied statistics

INTRODUCTION

Background of the Study

The knack to interpret visual presentations in text and produce related visuals are indispensable to help students understand and remember what they read. Graphic literacy or visual literacy is defined as the ability to interpret visual messages accurately along with the ability to create such messages.

Visuals incorporate charts, graphs, diagrams, maps, and photographs, and they are found in abundance in content area texts. Visuals provide a wealth of information that both reinforces and supplements text content. The ability to read, interpret, and construct graphic displays is of growing importance in an increasingly visual world as students interact more with computers and electronic texts which often rely heavily on graphic interfaces and graphic aids.

Vacca and Vacca (1993) believe that when students learn how to use and construct graphic

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representations, they are in control of a study strategy that allows them to identify what parts of a text are important, how ideas and concepts are encountered in text are related, and where they can find specific information to support more important ideas. Learners need to see these relationships and learn how to link ideas. When students use graphics while studying a concept, they build these links.

Graph comprehension involves reading and making sense of graphs seen in real life situations that best convey data. Graph is a concrete example of an authentic material and a trend and tool in Teaching English as a Second Language. This is in connection with Hutchinson and Waters (1987) when they emphasized that materials provide a stimulus to learning, help to organize the teaching learning process by providing a path through the complex mass of the language to be learned, embody a view of the nature of language and learning, reflect the nature of the learning task, can introduce new techniques to teachers, and provide models of correct and appropriate language use.

Hutchinson and Waters (1987) identified four elements for materials design which aim to provide a coherent framework for the integration of the various aspects of learning, while at the same time allowing enough room for creativity and variety: Input, Content, Language and Task.

Input refers to input as the data that form the point of departure for the task (Nunan, 1988). The input provides a number of things: stimulus material for activities; new language items; correct models of language used; a topic for communication; opportunities for learners to use their information processing skills; and opportunities for learners to use their existing knowledge both of the language and the subject matter.

Input comes from varied sources: newspaper extracts, weather forecast, menu, diary, recipe, horoscope, street maps, seminar programs, letters, drawings, memo, notes, pictures / photographs, obituary, travel regulations, wedding invitation, family tree, personal data sheet, invoices, etc.

Morris and Stewart-Dore (1984) suggest the possibility of extending the writing options by making the following forms available as examples: articles for newspapers, magazines and journals, reports to different kinds of groups, radio and television scripts and documentaries, puppet plays, news stories and reports, research reports, short stories, poems and plays, press release, bulletins and newsletters, editorials, progress reports and plans for future development, publicity brochures and posters, instructions and handbooks, recipes, minutes of meetings, scripts of group negotiations, replies to letters and other forms of correspondence, slide/ tape presentations, caption books to accompany a visual record of an experience, and comic strips for entertainment and information sharing.

Content focus. This relates to the use of language not as an end in itself, but a means of conveying information and feelings about something. Non-linguistic content should be exploited to generate meaningful communication in the classroom.

Language Focus. The aim of language teachers is to enable learners to use language; however, it may not be a good idea to engage students/learners activities or communicative tasks if they do not have enough of the necessary language knowledge. If materials should be good, they should involve both opportunities for analysis and synthesis. By this means, learners have the chance to take the language to pieces, study how it works and practice putting it back together again.

Task is a piece of classroom work which involves learners in comprehending, manipulating, producing, or interacting in the target language while attention is primarily focused on meaning rather than form (Nunan, 1989). Since the ultimate purpose of language learning is language use, materials should be designed to lead towards a communicative task in which learners use the content and language knowledge they have built up through the unit.

The difference between learning from text and learning from pictures results from the different types of representations of knowledge: Text represents information in symbolic structures of a language and is processed sequentially, that is, word by word or sentence by sentence (Schnotz, 1993). Pictures, on the other hand, convey their information by means of a visual-spatial structure (i.e., the spatial arrangements of the components of the picture), and thus represent the subject matter by employing an analogy based on common structural properties and encode information in parallel or simultaneously (Clark & Paivio, 1991).

Craik and Lockhart (1972) and Pavio (1986) agree that the use of graphic materials creates both verbal and nonverbal codes as well as connections between the two. They concurred that individuals can process information in a variety of ways, and these processes determine what is learned and how well.

Along the scenario presented and in view of the foregoing, this study concerns itself with the use of various types of graphic information as a test of comprehension for the Bachelor of Science in Applied Statistics students. Their performance will be evaluated based on their ability to comprehend what they read by giving correct responses to questions asked.

