RESEARCH ARTICLE

SELF-EFFICACY, ANXIETY AND ATTITUDES ON RESEARCH WRITING OF SELECTED BACHELOR OF SCIENCE IN INDUSTRIAL TECHNOLOGY STUDENTS: BASIS IN THE DEVELOPMENT OF MOTIVATION-INDUCED RESEARCH PROGRAM

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Manuscript Info	*Abstract*

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A research involving the study on self-efficacy, anxiety and attitudes on research writing of BS Industrial Technology students in Laguna State Polytechnic University (LSPU), Santa Cruz Campus is described in this paper. The main purpose of this study was to: 1.) Describe the students' self-efficacy, anxiety and their attitudes toward research writing, 2.) Analysis on the significant difference of the demographic information on the responses of the student towards research writing given the above mention variables, and 3.) Develop a motivation-induced research program for the students based on the result of the study. The statistical population of this study was graduate industrial technology students of LSPU. A sample of 200 students was selected using a proportional stratified sampling technique. A questionnaire was developed to interview the subjects of the study of which the validity and reliability were estimated based on opinions of a panel of experts and Cronbach's alpha coefficient, respectively. Results revealed that the respondents had a moderate level of research anxiety and research self-efficacy. On the other hand, the study also revealed that students of industrial technology have negative attitude toward research. Mann-Whitney U statistical test showed that there was a contributed significantly difference to the level of self-efficacy, anxiety, and attitudes towards research writing.

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Introduction:-

As one of the instructors in Methods of Research (MOR) and Thesis Writing in the College of Industrial Technology at Santa Cruz Campus, common informal observation from 2016 to present year has revealed that a large percentage of the students in the Technology program experience challenges in comprehending several concepts and procedures of research in the discipline. It is acknowledged that their deficiencies in understanding the research process has a negative influence on their ability, as graduating students, to apply this knowledge to writing the required final research project. Undeniably, the challenges which these Technology students experience with research instruction frequently results in their frustration oftentimes grounds not to graduate.

Research as an integral part of all academic disciplines should form the background knowledge of the Technology students. Therefore, in order to produce the ideal Technology graduate, the research teachers need to ensure that students develop the skills to conduct research using the accepted methodologies.

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Unfortunately, there was common perception among MOR and Thesis Writing professors that students over the past years, a large percentage of prospective graduate students exhibit a negative attitude towards the course, and research generally. Moreover, much of the information which they are given in the research course is not applied when they write their theses. The author conceived that the students' attitude to research in turn influences their ability to identify, comprehend and apply knowledge of the fundamental concepts in the execution of research as well as in the formulation of this required written work.

This situation is undesirable, especially as it impacts on the teachers' ability to further enhance the significance and value of research by encouraging the Technology students to use their critical thinking ability and apply their skills in doing research adaptive to real-life events. This further identifies that teachers' instructional methods and strategies should enable students to determine the relevance of the content they have learned. Preferably, this teaching should equip students with skills that they can employ for the betterment of themselves as members of a community, nation, and global. Hence, while the teacher should provide the students with both knowledge and skills during instruction in research, the contrast is the reality. Consequently, it is believed that the deficiency in these crucial components in the learning process impact negatively on Technology students' attitudes to research. Decisively, it is conceptualized that best practices in teaching are paramount because, more than anything else, the application of the basic principles to instruction can affect the students' acquisition of knowledge as well as their growth and development as 'well-rounded' individuals.

Methodology:-
This research utilized an action research design which is applied research carried out with the aim of bringing about a change or some level of improvement after the identification of a problem. Action research can be defined as "an approach in which the action researcher and a client collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis" (Bryman and Bell, 2011, p.414)

This research carried out after which the results can be used to present recommendations for the implementation of best practice principles and motivation-induced programs in teaching Methods of Research and Thesis Writing. The research used both quantitative and qualitative methods to collect and analyze the data. A self-made questionnaire will be administered to collect quantitative data, while qualitative data will be gathered from the group under study which includes demographic profile of the focal group.

This research study used the fourth year Bachelor of Science in Industrial Technology students from different major using random selection. A set of questionnaires was administered to the group under study to determine its demographic profile and research subscales as to self- efficacy, anxiety, and research attitude. The final data will determine the development motivation-induced research program for Bachelor of Science in Industrial Technology students in thesis writing.

Mann-Whitney U test – testing for differences in was used to determine the significant difference by considering an example where engagement score was measured in males and females. Using this interpretation of the Mann-Whitney U test, the researchers wish to know whether male and female engagement scores are similar or whether one gender has higher or lower values than the other.

Results and Discussion:-
Table 1:- Demographic Information of the Respondents.

