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Collaboration Of Faculty And Students In Enhancing Research Productivity: Basis For Research Publication And Utilization

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ABSTRACT
This study aims to assess and determine the effectiveness of collaboration among faculty and students in enhancing research productivity as basis for research publication and utilization. Research collaboration among faculty and students is one aspect to reach the maximum research output and productivity in a university. Recently, Laguna State Polytechnic University -San Pablo City Campus actively participated in the international research publication through the collaboration of faculty and graduate students which definitely adhere the integrity of the university. Proving that our university is competitive equipped with a research-oriented faculty and best student researchers. The study was limited only to the selected Students and faculty of Laguna State Polytechnic University. Eighty (80) respondents were represented the study. The research methodology used in this study is a descriptive quantitative approach, with a survey questionnaire as the primary instrument for this study. The researcher used an online questionnaire-checklist and distributed online to the participants. The collected data was tabulated, interpreted and analyzed by the used of statistical measures.
The study aims to gauge the collaboration of faculty and students in enhancing research productivity as basis for research publication and utilization. The findings of this study will help faculty members and administrators to develop strategies to enhance faculty and student in research productivity as basis for research publication and utilization.
The survey collects data using Likert-scale questions. The data is collected through frequency and percentage distribution, mean and standard deviation. The analysis is done using descriptive analysis (mean and standard deviation) and correlational analysis (Pearson r Product Moment Correlation Coefficient. The study aims to assess and determine the effectiveness of collaboration among faculty and students in enhancing research productivity as basis for research publication and utilization. The regression model shows how research work, research sources and research expertise predict research productivity. The three subcategories under faculty and collaboration in enhancing research productivity (Research Work, Research Sources and Research Expertise) have a significant relationship with the research productivity when correlated individually
Keywords: Collaboration of Faculty and Students, Research Productivity, Research Publication, Utilization

1. INTRODUCTION:

Universities have expanded their role in society from the preparation of the next generation to the production of novel knowledge or research. Students' role in universities has also changed, making these students not only the recipients of existing knowledge, but also active participants in knowledge generation. In recent years, students' participation is an essential factor for carrying out academic research in universities and for diffusion of tacit knowledge in innovation system (Krishna, V. V., & Patra, S. K. (2015).

Research collaboration is essential to the teacher-student connection in academia, and this issue is significant to higher education. Research collaboration in university-offered programs depends on what instructors and students anticipate from one another. Teachers want more from their students in terms of learning outcomes, and students want knowledge, assistance, and a healthy dose of criticism and innovation from their teachers. This review of the literature-based research study examines teacher-student research collaboration, which involves communication between teachers and students, (Abbas, A. et. al. 2020).

Collaboration in research has many advantages. First, collaboration is a key mechanism for mentoring graduate students and doctoral researchers. Second, participation in scientific publications and scientific presentations provides a golden opportunity to "socialize" students into the profession. Third, it enhances students' research skills. Fourth, it establishes positive mentoring relationships. Fifth, it provides "extra-classroom" communication / interaction with professors. Finally, it helps students understand the disciplinary nuances of research. Graduate students have been argued to play the most important role in university research output and having more students in master programs, EdD, PhD programs positively correlated with professors' productivity (Ramkumar S., et. al, 2017).

Higher education institutions are continually exploring what are the best ways in which they can achieve their missions. Recently, however, there has been a shift in the culture of higher education administration. There has been an increase in interest around enhancing faculty and student academic collaboration. Researchers are writing about the need for collaboration to increase student learning and to become research oriented. In light of the above statement, this study aims to determine the effectiveness of collaboration among faculty and student in enhancing research productivity which will serve as input for research publication and utilization.

Title: Collaboration of Faculty and Students in Enhancing Research Productivity: Basis for Research Publication and Utilization

THEORETICAL FRAMEWORK

Theories of collaboration exist at the interfirm and intergroup level, but not the intragroup or team level. Team interactions are often framed in terms of leadership and followership, a categorization which may, or may not, accurately reflect the dynamics of intragroup interactions.

