



Modeling the Critical Thinking Skills of Hospitality and Tourism Students

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Abstract

Background/Objectives: The main objective of the study is assess hospitality and tourism students' ability to logically analyze assumptions, arguments, deductions, inferences, and interpret information in various scenarios related to their hospitality and tourism. **Methods/Statistical analysis:** The survey data were encoded using Excel and based on the study's coding standards. IBM SPSS Statistics version 21.0 was utilized to transform some variables, compute statistics, and generate charts and tables. SPSS functions such as compare means, correlate, linear regression, graphs were used produce the required statistics and for the analyses. **Findings:** The study concluded that among the various critical thinking indicators, Inference, Interpretation, and Argument are positively moderate to strongly associated with the students' total scores. Self-Rating association with critical thinking did not establish strong correlation. On the basis of Course, analysis of variance showed that critical scores were differentiated excepting the variable Inference. **Improvements/Applications:** Total scores indicated differences given the different Year Level. BSTM students showed a higher critical thinking scores in almost all indicators except Deductions.

Index Terms

Assumption, Analysis, Critical thinking, Hospitality, Inference, , Deduction, Interpretation, Tourism

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I. INTRODUCTION

Mobile payment (also referred to as mobile money, mobile money transfer, and mobile wallet) generally refers to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, check, or credit cards, a consumer can use a mobile phone to pay for a wide range of services and digital or hard goods [1]. Although the concept of using non-coin-based currency systems has a long history [2], it is only recently that the technology to support such systems has become widely available.

Tourism is one major source of revenue and significant growth driver in many countries. In 2017, Philippine Statistics Authority reported that tourism contributed 12.2 percent to the country's gross domestic product (or GDP) amounting to PHP1.929 trillion [1]. World Travel and Tourism Council [2] likewise reported that tourism industry in the Philippines contributed a huge PHP4.3 trillion to the Philippine economy which is equivalent to 24.7 percent of the GDP. Apart from the GDP, Philippine tourism sector is dynamic engine of employment as it directly or indirectly supported 8.4 million jobs [2].

In view of the increasing growth in tourism in the Philippines, it is of paramount importance to produce hospitality and tourism graduates who are expected to effectively provide the demands of tourists/visitors. To ensure students to be successful in the hospitality and tourism, they need to acquire employable skill such as critical thinking [3].

According to Leander Marquez [4], "...the Filipino children and youth should not only be sent to schools to be taught skills... they should be trained to become critical thinkers so as to be open, sensitive, and understanding of the beliefs and values of others as well as not to be enslaved by their respective belief and value systems."

The importance of critical thinking in education is underscored by Michael Dell that in order to compete and win in the global, students and tomorrow's leader need another set of knowledge and skills i.e., the ability to collaborate, communicate and analyze problems. The 21st Century skills include critical thinking and problem solving skills to address the host of novel challenges in the workplace [3]. As Dell emphasized it is important that every students be given the opportunity to acquire and master these skill.

Programs in many academic institutions are beginning to see the value of critical thinking given the new challenges and dynamics of the hospitality and tourism sector. Education is a vital factor to enable students to learn how to think and solve

problems. Critical thinking education is continuing to evolve because of the complexities of its nature. Study conducted to assess the extent to which critical thinking is being transmitted tourism students, the result indicated significant increases in overall critical thinking [3]

Researches are conducted to examine the programs of academic institutions to develop students' high order thinking or to become thoughtful learners. As Mortimer Adler [5] succinctly puts it – "Learning that does not involve thinking is nothing but the memorization of facts not understood...To turn out thoughtful citizens and learners — persons able to think well and critically in everything they do..."

The Foundation for Critical Thinking underscored the importance of quality thinking because "...thinking, left to itself, is biased, distorted, partial, uninformed, or downright prejudiced. Yet the quality of our life and of what we produce, make, or build depends precisely on the quality of our thought" [6]. A process of critical thinking generates purposes, raises questions, uses information, utilizes concepts, makes inferences, makes assumptions, generates implications, and embodies a point of view. [7].

What is Critical Thinking?