Objectives

This study aimed to determine the reading performance of the students taking up Bachelor of Science in Applied Statistics (BSAS), College of Arts and Sciences, Benguet State University in the various types of graphic materials.

Specifically, this research sought to answer the following:

1. What is the reading performance of the BSAS students in the comprehension of graphic materials?

2. Is there a significant difference in the respondents' comprehension of graphic materials along a) gender and b) year level?

Conceptual Framework

The diagram below shows the paradigm of the study. The theories in reading and testing were taken into consideration in the construction of the reading test. The reading test on various graphic materials was culled out from various reading materials. The responses to the reading comprehension test served as the output to determine the performance of the respondents using the following criteria: Highly Proficient (HP), Proficient (P), and Not Yet Proficient (NP).

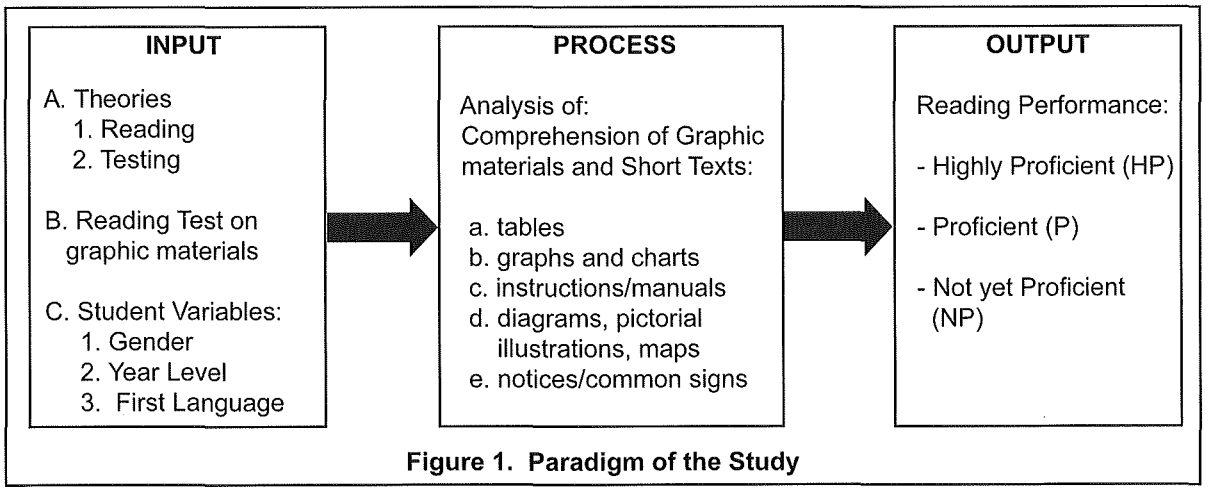

Figure 1. Paradigm of the Study

Hypotheses of the Study

The data gathered in this study were tested by the following hypotheses:

1. There is no significant difference in the scores of the BSAS students in the comprehension of graphic materials.

2. There is no significant difference in the comprehension of the BSAS students along the selected variables such as gender and year level.

MATERIALS AND METHODS

Locale and Time of the Study

This study was conducted from February to December 2008 to Bachelor of Science in Applied Statistics students in the College of Arts and Sciences, Benguet State University, La Trinidad, Benguet, Philippines.

Respondents

Table 1 presents the profile of the respondents according to gender and year level.

Collection of Data

A questionnaire determined the profile of the respondents and the needed data with regard to the students' gender and year level. A 50 – item test consisting of 10 items each for the tables; graphs and charts; instructions; diagrams, pictorial illustrations, maps and notices/common signs was administered to the students to determine their reading comprehension level.

A three-point scale was used to describe the level of reading comprehension of students along the various graphic information:
Highly Proficient (HP) – 8 -10 points
Proficient (P) – 5-7 points
Not Yet Proficient (NP) – 0-4 points

A multiple choice type of test was used in which every correct answer was given a score of 1.

Statistical Analysis

Summary statistics like frequency counts, percentage, and weighted mean were computed from test results. To determine if there are differences in the comprehension level of students along graphic materials, t-test for two groups and F-test for three or more groups were used. Level of significance was 0.05. The level of reading performance was based on the mean scores of the students in each category.

Table 1. Profile of respondents

SELECTED VARIABLES	NUMBER	PERCENT (%)
a. Gender		
Male	23	28.75
Female	57	71.25
TOTAL	80	100.00
b. Year Level		
First Year	22	27.50
Second Year	21	26.25
Third Year	20	25
Fourth Year	17	21.25
TOTAL	80	100.00

RESULTS AND DISCUSSION

Performance of Students in the Comprehension of Graphic Materials

Fifty two respondents (65%) were proficient in their reading comprehension of tables followed by 14 respondents (17.5%), highly proficient; and 14 respondents (17.5%), not yet proficient in their performance (Table 2).