Collaboration among teachers is a force that positively influences the whole school community to advocate to increment collaborative activities in the form of professional learning communities, stating that such collaborative communities "hold out immense, unprecedented hope for schools and the improvement of teaching". Positive effects for teachers were found in improved self-efficacy, increased teaching effectiveness and improvement of instructional quality (Hoch Weber3). These positive effects will improve their quality as professionals and as Hattie suggests, teacher quality alone accounts for the variance in student performance. The communities that will be formed by working collaboratively will enhance teacher effectiveness and expertise (Hattie, 2015).

Theories of collaboration exist at the interfirm and intergroup level, but not the intragroup or team level. Team interactions are often framed in terms of leadership and followership, a categorization which may, or may not, accurately reflect the dynamics of intragroup interactions. (Colbry, S., Hurwitz, M., & Adair, R. (2014).

Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of "mental construction." In other words, students learn by fitting new information together with what they already know. Constructivists believe that learning is affected by the context in which an idea is taught as well as by students' beliefs and attitudes. Constructivism is a learning theory found in psychology which explains how people might acquire knowledge and learn. It therefore has direct application to education. The theory suggests that humans construct knowledge and meaning from their experiences. Constructivism is not a specific pedagogy. Piaget's theory of Constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of many education reform movements. Research support for constructivist teaching techniques has been mixed, with some research supporting these techniques and other research contradicting those results. (Bada, S. O., & Olusegun, S. (2015).

The positive influence of teacher collaboration transcend the teacher community; research has shown that professional collaborative activities might have a positive effect on student achievement found a significant direct positive effect on student achievement while Lara-Alecio et al. (2014) found that students whose teachers participated in collaborative activities, such as instruction strategies, scored higher in science and reading achievement than students whose teachers did not attend such professional development activities. However, because of its relatively recent emergence, empirical evidence of the effects of teacher collaboration on student achievement is limited.

2. PROBLEM STATEMENT AND RESEARCH QUESTIONS

The purpose of this study is to assess and determine the effectiveness of collaboration among faculty and students of LSPU-SPCC which will serve as basis in enhancing research productivity at Laguna State Polytechnic University- San Pablo City Campus as basis for research publication and utilization.

Hence, this study explored the following research questions:

How do faculty and student collaborated in enhancing research productivity in terms of:

I. Research Work

1.1 Knowledge and Skills

1.2 Awards and Recognition

1.3 Commitment and Satisfaction

II. Research Sources

2.1 Library

2.2 ResearchGate

2.3 Websites

III. Research Expertise

3.1 Manuscript Writing

3.2 Statistics Analysis

3.3 Paper Lay-outing

Do faculty and student collaboration greatly measure their effectiveness in research productivity in terms of?

2.1. Research Publication

2.1.1Journal Article

2.1.2 Electronic Books

2.1.3 Research Output

2.2. Research Utilization

2.2.1Copyright

2.2.2 Patent

2..2.3 Utility Model

3. Is there a significant relationship between faculty and student collaboration in enhancing research productivity?

3. RESEARCH METHODS

This section explains the research design, context and participants, and the research instrument employed in the present research.

3.1. Research Design

A descriptive method in this study is used through a researcher-made survey questionnaire. In treating the collected data, the quantitative approach is significantly helpful in this study in which the researcher will design and control data collection and analysis. The correlational approach is employed to find out if any relationship exists between variables, that is how variables vary with one another.

3.2. Research Instrument

A researcher made survey questionnaire is used as the main instrument in obtaining the quantitative data using Likert-scale surveys. Data are gathered through frequency and percentage distribution. Descriptive analysis such as mean and standard deviation will also be utilized. Pearson r Product Moment Correlation coefficient will be used to determine the relationship of the variables.

To determine the level of awareness on internet of things among college students, the researcher used the frequency and percentage distribution.