The following were the definitions of critical thinking based on the literature review of the study, namely:

- the process of thinking carefully about a subject or idea, without allowing feelings or opinions to affect you [8]
- the process of analyzing information in an objective way, in order to make a judgement about it (Oxford dictionary). [9]
- that mode of thinking in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. [7]
- the examination and test of propositions of any kind which are offered for acceptance, in order to find out whether they correspond to reality or not. [10]
- includes the component skills of analyzing arguments, making inferences using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems. [11]
- critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and sociocentrism. [7]

Critical thinking involves cognitive skills and dispositions and background knowledge is not sufficient condition to critical thinking within a given subject [11]. Critical faculty is a product of education and training, a mental habit and power. It is a guarantee against delusion, deception, superstition and misapprehension [10]. It is a disposition to be open and fair-minded, inquisitive, flexible, seek reason, to well-informed and to entertain diverse viewpoints [11].

The processes of critical thinking include analysis of thinking and assessment of thinking. To analyze thinking means to identify its purpose, question at issue, as well as its information, inferences(s), assumptions, implications, main concept(s), and point of view. While, to assess thinking means to check it for clarity, accuracy, precision, relevance, depth, breadth, significance, logic, and fairness. [7].

Rayhanul Islam [12] presented the importance of being able to think well and solve problems systematically in the new knowledge economy. Moreover, critical thinking also enhances language and presentation skills including promoting creativity. It is crucial for self-reflection on one's values and decision. This leads to an informed judgement to overcome biases and prejudices and ultimately become the foundation of a liberal democratic society.

The characteristics of a cultivated thinker are the following:

- Raises vital questions and problems, formulating them clearly and precisely
- Gathers and assesses relevant information, using abstract ideas to interpret it effectively
- Comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards
- Thinks open mindedly within alternative systems of thought, recognizing and assessing, as needs be, their assumptions, implications, and practical consequences
- Communicates effectively with others in figuring out solutions to complex problems

Operational Definition of Indicators

Watson and Glaser Critical Thinking Appraisal includes five dimensions to measure critical thinking namely : inference, assumption, deduction, analysis, and interpretation. The definitions of these indicators are:

- Inference – the reasoning involved in drawing a conclusion or making a logical

judgement on the based on circumstantial evidence and prior conclusions rather than on the basis of direct observation.

- Assumption – is something that you assume to be the case, even without proof. An assumption is something which is presupposed or taken for granted.
- Deduction – is reasoning from the general to the particular (or from cause to effect).
- Analysis - when making important decisions, it is useful to be able to distinguish between a strong argument and a weak argument. A strong argument is both important and directly related to the question.
- Interpretation- is the act of explaining, reframing, or otherwise showing your own understanding of something.

A. Purpose of Statement

The main objective of the study is assess hospitality and tourism students' ability to logically analyze assumptions, arguments, deductions, inferences, and interpret information in various scenarios related to their hospitality and tourism. The research will serve as a basis for formulating critical thinking model which will help and prepare students in making correct decisions. Specifically, the study seeks to answer the following questions:

1. What is the profile of the respondents in terms of :
 - a. Age
 - b. Year Level
 - c. Gender
 - d. Course
2. How would the students assess themselves in terms of their academic performance?
3. What are the levels of critical thinking of hospitality and tourism students with respect to the following indicators:
 - a. Inferences
 - b. Recognition of Assumptions
 - c. Deductions
 - d. Interpreting Information
 - e. Evaluation of Arguments/Analysis
4. Is there a significant relationship between the critical thinking indicators and the total scores?
5. Is there a significant difference in the critical thinking skills between the hospitality and tourism students?
6. Is there a significant difference in the critical thinking indicators and total score based on their gender, course, and year level?

7. How significant is their perceived academic self-rating relate to the critical thinking skills?
8. What is the percentile distribution of hospitality and tourism students given their critical thinking score?

Hypotheses

- H1: There is no significant relationship between the critical thinking indicators and total scores
- H2: There is no significant relationship between the total scores of hospitality and tourism students.
- H3: There is no significant difference in the critical thinking scores based on gender, course, and year level.
- H4: There is no significant relationship between self-rating and critical thinking score.