There were 45 respondents (56.25%) who were proficient in the comprehension of graphs and charts. This was followed by 22 respondents (27.5%), highly proficient; and 13 respondents (16.25%), not yet proficient.

In the reading comprehension of instructions/manuals, 53 respondents (66.25%) were highly proficient followed by 26 respondents (32.5%), proficient; only one (1) respondent (1.25%), not yet proficient.

Forty three (43) respondents (53.75%) had proficient performance in the reading comprehension of maps, diagrams, and pictorial illustrations; 30 respondents (37.5%), highly proficient; and seven (7) respondents (8.75%), not yet proficient.

Performance of students in the comprehension of notices/common signs was proficient with 40 respondents (50.0%); highly proficient with 32 respondents (40.0%); and not yet proficient with 7 respondents (10.0%).

Interpretation of the Performance of the Respondents in the Comprehension of Graphic Materials

BSAS students are highly proficient in the comprehension of instructions/manuals with a mean score of 8.08 followed by notices/common signs with a mean score of 6.92; maps, diagrams, and pictorial illustrations, 6.75; graphs and charts, 6.40; and tables, 6.00 (Table 3).

The hypothesis that there is no significant difference in the scores of the students in the reading comprehension of graphic materials is rejected.

The results show that the BSAS students comprehended easily in instructions as revealed by their highly proficient performance while comprehension of tables is found to be the most difficult for them. Instructions were found the easiest to comprehend by the BSAS students because it involves the recognition of explicitly stated facts and details and does not extend beyond the literal surface value of words. The students recognized facts and details which are directly stated in the material read that appeared on the printed page.

It is interesting to note that graph comprehension involves reading and making sense of graphs seen in real life situations that best convey data. Henry (1961) explained that pictures, illustrations, drawings, and other graphics encourage students to view reading as an interactive process that takes place between the reader and the text.

Table 2. Summary of the performance of students in the five aspects of comprehension

	TABLES	GRAPHS & CHARTS	INSTRUCTIONS	MAPS, DIAGRAMS, PICTORIAL ILLUSTRATIONS	NOTICES, COMMON SIGNS
Not Yet Proficient (0-4)	14 (17.5)	13 (16.25%)	1 (1.25%)	7 (8.75%)	8 (10.0%)
Proficient (5-7)	52 (65)	45 (56.25%)	26 (32.5%)	43 (53.75%)	40 (50.0%)
Highly Proficient (8-10)	14 (17.5%)	22 (27.5%)	53 (66.25%)	30 (37.5%)	32 (40.0%)
Total	80 (100%)	80 (100%)	80 (100%)	80 (100%)	80 (100%)

Table 3. Interpretation of the performance of BSAS students in the comprehension of graphic materials

GRAPHIC MATERIALS	Xw	INTERPRETATION
A. Tables	6.00	Proficient
B. Graphs and Charts	6.40	Proficient
C. Instructions	8.08	Highly Proficient
D. Maps, Diagrams, Pictorial Illustrations	6.75	Proficient
E. Notices/Common Signs	6.92	Proficient
Overall	6.83	Proficient
$X^2c = 69.021$	prob. = 0.000	s - significant

There are four (4) critical factors that influence graph comprehension: The first factor, the purposes for using graphs is commonly divided into two classes: analysis and communication (Kosslyn, 1985). Graphs used for data analysis function as discovery tools at the early stages of data analysis when the student is expected to make sense of the data. This aspect of graph use appears to be related to the school curriculum.

Kosslyn (1985) emphasized that graphs used for communication are pictures intended to convey information about numbers and relationships among numbers; a good graph forces the reader to see the information the designer wanted to convey.

Such graphs would be simple in form and content and are intended to display patterns. In school curriculum, science and social studies are often the disciplines where already-designed graphs are presented for the purpose of communication. Standardized tests often test students' graph comprehension with graphs used to communicate.

The second factor, the characteristics of tasks, is often described as they relate to graph comprehension, as visual decoding, judgment tasks and the context or semantic content of a graph. Each task characteristic is described in depth. They discuss the nature of graph reading processing errors to be the most significant. They state that the translation to the "messy" world of everyday reality in which knowledge has links to one's other knowledge as well as to personal beliefs and emotional reactions introduce yet another level of complexity.