To determine the collaboration of faculty and students in enhancing research productivity, the researcher used weighted mean and standard deviation. To find out if this collaboration of faculty and students in enhancing research productivity significantly relates to their research publication and utilization, the researcher use the Pearson r Product Moment Correlation Coefficient.

4. RESULTS AND DISCUSSION

This section constitutes tabular presentations of the gathered data that show its analysis with respective interpretations based on the statistical treatment used.

Descriptive statistics for each indicator and scale are made, with remarks on these statistics. The data were examined and interpreted to generate conclusions and recommendations from the study. Statistical details for the indicators were presented individually and as a whole, asserting that the respondents have a favourable perception of their online environment and online learning experience.

4.1. Level of Research Work

Table 1. Level of Knowledge and Skills in Terms of Research Work

	Knowledge and skills of faculty and students in research work……	**Mean**	**SD**	**Verbal Interpretation**
1	creates a strategy to gather facts and information in research.	4.50	.656	Strongly Agree
2	enables appropriate data and evaluate it for quality and relevance.	4.59	.724	Strongly Agree
3	foster critical thinking in conducting research.	4.64	.698	Strongly Agree
4	enable them to become research-oriented.	4.56	.633	Strongly Agree
5	encourage curiosity as it opens us to different ideas and opinions.	4.56	.709	Strongly Agree
	Over-all mean	**4.57**	**0.684**	**Strongly Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on Table 1, all statements relating to the perceived level of knowledge and skills in terms of research work have the same “strongly agreed” verbal interpretation with mean scores ranging from Mean 4.50 to 4.64 and SD .633 to .724. Respondents both strongly agreed that the level of knowledge and skills in terms of research create a strategy to gather facts and information in research: (mean 4.50;SD.656) enables appropriate data and evaluate it for quality and relevance: (Mean 4.59;SD.724) foster critical thinking in conducting research: (Mean 4.64;SD=.698) enable them to become research-oriented:(Mean= 4.56;SD=.633) encourage curiosity as it opens us to different ideas and opinions (Mean= 4.56;SD=.709) strongly agree with the knowledge and skills in this aspect.

Overall, the mean score of 4.57 indicates an agreement on the knowledge and skills in terms of research work.

Table 2. Level of Awards and Recognition in Terms of Research Work

	The awards and recognition of the faculty and students in research work.....	**Mean**	**SD**	**Verbal Interpretation**
1	strengthen informational resources that can help address the problem.	4.60	.704	Strongly Agree
2	enable us to improve at identifying problems that may lead us to increase our performance.	4.51	.711	Strongly Agree
3	develop excellent communication skills, which are vital in research.	4.53	.711	Strongly Agree
4	help in tracing citations to unlock the scholarly conversation.	4.50	.746	Strongly Agree
5	increase the likelihood of getting the exact information needed in research.	4.46	.762	Agree
	Over-all mean	**4.52**	**0.728**	**Strongly Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Table 2 reveals the perceived level of awards and recognition in terms of research work with an overall mean Mean=4.52; SD= .727) interpreted as "strongly agree'. This shows that the respondents promote research output that leads to high quality research. Moreover, both indicators 2 and 4 shows that the level of awards and recognition of the faculty and students in research and study programs enable us to improve at identifying problems that may lead us to increase our performance. Respondents also agreed on indicators 1 and 3 that the level of awards and recognition of the faculty and students in research and study programs develop excellent communication skills, which are vital in research with (Mean=4.53; SD=.711) and strengthen informational resources that can help address the problem with (Mean=4.60; SD=.704). Only indicator 5 "agree" that the level of awards and recognition in research and study programs increase the likelihood of getting the exact information needed in research with (Mean=4.46; SD=.762).