B. Conceptual Framework

The framework of the study is divided into three main constructs namely: the Critical Thinking Indicators Critical Thinking Score, and Self-Rating. Critical Thinking Indicators include Inference, Assumption, Deductions, Interpreting Information, and Arguments. Self-Rating is a self- evaluation of students on well they perform academically. The Critical Thinking Total Score is composite variable which combine all the indicators of critical thinking. The Independent Variables are Critical Thinking Indicators, and Self-Rating and the Dependent Variable is the Critical Thinking Score. Moderating variables include : Year-Level, Course, and Gender.

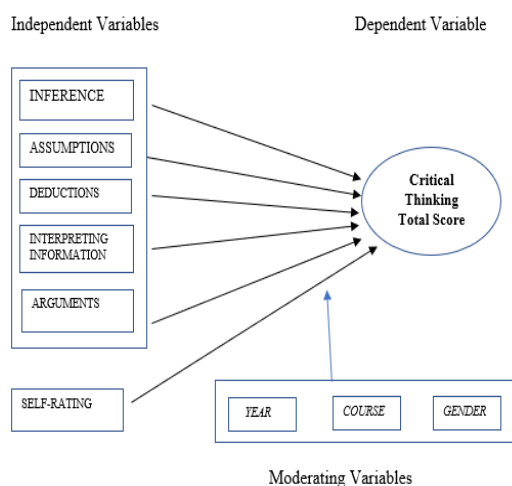


Fig 1. Conceptual Framework on Critical Thinking Assessment of Hospitality and Tourism Students

II. METHODOLOGY

A. Research Design

A descriptive and correlational design was adopted in conducting the critical thinking assessment for the hospitality and tourism students of the university. The study involved students in all year level the College of Hospitality and Tourism Management. The survey was administered from March to June 2019 with sampling size of 270 represented by college students which were picked randomly. Likewise, respondents of the study participated on a voluntary basis. Ethical considerations were taken in the data collection, privacy and confidentiality of information about subject and their responses.

B. Research Instrument

The study used a researcher-made questionnaire survey composed of six parts : Inference, Assumptions, Deductions, Interpreting Information, Argument, and Demographic Profile. Each part or factor, is composed of four items. The test is a modified version of the Watson-Glaser Critical Thinking Test [13]. To test included cases relevant to hospitality and tourism such as: Food and Waterborne Diseases, Food Service Activities, Suppliers, Catering Service, and Local Products. Inference indicator is answered by True, Lacks Information, and False. Assumptions is answered either the assumption is Logical or Illogical. Deduction and Interpreting indicators choices is either Follow, or Does not Follow. The indicator Argument is either answered by Strong or Weak. There are four tests composed of 5 items per test. Before the test was administered, it was pre-tested to 30 students. As to internal consistency, the instrument was tested using SPSS reliability tool (Cronbach Alpha). The Cronbach alpha for the instrument, composed of the critical thinking indicators and total score,, is considered to be acceptable ($\alpha=0.65$ or 0.70).

C. Statistical Analysis

To analyze the underlying relationship of the critical thinking variables descriptive and inferential statistics were employed. First, a coding standard was designed for the different variables. The survey data were encoded using Excel® spreadsheet and based on the study’s coding standards. IBM SPSS Statistics version 21.0 ® was utilized to transform some variables, compute statistics, and generate charts and tables. SPSS functions such as compare means, correlate, linear regression, graphs were used produce

the required statistics and for the analyses.

Code for the answers in critical thinking items are in binary 1 (correct) and 0 (wrong). Each five test are aggregated in one variable also called latent variable. The Total Score is the sum of all the total scores for each test. Correlation coefficients were computed to examine the strength of association between variables, whereas ANOVA tested for significant difference in variability among the groups under study. The significance level was set at .05.