The third critical factor in graph comprehension is described as the characteristics of the discipline. The authors looked at the spread and variation within a data set, the type of data, the size of a data set, and the way a representation provides structure for data can influence graph comprehension. During the early school years, it was stated that teachers should create a gradual transition from objects to the more abstract bar graph (Rangecroft, 1994).

Moritz and Watson (1997) noted that using pictographs is particularly important to establish links between actual objects and one-to-one representation of data, prior to introducing more symbolic forms of scaled representation.

The final factor that affects graph comprehension is the characteristics of the graph readers. Carpenter & Shah (1998) noted that individual differences in graphic knowledge should play a large role in the comprehension process as does variation in the properties of the graph itself. It was noted by Winn (1991) however, that there is no evidence that measures of general intelligence are effective in explaining differences in interpretations of information presented in graphs.

Performance of Students According to Selected Variables

Performance of Students According to Gender

Male respondents had higher mean scores of 6.91 in the comprehension of maps, diagrams, pictorial illustrations; 6.43 in the comprehension of graphs and charts; and 6.13 in the comprehension of tables than the female respondents with mean scores of 6.65, 6.35 and 5.88, respectively (Table 4).

Female respondents, however, showed a higher mean score of 8.23 in the comprehension of instructions and 7.07 in the comprehension of notices/common signs than the male respondents with mean scores of 7.61 and 6.39.

Statistically, the study shows no significant difference in the performance of BSAS students in their reading comprehension of the graphic materials on the basis of gender. Hence, the hypothesis that there is no significant difference in the performance of BSAS students on the basis of gender is accepted.

In like manner, the study of Millan (1992) on Competence in English Grammar of First Year High School students of the Mountain Province General Comprehensive High School indicated that boys tend to be more active and aggressive, less neat and exacting than girls; boys seem to be superior in mathematical and scientific subjects, while the girls excel in language arts, spelling and penmanship; boys surpass girls in the tests of spatial nature, of mechanical aptitude, and of general information, while girls excel in tests of manual dexterity, speed and precision; a smaller percentage of girls than boys tend to be mentally retarded; reading disabilities and speech handicaps also seem to occur frequently among boys than among girls.

She also noted that on measures of verbal fluency, girls usually do better than boys. Girls learn a little earlier than boys to talk, to use sentences, and use a greater variety of words. They also speak more clearly, read earlier and do consistently better than boys in tests in spelling and grammar.

Another study conducted by Dalay-on (1991) on Reading Competence of Sophomore students of Gov. Bado Dangwa Agro-Industrial School (GBDAIS) showed that both male and female second year students are competent in both literal and interpretative levels of comprehension.

Performance of Students According to Year Level

Third year students had the highest performance in the comprehension of tables with a mean score of 7.20 followed by the fourth year students with 6.41 mean score while the first year students had a mean score of 5.27. The second year students obtained the lowest mean score of 5.10 (Table 5).

In the comprehension of graphs and charts, the third year students still recorded the

Table 4. Performance of students according to gender

GRAPHIC MATERIALS	MALE		FEMALE		tc	PROB.
	Xw	DE	Xw	DE		
A. Tables	6.13	P	5.88	P	0.613	0.542
B. Graphs and Charts	6.43	P	6.35	P	0.172	0.865
C. Instructions	7.61	P	8.23	HP	1.495	0.144
D. Maps, Diagrams, Pictorial Illustrations	6.91	P	6.65	P	0.686	0.496
E. Notices/Common Signs	6.39	P	7.07	P	0.490	0.627
Overall	6.70	C	6.84	P	0.490	0.627

* ns – not significant

Table 5. Performance of students according to year level

GRAPHIC MATERIALS	1st Year	2nd Year	3rd Year	4th Year	over all	DE	Fc	PROB
A. Tables	5.27[b]	5.10[b]	7.20[a]	6.41[a]	6.00	P	6.716	0.000
B. Graphs and Charts	5.32[b]	6.62[a]	7.20[a]	6.47[a]	6.40	P	4.454	0.006
C. Instructions	7.45[c]	8.52[ab]	7.60[bc]	8.76[a]	8.08	HP	3.750	0.044
D. Maps, Diagrams, Pictorial Illustrations	6.41[bc]	5.59[c]	7.70[a]	6.94[ab]	6.75	P	5.354	0.002
E. Notices/Common Signs	6.05[b]	6.71[ab]	7.55[a]	7.35[a]	6.92	P	4.596	0.005
	6.1[c]	6.58[bc]	7.45[a]	7.186[ab]	6.83		6.928	0.000

* s - significant

highest mean score of 7.20 followed by the second year students with a mean score of 6.62 while the fourth year students had 6.47 mean score. The first year students had the lowest mean score of 5.32.