Table 3. Level of Commitment and Satisfaction in Terms of Research Work

	The commitment and satisfaction of the faculty and students in research work.....	**Mean**	**SD**	**Verbal Interpretation**
1	aim to increase the achievement rate through quality research.	4.59	.669	Strongly Agree
2	enhance the responsibilities to promote an advanced method of conducting research.	4.46	.795	Agree
3	stimulate the research work in the form of publications or presentations.	4.56	.709	Strongly Agree
4	motivate academics to improve university research performance.	4.58	.708	Strongly Agree
5	promote research output that leads to high-quality research.	4.31	.756	Agree
	Over-all mean	**4.50**	**0.727**	**Strongly Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

This table presents the level of commitment and satisfaction in Terms of Research Work for various aspects aim to increase the achievement rate through quality research.: (Mean = 4.59;SD=.669), enhance the responsibilities to promote an advanced method of conducting research: (Mean 4.46;SD=.795) , stimulate the research work in the form of publications or presentations**:** (Mean 4.56;SD=.709), motivate academics to improve university research performance: (Mean 4.58;SD=.708), promote research output that leads to high-quality research: (Mean = 4.31;SD=.756) strongly agree with the commitment and satisfaction of the faculty and students in research work. Overall, the mean score of 4.50 indicates the commitment and satisfaction of the faculty and students in research work.

4.2. Level of Research Sources

Table 4. Level of Library in Terms of Research Resources

	The research sources of the faculty and students in the library ……	**Mean**	**SD**	**Verbal Interpretation**

1	improve the level of service offered by the staff or librarian of the institution by increasing faculty and student's knowledge of the investigative process.	4.41	.822	Agree
2	connect you with sources of information and networks of professional support.	4.50	.779	Strongly Agree
3	clarify purposes, processes and priorities when introducing change for research.	4.40	.789	Agree
4	provide individual or group instruction on research skills to access relevant information.	4.38	.832	Agree
5	assist them in developing research strategies, refining search terms and understanding citation practices.	4.33	.792	Agree
	Over-all mean	4.40	0.803	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on the table above, respondents strongly agree that the level of Library in Terms of Research Resources of the faculty and students connect you with sources of information and networks of professional support with a (Mean=4.50;SD=.779) However , most of the respondents agree on indicators(1,3,4,5) improve the level of service offered by the staff or librarian of the institution by increasing faculty and student's knowledge of the investigative process: (Mean=4.41;SD=.822), clarify purposes, processes and priorities when introducing change for research: (Mean =4.40=;SD.789) provide individual or group instruction on research skills to access relevant information: (Mean= 4.38;SD=.832) assist them in developing research strategies, refining search terms and understanding citation practices: (Mean = 4.33;SD=.792).

Table 5. Level of ResearchGate in Terms of Research Resources

	The research sources of the faculty and students in the electronic journal …….	**Mean**	**SD**	**Verbal Interpretation**
1	deliver students with curated lists of relevant electronic journals, including those specific to their research area.	4.39	.803	Agree
2	guide students on how to access journals through subscriptions and databases.	4.40	.880	Agree
3	can explore them to use electronic search tool independently to find relevant articles.	4.46	.795	Agree
4	develop critical thinking skills in searching relevant and updated information.	4.38	.786	Agree
5	foster research networks and accelerated research progress	4.44	.691	Agree
	Over-all mean	**4.41**	**0.791**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on Table 5, all statements relating to the perceived level of ResearchGate in Terms of Research Resources have the same "agreed" verbal interpretation with mean scores ranging from Mean 4.38 to 4.46, and SD .691 to .880. Deliver students with curated lists of relevant electronic journals, including those specific to their research area: (Mean=4.39;SD.803) guide students on how to access journals through subscriptions and databases: (Mean = 4.40;SD=.880) can explore them to use electronic search tool independently to find relevant articles: (Mean =4.46 ;SD=.795) develop critical thinking skills in searching relevant and updated information: (Mean = 4.38;SD=.786) foster research networks and accelerated research progress:(Mean= 4.44;SD=.691) agree with the ResearchGate in Terms of Research Resources.