III. RESULTS & DISCUSSIONS

A. Demographic Profile

Majority of the respondents are aged between 18 to 21 which is equivalent to 89 percent. Females represent 69 percent of the subjects and only 31 are males. In terms of courses, 184 students are taking the course in Hospitality Management which represents 55 percent of the respondents while 84 students are into Tourism or 45 percent of the total students. The profile of students by year level is concentrated in the first year and third. First year students numbered 115 or 43 percent and third year students amounted to 100 representing 37 percent. The rest of the students are in second year and fourth year level (54 students or 20 percent). The distribution of students by course are almost the same.

B. Difficulty Index (Item Analysis) and Descriptive Statistics

The critical thinking assessment was patterned after Watson-Glaser instrument. Based on this instrument, the indicators measured were : Inference, Assumption, Argument, Deduction and Interpretation [14] [15].

The results of the test revealed the following visual profiles based on the correct and wrong answers. Inference question number 1 gathered the highest correct score of 227 (84 percent) compared with question number 3 registering the highest wrong score 249 or 92 percent. Question number 1 in Assumption gathered the highest correct score of 234 (87 percent) while 62 percent of the respondents did not answer it correctly in question 4.

The highest correct scores in Deduction was made in question 5 (208 or 77 percent). Question number 3, deduction registered the highest wrong scores which is 186 or 69 percent. Interpretation question number 1 registered the highest correct score (226 or 84 percent). Item number 3 of interpretation registered the highest correct score numbering 226 or 83 percent. Item 5 meanwhile got the highest incorrect answers 69 percent. Item number 1 of Argument scored

highest in correct answer 231 or 86 percent. As to incorrect answers, item 4 in Argument registered the highest incorrect answers.



Fig 2. Result of Critical Thinking Assessment based on Watson-Glaser Indicators

The succeeding table shows the summary of frequency of students who answered the items correctly and incorrectly. The indicator Argument scored the highest number of students who answered it correctly (N=955 or 26%) with Interpretation with 730 or 20 percent. The range of percentage of correct answers is between 18 to 26 percent. Students found it difficulty to answer the item of Inference (N=671; 27 %). Second difficult indicator is the indicator Deduction (N=566, 22%). Overall, 59 percent of the students answered all the items correctly (N=2,516) while 41 percent failed to correctly answer the items (N=3,694).

Table 1. SUMMARY OF WRONG AND RIGHT ANSWERS BY FACTOR

INDICATOR	WRONG	%	RIGHT	%
Inference	671	27%	679	18%
Assumption	434	17%	646	17%
Deduction	566	22%	684	19%
Interpretation	450	18%	730	20%
Argument	395	16%	955	26%
Total	2,516	100%	3,694	0%

Distribution of Scores in the Critical Thinking Assessment

Visual inspection of the shape of the distribution shows that the scores of students in the critical thinking are approximately symmetric. The computed skewness are the various indicators ranges from— 0.746 to .186 with Argument showing slight moderate skewness. Kurtosis or Peak s of these indicators indicated mostly mesokurtic shape [16].