Variable		N	%
Gender	Male	78	61.00
	Female	122	39.00
Age	20	134	67.00
	21	41	20.50
	22	25	12.50
Course Relation	Food Technology	45	22.50
	Electrical Technology	41	20.50
	Electronics Technology	37	18.50
	Drafting Technology	42	21.00
	Refrigeration &Air Conditioning Technology	35	17.50

The total number of respondents in this study includes two hundred (200) industrial technology who already taken research writing. A summary of the demographic information of respondents is presented in Table 1. One hundred twenty-two (122) or 61 % of the respondents are female and seventy-eight (78) or 39% are male. Most of students who took research writing was twenty (20) years old which is 67% of the total population of the study, while forty-one (21) or 20.50% and twenty-five (25) or 12.50% is twenty and twenty-two years old respectively. It is evident, that the program of industrial technology for bachelor's degree is four years, a large population of the respondents are twenty years old as reflected in the table. As for the course relation, huge part of the respondents coming from the food technology of forty-five (45) or 22.50%, followed by drafting technology of forty-two (42) or 21%, electrical technology of forty-one (41) or 20.50%, and thirty-five (35) or (17.50) coming from the refrigeration and air-conditioning technology.

Table 2:- Responses to the research self-efficacy scale (n=200).

Indicators	Mean	Std. Deviation	Rank
The ability to do effective electronic database searching of the scholarly literature	3.015	0.623	1
The ability to review a particular area of agricultural science theory and research, and write a balanced and comprehensive literature review	2.470	0.631	2
The ability to effectively present findings both verbally and in written form	2.352	0.542	3
The ability to design and implement the best sampling strategy for the study	2.127	0.556	6
The ability to choose a research design that will answer a set of research questions or will test a set of hypotheses	2.212	0.521	4
The ability to interpret and understand statistical printouts	1.604	0.671	9
The ability to design and implement the best data analysis strategy for the study	1.689	0.456	8
The ability to identify and report limitations of the study	2.202	0.572	5
The ability to use various technological advances effectively in carrying out research	2.043	0.579	7

Table 2. summarizes descriptive statistics for the items of research self-efficacy scale used in the analysis, including mean, standard deviation and rank of the items from students' point of views. When analyzing the items of research self-efficacy in the questionnaire, it was found out that "the ability to do effective electronic database searching of the scholarly literature" got the highest ranked (Mean=3.015, SD=0.623), while "the ability to interpret and understand statistical printouts got the lowest rank among other indicators " (Mean=1.604, SD= 0.671).Overall, College of Industrial Technology (CIT) students tend to hold moderate level of research self-efficacy.

The term self-efficacy was soon extended to research domain. Forester et al. (2004) defined research self-efficacy as one's confidence in successfully performing tasks associated with conducting research (e.g., performing a literature review or analyzing data). Researchers identified four dimensions for research self-efficacy, including: data analysis (i.e., confidence in one's ability to work with and analyze data), research integration (i.e., confidence in one's ability to integrate one's research ideas with the existing literature), data collection (i.e., confidence in one's ability to complete data collections tasks such as training raters and keeping accurate records), and technical writing.(Forester et al. 2004).

Table 3:- Responses to the attitude toward research scale (n=200).

Indicators	Mean	Std. deviation	Rank
Research is important for me	1.560	0.453	2
Many important discoveries are the result of the research	1.216	0.418	10
Research is interesting	1.304	0.512	7
I enjoy research	1.201	0.644	11
Many important discoveries are the result of the research	1.445	0.512	3
Research is an important step toward discovering the universe	1.561	0.532	1
The skills I have acquired in research will be helpful to me in the future	1.441	0.433	4

Research can help expand knowledge	1.312	0.467	8
I use research in my daily life	1.227	0.517	9
* Doing research is a waste of time	1.374	0.682	6
* Research is tedious task	2.400	0.531	5

* Items have been reverse scored.

Students were asked to express their attitudes toward research with regards to 11 items. Means and standard deviations for 11 attitude items are reported in Table 3. Overall, CIT students tend to hold negativeattitudes toward research. The highest mean was declared for the item of "Research is an important step toward discovering the universe" (Mean=1.561; SD= 0.532). The next items that had higher mean scores than others were "Research is important for me" (Mean=1.56, SD=0.453), and "Many important discoveries are the result of the research" (Mean=1.445, SD=0.512) .It means that CIT students tend to view research with somewhat a negativefeelings.

Research showed that students typically tend to view research-related courses with negative attitudes and feelings. One of the main problems of these negative attitudes is that they have been found to serve as obstacles to learning (Carbonell,2000). Students' attitude influences how they mentally approach research including all the work related to that research. A positive attitude enables students to solve the problem quickly whereas, a negative attitude hampers the efforts in research. The enhancement of positive attitudes toward research, therefore, is one of the key components that impacts students' research self-efficacy. For this reason, investigating their attitude toward research is a great stride for future educational development.

Table 4:- Responses on anxiety toward research scale (n=200).