Table 6. Level of Websites in Terms of Research Resources

	The research sources of the faculty and students in the websites…….	**Mean**	**SD**	**Verbal Interpretation**
1	provides faculty and students with curated list of academic journals and reputable news sources.	4.44	.726	Agree
2	assist them to avoid unreliable or biased information and focus on credible sources	4.46	.762	Agree

3	encourage them to explore engines and online tools to find relevant information.	4.49	.729	Agree
4	helps them to create online research guides and practices for conducting research.	4.54	.693	Strongly Agree
5	serve as a valuable resource for future students and researchers.	4.54	.693	Strongly Agree
	Over-all mean	**4.49**	**0.721**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

This table presents the level of Websites in Terms of Research Resources for various aspects provides faculty and students with curated list of academic journals and reputable news sources: (Mean = 4.44;SD=.726) assist them to avoid unreliable or biased information and focus on credible sources: (Mean 4.46;SD=.762) encourage them to explore engines and online tools to find relevant information : (Mean 4.49;SD=.729) helps them to create online research guides and practices for conducting research : (Mean 4.54;SD=.693) serve as a valuable resource for future students and researchers. : (Mean = 4.54;SD=.693) agree of the faculty and students in the websites.

4.3. Level of Research Expertise

Table 7. Level of Manuscript Writing in Terms of Research Expertise

	The research expertise of the faculty and students in manuscript writing…….	**Mean**	**SD**	**Verbal Interpretation**
1	creates a transparent, inclusive, and accountable research team that promotes creativity and productivity while protecting less influential members.	4.59	.669	Strongly Agree
2	produce the best work for the good of the company or organization by including the ideas and skill sets of multiple writers.	4.63	.624	Strongly Agree
3	generate more ideas, explore different perspectives, and develop critical thinking skills.	4.49	.675	Agree
4	supports to have a number of research to actively engage students in writing processes.	4.54	.655	Strongly Agree
5	allows the faculty and student researcher that they most need in order to improve their writing.	4.49	.729	Agree
	Over-all mean	4.55	0.670	**Strongly Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on the table above, respondents "agree" that faculty and students in manuscript writing generate more ideas, explore different perspectives, and develop critical thinking skills with a (Mean=4.49; SD=.675). Likewise, indicator 5 states that faculty and students in manuscript writing allows the faculty and student researcher that they most need in order to improve their writing with a verbal interpretation of "agree" (Mean=4.49; SD=.729). However, most of the respondents "strongly agree" on indicators 1, 2 and 4 stating that faculty and students in manuscript writing supports to have a number of research to actively engage students in writing processes with (Mean=4.54, SD=.655) creates a transparent, inclusive, and accountable research team that promotes creativity and productivity while protecting less influential members with (Mean=4.59; SD=.669) and that produce the best work for the good of the company or organization by including the ideas and skill sets of multiple writers with (Mean=4.63; SD=.624).

Table 8. Level of Statistics Analysis in Terms of Research Expertise

	The research expertise of the faculty and students in statistics analysis.....	**Mean**	**SD**	**Verbal Interpretation**
1	examine differences among groups and the relationships among variables	4.54	.693	Strongly Agree
2	allows researchers to hold a degree of confidence that their findings are real, reliable, and not due to chance.	4.50	.675	Strongly Agree
3	provide researchers draw conclusions from a sample to a population.	4.51	.711	Strongly Agree
4	offers us a valuable set of interpretations for understanding the results of an investigation.	4.54	.728	Strongly Agree
5	equips us to identify trends within different data points, develop statistical models, and design surveys and research studies.	4.54	.728	Strongly Agree

	Over-all mean	**4.53**	**0.707**	**Strongly Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on Table 8, all statements relating to the perceived level of Statistics Analysis in terms of Research Expertise have the same "strongly agreed" verbal interpretation with mean scores ranging from Mean 4.50 to 4.54 and SD .675 to .728. Respondents

both strongly agreed that the level of Statistics Analysis in terms of Research Expertise allows researchers to hold a degree of confidence that their findings are real, reliable, and not due to chance. It also provides researchers draw conclusions from a sample to a population. Respondents strongly agreed that level of Statistics It equips us to identify trends within different data points, develop statistical models, and design surveys and research studies and offers us a valuable set of interpretations for understanding the results of an investigation.