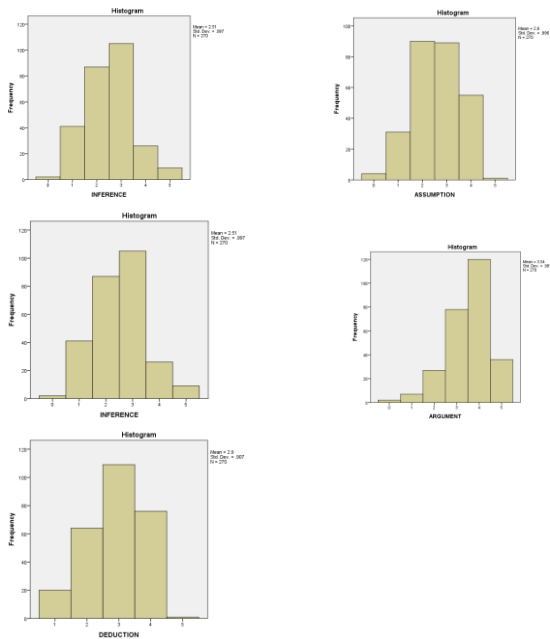


Fig. 3. Histograms of Critical Thinking Indicators

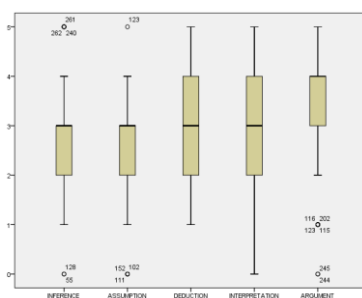


Fig.4. Boxplots of Critical Thinking Indicators

To compare the various indicators of the study, a graphical display or boxplot was generated. First, almost all the indicators have the same median excepting Argument. In terms of dispersion, the data of the indicators Deduction and Interpretation are more spread than the others. Likewise, these two indicators have prominent 1st and 3rd quartiles

with no outliers. Inference, Assumption, and Arguments showed values or outliers. The indicator Argument showed some low outlier values while Inference and Assumption have both high and low outliers.

The mean of Inference, Assumption, Deduction, and Interpretation are approximately the same (between 2.60 and 3.06) except Argument (M=3.54). The median of the aforementioned variables are the same (MD=3.00) with the exception of Argument. All standard errors are equal or below .07. With this statistics, it estimated that the distribution is normal.

Table 2. DESCRIPTIVE STATISTICS FOR CRITICAL THINKING INDICATORS

	Inference	Assump ptn	Deduc tn	Interp ret	Argu mnt	Tot al
Mean	2.81	2.60	2.90	3.063	3.54	14.92
Standar d Error	0.07	0.06	0.06	0.058	0.06	0.14
Median	3.00	3.00	3.00	3.000	4.00	15.00
Mode	3.00	2.00	3.00	3.000	4.00	15.00
Standar d Devia tion	1.07	1.00	0.91	0.952	0.98	2.31
Sample Varianc e	1.15	0.99	0.82	0.907	0.96	5.32
Kurtosis	-0.49	-0.54	-0.60	0.082	0.78	0.32
Skewne ss	-0.16	-0.19	-0.38	-0.257	-0.75	-0.25
Range	5.00	5.00	4.00	5.000	5.00	14.00
Minimu m	0.00	0.00	1.00	0.000	0.00	7.00
Maximu m	5.00	5.00	5.00	5.000	5.00	21.00
Sum	759	703	784	827	955	4028
Count	270	270	270	270	270	270

Critical Thinking Percentage Score

More than half of the students passed the Critical Thinking Assessment (M=.58, SD=.09). Among the

critical thinking indicators, Argument registered the highest passers (M=.71,SD=.20) followed by Interpretation (M=.58,SD=.18). Half of the subjects passed the critical thinking test in Inference and Assumption. The results showed that the students have above average performance.

Deduction	0.07	0.08	1.00		
Interpretation	.161**	-0.04	-0.09	1.00	
Argument	0.10	-0.12	-0.07	.194**	1.00

Table 3. CRITICAL THINKING SCORE OF STUDENTS BY FACTOR AND OVERALL PERFORMANCE

Indicator	Minimum	Maximum	Mean	Std. Deviation
Inference	0.00	1.00	0.50	0.20
Assumption	0.00	1.00	0.52	0.20
Deduction	0.20	1.00	0.58	0.18
Interpretation	0.00	1.00	0.61	0.19
Argument	0.00	1.00	0.71	0.20
Overall	0.28	0.84	0.58	0.09

The result also indicated a higher passing percentage among Tourism students (M=.61, SD=.09) compared to Hospitality Students (M=.56, SD=.09). Across all the critical thinking indicators, Tourism scores indicated higher percentage passers than Hospitality.

C. Correlation Analysis

The table below shows the correlation coefficient between two critical thinking indicators. Very weak correlations were found between Assumption-Inference (r=.03), Deduction-Inference (r=.07), Deduction-Assumption (r=.08), Interpretation-Assumption (r= -.04), Interpretation-Deduction(r= -.09), and Argument-Deduction (r=-.07). Weak relationships were found between Argument-Inference (r=.10), and Argument-Assumption (r= -.12). Significant relationships were found in Interpretation-Inference (r=.16) and Argument-Interpretation (r=.19) at .01 level two-tailed.