The fourth year students showed a highly competent performance in the comprehension of instructions with a mean score of 8.76 followed by the second year students with a mean score of 8.52 while the third year students showed 7.60 mean score. The first year students recorded the lowest mean score of 7.45.

In like manner, the third year students had a higher performance in the comprehension of maps, diagrams, pictorial illustrations with a mean score of 7.70. The fourth year students came second with a mean score of 6.94 followed by the first year students with a mean score of 6.41 while the second year students had the lowest performance with a mean score of 5.59, respectively.

The third year students still demonstrated the highest performance in the comprehension of notices/common signs with a mean score of 7.55 followed by the fourth year students with a mean score of 7.35. The second year students showed a mean score of 6.71 while the first year students recorded the lowest mean score of 6.05.

Statistically, there is a significant difference in the performance of BSAS students in the reading comprehension of graphic materials according to year level. The hypothesis that there is no significant difference in the performance of BSAS students on the basis of year level is denied.

The performance of the students according to year level could also be associated to the issue of prediction in reading. As they grow old and as they go to a higher level of education, their schema or ability to interpret graphic materials meaningfully is enhanced.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study determined the performance of the Bachelor of Science in Applied Statistics students enrolled at Benguet State University, La Trinidad, Benguet along Comprehension of Graphic Materials: a) Tables, b) Graphs and Charts, c) Instructions, d) Maps, Diagrams, Pictorial Illustrations, and e) Notices/Common signs. It also determined if there is a significant difference in the respondents' comprehension of graphic materials along a) gender, and b) year level.

Respondents of this study were 80 Bachelor of Science in Applied Statistics students. The reading comprehension test was made of a 50-item, broken down into: 10 items for tables; 10 for graphs and charts; 10 for instructions; 10 for diagrams, pictorial illustrations, maps; and 10 for notices/common signs taken from various sources of reading materials.

A questionnaire was used as a tool in collecting the profile of respondents according to gender and year level. Frequency counts, percentages, and weighted means were computed from test results. The differences in the comprehension level of the students were determined through the use of t-test for two groups and F-test for three or more groups. A three-point scale was used to describe the performance of the students in the comprehension of graphic materials.

Summary of Findings

1. a. BSAS students found interpretation of tables the most difficult to comprehend while interpretation of instructions the easiest.

b. The level of comprehension of respondents in interpretation of tables was proficient (6.00); interpretation of graphs and charts, proficient (6.40); interpretation of instructions, highly proficient (8.08); interpretation of maps, diagrams, pictorial illustrations, proficient (6.75); and interpretation of notices/common signs, proficient (6.92). The overall level of reading performance of students in the five skills/aspects of comprehension was proficient (6.83).

The hypothesis that there is no significant difference in the scores of the students in the reading comprehension of graphic materials is rejected.

2. a. The male respondents had high reading performances in the comprehension of maps, diagrams, pictorial illustrations; graphs and charts; and tables while the female respondents registered high performances in the comprehension of instructions; and notices/ common signs.

b. No significant difference in the performance of the respondents in the comprehension of graphic materials based on gender. The findings further means that gender did not affect the performance of students.

c. The performance of the respondents in the comprehension of graphic materials differed significantly based on year level.

The hypothesis that there is no significant difference in the comprehension of the BSAS students along gender is accepted while rejected along year level.

Conclusions

1. The Bachelor of Science in Applied Statistics students varied in their reading comprehension of graphic materials.

2. Gender did not affect the reading comprehension of the students.

3. Respondents significantly differed in their reading comprehension based on year level.

Recommendations

1. Graphic materials are very effective tools in teaching English. Therefore, language teachers should be encouraged to develop the learner's interest using authentic materials from magazines and newspapers that will replicate real-life situation in developing comprehension skills. Comprehension outcomes are said to come by easily when materials are within the realm of the reader's socio-cultural background.

2. Language teachers should also utilize any graphic materials, multiple media, art, multidisciplinary thematic units, and even games in designing classroom tasks to promote reading comprehension skills.

3. Ease or difficulty in reading comprehension is positively related not only to linguistic or grammatical competence but also communicative competence. It is recommended that language teachers provide interesting language lessons using newspapers, magazines

or any graphic materials as input in developing reading comprehension skills.

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