Table 9. Level of Paper Lay-outing in Terms of Research Expertise

	The level of IoT importance in digital simulation……	**Mean**	**SD**	**Verbal Interpretation**
1	unlock new learning opportunities in education	4.21	.729	Strongly Agree
2	provides connected classrooms to smart education for transformative potential of IoT and wireless data	4.19	.722	Agree
3	empower students through wireless data plan to enhance learning.	4.12	.759	Agree
4	revolutionize education with new learning experiences.	4.14	.761	Agree
5	improve overall student engagement using innovation.	4.19	.745	Agree
	Over-all mean	**4.17**	**.658**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

This table presents the level of research expertise of the faculty and students in paper lay outing for various aspects helps the viewer understand the message the design is conveying with: (Mean = 4.50;SD=.796) serves as a key in creating user-friendly, engaging designs, particularly in the realms of web design and advertising with: (Mean 4.49;SD=.857) allows other researchers to learn from its conclusions, and thus makes a contribution to the sum of gathered knowledge about its topic with: (Mean 4.55;SD=.709) convey the point you have and make the difference to the reader with the message you are trying to get across or provide the information you are trying to reach out with.: (Mean 4.46;SD=.810) evaluates the evidence, challenging presumptions, and developing cogent arguments which are all necessary components of research with (Mean = 4.45;SD=.794) agree with the Paper Lay-outing in this aspect. Overall, the mean score of 4.49 indicates the research expertise of the faculty and students in paper lay outing.

4.4. Level of Research Publication

Table 10. Level of Journal Article in Terms of Research Publication

	The research publication of the faculty and students in journal article…….	**Mean**	**SD**	**Verbal Interpretation**
1	provides a means of communication and a permanent record of an article in research.	4.44	.809	Agree
2	serves as the final output of most research.	4.44	.793	Agree
3	explore a very narrow, specific topic in depth.	4.40	.756	Agree
4	supports detailed reports of the methodology and results of laboratory research, case series reports, clinical trials, program evaluation, and other kinds of research studies.	4.46	.745	Agree
5	give researchers a venue to "impart their knowledge to one another, and contribute what they can.	4.41	.758	Agree
	Over-all mean	**4.18**	**.634**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Based on Table 10, all statements relating to the perceived level of Journal Article in Terms of Research Publication have the same "agreed" verbal interpretation with mean scores ranging from Mean 4.40 to 4.46 and SD .745 to .809. Respondents both agreed that the level of Journal Article in Terms of Research Publication provides a means of communication and a permanent record of an article in research. It also serves as the final output of most research. Respondents agreed that level of Journal Article give researchers a venue to "impart their knowledge to one another and contribute what they can. It's explored a very narrow, specific topic in depth and supports detailed reports of the methodology and results of laboratory

research, case series reports, clinical trials, program evaluation, and other kinds of research studies.

Table 11. Level of Electronic Books in Terms of Research Publication

	The research publication of the faculty and students in electronic books.....	Mean	SD	Verbal Interpretation
1	provide in-depth information about a topic and are usually great sources for research.	4.44	.777	Agree
2	help readers absorb and recall content more effectively.	4.45	.761	Agree
3	provides a convenient way to keep track of work.	4.46	.745	Agree
4	allow the reader to gain a deeper understanding of the subject matter and to explore it at their own pace.	4.43	.792	Agree
5	contain a full reference list of sources used and often an index to help you quickly find the information you need.	4.50	.729	Strongly Agree
	Over-all mean	**4.18**	**.637**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Table 11 presents the level of agreement on the importance of IoT in advancing mobility applications for various aspects. Most of the respondents agree the importance of IoT in these aspects. Advances communication and collaboration skills: (Mean= 4.19; SD=7.66) Advances informatization and enabling students to acquire knowledge and skills of IT devices: (Mean 4.17;.730) Allows students to help each other

and work together to better understand the material: (Mean = of 4.18; SD=7.87) Provides students with a more immersive, engaging experience that enhances student learning: (Mean 4.17;SD7.58) Increase student motivation, social interactions, positive outcomes, enhanced student learning, and enhanced student engagement: (Mean= 4.19;SD=.739) agree with the importance of IoT in this aspect.