Table 4. CORRELATION MATRIX AMONG DIFFERENT CRITICAL THINKING INDICATORS

Indicator	Inference	Assumption	Deduction	Interpretation	Argument
Inference	1.00				
Assumption	0.03	1.00			

Critical Thinking Indicators and Total Score

Each critical thinking indicators were compared with the Total Score A to find if there are relationships and the following results were found. The magnitude of the association for all indicators with the Total Score indicated moderate to strong (.39 |r| < .51).

Table 5. CORRELATION COEFFICIENTS OF CRITICAL INDICATORS WITH TOTAL SCORE

Indicator	Correlation	Association
Inference	.585**	Strong
Assumption	.410**	Moderate
Deduction	.389**	Moderate
Interpretation	.514**	Strong
Argument	.474**	Strong

** Significant at .01 level two-tailed

D. Correlation between Critical Thinking Indicators/Total Score with Self-Rating

The association between individual indicators of critical thinking and self-rating were calculated and the result indicated that all indicators have no relationship with self-rating (r <0.1) with the exception of Deduction (r = .12) which is found to be significant at .05 level two-tailed.

Total Score and Self-Rating association is found to be weak positively correlated (r = .09) but not statistically significant.

Correlation between Critical Indicators and Total Score by Course

Individual Critical Indicators were correlated with Total Score according to the students' courses. BSTM students registered a higher correlation in Inference and Interpretation. BSHM indicated higher correlation values in Assumption, Deduction, and Argument. The correlation coefficients were all significant at .01 level, two-tailed.

Table 6. CORRELATION BETWEEN CRITICAL THINKING INDICATORS WITH TOTAL SCORE BY COURSE

Indicator	BSHM	BSTM
Inference	0.48	<i>0.66</i>
Assumption	<i>0.38</i>	0.36
Deduction	<i>0.46</i>	0.41
Interpretation	0.47	<i>0.52</i>
Argument	0.51	0.40

* All values are significant at .01 level two-tailed

** Italics means higher value.

Correlation between Critical Thinking Indicators and Total Score by Gender

Based on the r values generated, Males showed higher coefficients only in Deduction. Females registered higher values in Inference, Assumption, and Interpretation. Both gender are equal in Argument. The magnitude of relationship between the indicators and total score was statistically significant from slightly moderate to very strong ($.4 < |r| < .6$).

Indicator	Male	Female
Inference	0.52	<i>0.61</i>
Assumption	0.40	<i>0.41</i>
Deduction	<i>0.51</i>	0.36
Interpretation	0.45	<i>0.54</i>
Argument	0.47	0.47

* All values are significant at .01 level two-tailed

** Italics means higher value.

Correlation between Critical Thinking Indicators and Total Score by Year Level

First year students showed higher correlation coefficient in Inference, Deduction, and Argument. Third year students registered higher r values in Assumption and Interpretation. Overall, the coefficients on both year levels are significant at .01 level two-tailed.

Table 7. CORRELATION OF CRITICAL THINKING BY YEAR LEVEL

Indicator	1 st Yr.	3 rd Yr.
Inference	.62	<i>.54</i>
Assumption	.35	<i>.46</i>
Deduction	<i>.45</i>	.38
Interpretation	.44	<i>.57</i>
Argument	<i>.50</i>	.35

* All values are significant at .01 level two-tailed

** Italics means higher value.

Passing Average by Course, Gender and Year Level

The percentage of passing average by different demographics were analyzed based on Course, Gender, and Year Level. BSTM students scored higher passing average than BSHM. Female students registered a slightly higher average than Males. Averages of students by year level showed that 1st and 3rd year approximately performed the same. All year levels performed more than 50 percent passing ($.53 < |M| < .60$).