Indicators	Mean	Std. Deviation	Rank
I need to improve my research skills	3.061	0.438	2
I need to improve my statistical skills	3.067	0.572	1
It bothers me that my research may not be judged as a quality work	2.733	0.574	5
When reading research articles, I am apprehensive about being able to synthesize the findings	3.018	0.622	4
*I produce research that is respected by my peers	2.590	0.618	6
When I conduct research, I worry about the possibility of using incorrect data analysis	2.174	0.539	10
I often feel uncomfortable when discussing research methods	2.145	0.551	12
When working on a research project, I experience anxiety	3.052	0.671	3
It bothers me that my research may not be judged as acceptable by reviewers	2.423	0.652	8
* I am confident in preparing a research methodology of a study	2.317	0.572	9
* I am confident in conducting the data analysis of a study	2.590	0.533	7
* I am confident when writing the theoretical framework for a research study	2.158	0.643	11

* Items have been reverse scored.

Table 4 shows the responses for 12 items contained in the research anxiety scale. In general, the research anxiety of the CIT students at LSPU was moderate. The highest mean score belonged to "I need to improve my statistical skills" (Mean=3.067, SD=0.572), "I need to improve my research skills" (Mean=3.061, SD=0.438), Item 7 "I often feel uncomfortable when discussing research methods", had the lowest mean score at 2.145 (SD=0.551), indicating a lack in confidence when writing the framework for a research study.It means that CIT students tend to view research with moderate level of anxiety in research.

Research anxiety refers to the characteristics which a student perceives as discomforting, to the extent that productivity may be reduced (Higgins, 2006). In the academic domain, research has demonstrated strong relationships among various dimensions of self-efficacy and anxiety. McGrath (2002) noted that fear and anxiety are often the causes of students failing to complete their researches and some students face considerable anxiety toward the research process. Students with more confidence in their abilities to perform the dissertation task are less likely

to react in a detrimental way to stress related to the research process, have less trepidation for the research, and are therefore more likely to demonstrate greater perseverance on the research.

Table 5:- Analysis on the significant difference demographic information in terms of gender and research subscales.

	RS 1: Self-efficacy	RS 2 : Anxiety	RS 3 : Attitude
Mann-Whitney U	6437	6048	7230
Wilcoxon W	23416.7	23484.1	25243.5
Z	-3.415	-2.334	-4.12
P-value	.000	.004	.001
Grouping variable: gender			

Mann-Whitney U and research subscales (RS) depicts that for research subscales 1, 2, and 3 p-value<0.05 so we reject null hypothesis and conclude that there is significant difference in the mean scores of students across their genderon student's self-efficacy, research anxiety and attitude towards research.

Statistical analysis on gender factors for third industrial technology students failed to reach the acceptance level of .005. And therefore, student gender and research subscales were found to be significantly related.

Table 6:- Analysis on the significant difference demographic information in terms of age and research subscales.

	RS 1: Self-efficacy	RS 2 : Anxiety	RS 3 : Attitude
Mann-Whitney U	6010	7433	6809
Wilcoxon W	21106.1	22227.0	25243.5
Z	-3.902	-2.0143	-4.05
P-value	.000	.000	.000
Grouping variable: age			

Mann-Whitney U and research subscales (RS) depicts that for research subscales 1, 2, and 3 p-value<0.05 so we reject null hypothesis and conclude that there is significant difference in the mean scores of students across their ages on student's self-efficacy, research anxiety and attitude towards research.

Statistical analysis on gender factors for third industrial technology students failed to reach the acceptance level of .005. And therefore, student gender and research subscales were found to be significantly related.

Table 6:- Analysis on the significant difference demographic information in terms of course relation and research subscales.

	RS 1: Self-efficacy	RS 2 : Anxiety	RS 3 : Attitude
Mann-Whitney U	5527	6198	6509
Wilcoxon W	28902.1	34092.2	29849.5
Z	-3.119	-3.337	-3.902
P-value	.001	.000	.000
Grouping variable: course relation			

Mann-Whitney U and research subscales (RS) depicts that for research subscales 1, 2 and 3 p-value<0.05 so we reject null hypothesis and conclude that there is significant difference in the mean scores of students across their course relation on student's self-efficacy, anxiety and attitude towards research.

Statistical analysis on gender factors for third industrial technology students failed to reach the acceptance level of .005. And therefore, student gender and research subscales were found to be significantly related.

Conclusion:-
As a result, undergraduate students encounter with the burden of doing research. Since research is one of the main tasks of the undergraduate students in addition to education, research anxiety, self- efficacy and attitude towards research,
undoubtedly can greatly interfere with students' ability to learn and master research concepts. Research has shown

that low research self-efficacyand anxiety, as well as negative attitude can interfere with students' research training and willingness to conduct research and add scholarly contributions to their field of study

Recommendations:-

Although the present study provided interesting findings that contribute to the literature and teaching practices, there is still more to do. Conducting comparative studies investigating both cognitive and non-cognitive constructs is necessary to better understand how various variables interact in a different context. Also, it is suggested that future studies may consider interviewing some of the participants about reasons of low self- efficacy and anxiety. Such studies may uncover some of the causes of individuals' self-beliefs and emotions in learning research.

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