Overall, the mean score of 4.18 indicates an agreement on the importance of IoT in advancing mobility applications.

Table 11. Level of Technological Advancement in Terms of Research Computing

	With the technological advancement of IoT, the research computing…….	Mean	SD	Verbal Interpretation
1	minimizes human effort in research	4.19	.766	Agree
2	automate mundane of task in making research	4.17	.730	Agree
3	arrange reports and analysis accurately	4.18	.787	Agree
4	4. delivers wide variety of smart system	4.17	.758	Agree
5	5.provide intelligent devices and sensors in conducting research	4.19	.739	Agree
	Over-all mean	**4.18**	**.637**	**Agree**

Legend: 1.00-1.49=Strongly Disagree; 1.50-2.49=Disagree; 2.50-3.49=Uncertain; 3.50-4.49=Agree; 4.50-5.00=Strongly Agree

Table 12 shows all statements relating to the perceived level of Technological Advancement in Terms of Research Computing have the same “agreed” verbal interpretation, minimizes human effort in research: (Mean = 4.19;SD=.766) automate mundane tasks in research: (Mean 4.17;SD=.730) arrange reports and analysis accurately: (Mean = 4.18; SD=.787) delivers a wide variety of smart systems: (Mean = 4.17SD=.758) provide intelligent devices and sensors in conducting research: (Mean 4.19;SD.739) agree with the importance of IoT in this aspect.

Overall, the mean score of 4.18 indicates an agreement on the importance of IoT in advancing research computing.

Table 16. Correlation Analysis between faculty and student collaboration in enhancing research work in terms of Research Publication

Research Work	Research Publication								
	Journal Article			Electronic Books			Electronic Books		
	r-value	p-value	interpretation	r-value	p-value	interpretation	r-value	p-value	interpretation
Knowledge and	**.180**	**.142**	Not significant	**.163**	**.183**	Not significant	**.145**	**.238**	Not significant

skills									
Awards and Recognition	**.192**	**.117**	Not significant	**.173**	**.158**	Not significant	**.160**	**.192**	Not significant
Commitment and Satisfaction	**.154**	**.211**	Not significant	**.123**	**.318**	Not significant	**.115**	**.348**	Not significant

Table 16 presents the correlation analysis between student and faculty collaboration in improving research output in terms of research publication is shown in Table 16. The correlations are weak (all R-values are less than 0.20), suggesting that there is little to no relationship between the three variables (knowledge and skills, awards and recognition, and commitment and satisfaction) and the categories of research work, journal articles, and electronic books. Since all of the p-values are higher than 0.05, none of the relationships are statistically significant.

This implies that, in the context of the given categories (Research Work, Journal Articles, and Electronic Books), these characteristics do not significantly and quantifiably affect one another. In summary, the data indicates that there is no significant relationship between Research Work, Journal Articles, or Electronic Books and the variables under investigation (Knowledge and Skills, Awards and Recognition, and Commitment and Satisfaction).

Table 17. Correlation Analysis between faculty and student collaboration in enhancing research work in terms of Research Utilization

Research Work	**Research Utilization**								
	Copyright			**Patent**			**Utility Model**		
	r-value	p-value	interpretation	r-value	p-value	interpretation	r-value	p-value	interpretation
Knowledge and skills	**.129**	**.293**	Not significant	**.181**	**.140**	Not significant	**.306***	**.011**	significant
Awards and Recognition	**.166**	**.177**	Not significant	**.196**	**.110**	Not significant	**.306***	**.011**	significant
Commitment and Satisfaction	**.159**	**.196**	Not significant	**.161**	**.189**	Not significant	**.319****	**.008**	significant