Table 8. PASSING AVERAGE PERCENTAGE BY COURSE, GENDER, AND YEAR LEVEL

Variable		Mean	Std. Devt.
Course	BSHM	0.56	0.09
	BSTM	<i>0.61</i>	0.09
Gender	Female	<i>0.59</i>	0.09
	Male	0.58	0.09
Year Level	1st	<i>0.60</i>	0.09
	2nd	0.53	0.11
	3rd	0.59	0.08
	4th	0.56	0.10

** Italics means higher value.

E. Analysis of Variance of Critical Thinking Indicators

Analysis of Variance of Passing Percentage by Course, Year, and Gender

Based on ANOVA statistics, passing average percentage showed significant difference among BSHM and BSTM students [F(1,268)=16.94, p<.0001]. BSTM passing percentage is statistically different with BSHM. Comparison of means by Year Level showed statistical difference [F(3,265)=3.02, p=.03]. However, Passing Percentage based on Gender was found to be the same on both Male and Female [F(1,266)=.77, p=.38].

By Gender (Male, Female)

Analysis of Variance statistics was calculated to determine if there are significant differences in the different critical thinking indicators by Gender. The result showed that there are no significant difference in the critical thinking skills between the male and female students.

Indicator	df	F	p	Sig.
• Inference	1,266	2.21	.14	NS
• Assumption		1,266	2.30	.13
• Deduction		1,266		
• Interpretation		1,266	.36	.5
• Argument	1,266	.59	.81	NS
• Total Score	1,266	.77	.38	NS

*NS = not significant

By Course (BSHM, BSTM)

The results of the comparison of means revealed that there were significant differences in the critical thinking indicators and total score between the students in BSTM and BSHM except the Inference factor. The ANOVA statistics are summarized below:

Indicator	df	F	p	Sig
• Inference	1,268		3.19	.14
• Assumption	1,268	19.49		.00
• Deduction	1,266	4.32		.04
• Interpretation	1,266	7.20		.01
• Argument	1,266	6.70		.02
• Total Score	1,266	16.94		.00

*NS = not significant Sig = significant

By Year Level

Based on Year Level, all indicators showed significant difference at .05 level two-tailed except for Inference Indicator. The following statistics are shown below:

Indicator	df	F	p	Sig
• Inference		3,265		.50
• Assumption	1,268		2.99	
• Deduction	1,266		4.62	.00
• Interpretation	1,266	3.28		.02
• Argument	1,266	4.17		.00
• Total Score	1,266	3.02		.03

*NS = not significant Sig = significant

Table 9. MEAN DIFFERENCE AMONG BSHM AND BSTM STUDENTS

Indicator	BSHM		BSTM		Mean Difference
	Mean	Std. Deviation	Mean	Std. Deviation	
INFERENCE	2.41	.88	2.63	1.10	0.22*
ASSUMPTION	2.35	.96	2.87	.96	0.52**
DEDUCTION	3.01	.91	2.79	.89	-0.23**
INTERPRETATION	2.91	.94	3.22	.94	0.31**
ARGUMENT	3.39	.96	3.69	.98	0.31**
TOTALSCORE	14.08	2.14	15.20	2.33	1.12**

*Not significant by Gender, Course, and Year .05 level two-tailed

** Significant by Course and Year Level .05 level two-tailed

F. Self Rating Descriptive and ANOVA Statistics

BSHM and BSTM students have almost the same mean in their critical thinking scores which is 3.95 (SD = .828) and 3.85 (SD = .807) respectively. A comparison of means was conducted to determine if there are significant differences based on the Course, Gender and Year of the students. In terms of the type of the Course taken by students, the result showed that their self-rating do not significantly differ [F(1,264)=.976, p=.324]. The ANOVA statistics likewise did not indicate any difference

when Gender is considered [F(1,263)= .130 p=.719). When Self-Rating was compared by Year Level, there was a considerable difference [F(3,262)= 7.629, p<.001].

Percentile Comparisons by Courses

The percentile rank of each subject based on their Total Score was computed and the following cut-off values were derived.

0.60 - 0.69	18	17	35
0.70 - 0.79	14	19	33
0.80 - 0.89	9	12	21
0.90 - 0.99	2	11	13
1.00 - 1.00	0	1	1
	139	131	270

Table 10. PERCENTILE AND TOTAL SCORE VALUES

Percentile	Total Score
1.00	21
0.90	18
0.80	17
0.70	16
0.60	15
0.50	15
0.40	15
0.30	14
0.20	13
0.10	12
0.00	7

The frequency distribution of the percentile by Course showed that 22 percent or 60 students are in the 0.40 to 0.49 percentile range. The second highest percentile groups are in the 0.00 to 0.09 (N=39) and 0.20 to 0.29 (N=38) which is both 14 percent. BSTM students are located in the upper percentile ground from 0.70 to 1.0 compared to BSTM students in the lower percentile (0.00-0.69). The succeeding table shows the distribution.

Table 11. PERCENTILE DISTRIBUTION BY BSHM AND BSTM.

Percentile	BSHM	BSTM	Total
0.00 - 0.09	23	16	39
0.10 - 0.19	17	13	30
0.20 - 0.29	24	14	38
0.40 - 0.49	32	28	60

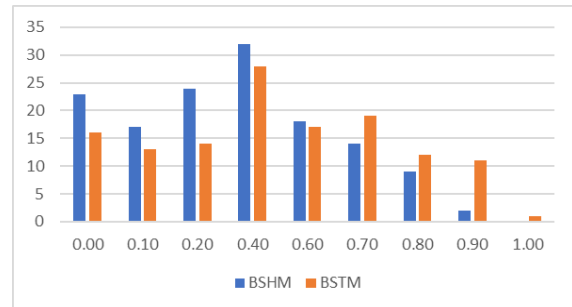


Fig. 5. Comparison of Percentile Distribution by Course

A visual representation of the percentile distribution regardless of the Course is displayed in Figure 6. It shows that 22 percent of the samples are located in 0.40 to 0.49 percentile groups. The next range which is 0.00 to 0.09 comprised 15 percent of the students. The percentile range 0.20 to 0.29 indicates 14 percent of the students belong to this. Only one student was classified in the 1.0 percentile.

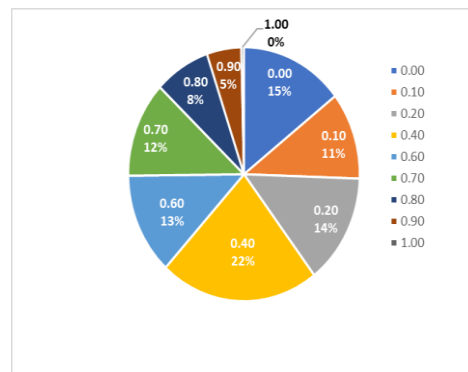


Fig. 6. Percentile Distribution by Total Scores

V. CONCLUSIONS AND RECOMMENDATIONS

More than a quarter of the respondents scored correctly in analysing whether an argument is strong or not. Two out of ten students was able to interpret

and understand the information correctly. On the other hand, about a quarter was not able to infer the correct conclusion and make logical judgement.

The average overall percentage passing score is 58 percent (or above average). The indicator with the highest score is in analysis of argument. The lowest average is in drawing conclusion. Tourism students scored strongly on inference, or drawing conclusions and interpreting information and it was found consistent given gender consideration. Hospitality students registered average in almost all indicators. First year and Third year students garnered above average scores in inferencing and interpretation of information. The result also yielded no significance in gender. Comparison between the two groups of students showed significant difference in course and year level.

The study concluded that among the various critical thinking indicators, Inference, Interpretation, and Argument are positively moderate to strongly associated with the students' total scores. The factor Deduction and Assumptions are positively correlated with the dependent variable only slightly moderate. Self-Rating association with critical thinking did not establish strong correlation.

Comparison of means showed that Gender did not significantly differentiate the scores on all indicators. On the basis of Course, analysis of variance showed that critical scores were differentiated excepting the variable Inference. Total scores indicated differences given the different Year Level. BSTM students showed a higher critical thinking scores in almost all indicators except Deductions.

Examining the r coefficients and r^2 of the indicator vis-à-vis total score, we can conclude that Inferencing explains 35 percent of the variation in the total score; Interpretation, 26; Argument, 22 percent, and Assumption, 17 percent. Moreover, all of the indicators were found to be significant predictors to total critical thinking score (refer to the Figure below). Self-rating showed only 1 percent of the variation with respect to the total score (not significant).

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