Since the p-value is higher than 0.05, Table 17 demonstrates that the relationship between Copyright and Knowledge and Skills is not statistically significant. Because the p-value is higher than the 0.05 cutoff, the relationship between Knowledge and Skills and Patent is likewise not statistically significant. Furthermore, with a p-value higher than 0.05, the association between Awards & Recognition and Patent is not statistically significant. The Utility Model and Awards & Recognition have a statistically significant connection (p-value < 0.05). This implies that the likelihood of developing a utility model is higher for individuals who earn more honors and recognition. Since the p-value is greater than 0.05, the relationship between Copyright and Commitment and Satisfaction is not significant. Similarly, there is no significant correlation between Commitment and Satisfaction and Patent (p-value > 0.05), however there is a statistically significant correlation between Commitment and Satisfaction and Utility Model (p-value < 0.05). This suggests that there is a positive correlation between the development of a utility model and higher levels of commitment and satisfaction.

It only implies that the likelihood of creating a utility model is influenced by Knowledge and Skills, Awards and Recognition, and Commitment and Satisfaction, all of which have a statistically significant positive link with Utility Model. However, there appears to be no direct association between Copyright and Patent and Knowledge and Skills, Awards and Recognition, or Commitment and Satisfaction in this study.

Table 18. Correlation Analysis between faculty and student collaboration in enhancing research resources in terms of Research Publication

Research Resources	**Research Publication**								
	Journal Article			**Electronic Books**			**Electronic Books**		
	r-val	p-val	interpretation	r-val	p-val	interpretation	r-val	p-val	interpretation

	ue	ue		ue	ue		ue	ue	
Library	**.029**	**.813**	Not significant	**.026**	**.8311**	Not significant	**.016**	**.898**	Not significant
Research Gate	**-.001**	**.995**	Not significant	**-.017**	**.888**	Not significant	**-.013**	**.919**	Not significant
Websites	**.172**	**.160**	Not significant	**.146**	**.236**	Not significant	**.141**	**.252**	Not significant

Based on the above table, the correlation is quite near to zero, as seen in the above table, suggesting that there is no significant connection between journal articles and library resources. The p-value indicates that the result is not significant because it is significantly higher than the usual significance level of 0.05. As in the last instance, the p-value is once more significantly over 0.05, suggesting that the result is not significant, and the correlation is insignificant. This conclusion is also not significant when it comes to electronic books because the correlation is very low and the p-value is very high. There is no association between Research Gate and Journal Articles, as the correlation is practically negligible. The result is not significant because the p-value is significantly higher than 0.05. Regarding websites, the p-value shows the association, but the correlation is still weak.

As a result, the p-value for each pair in the table is greater than the 0.05 threshold for statistical significance, and the correlations are either very weak or close to zero. This indicates that the publication formats (journal articles, electronic books) and the research resources (library, research gate, websites) do not statistically significantly correlate.

Table 19. Correlational Analysis between faculty and student collaboration in enhancing research respurces in terms of Research Utilization

Research Resources	**Research Utilization**								
	Copyright			**Patent**			**Utility Model**		
	r-value	p-value	interpretation	r-value	p-value	interpretation	r-value	p-value	interpretation
Library	.102	.406	Not significant	067	.585	Not significant	.197	107	Not significant
Research Gate	.058	.638	Not significant	.044	.721	Not significant	.155	.207	Not significant
Websites	.149	.226	Not significant	.189	.122	Not significant	.310*	.010	significant

Table 19 reveals the findings of a correlation study that looked at the relationship between forms of research utilization (Copyright, Patent, Utility Model) and research resources (Library, Research Gate, Websites) are shown in Table 19. In all situations, the p-values are more than 0.05, suggesting no statistically significant links, and Library and Research Gate exhibit modest correlations with all forms of Research Utilization (Copyright, Patent, and Utility Model). Websites exhibit modest relationships with patents and copyright, and these relationships are not statistically significant in either instance (p-values > 0.05). However, the association between Websites and Utility Model is statistically significant, as indicated by the moderately positive correlation (r = 0.310) and significant p-value (p = 0.010) for Utility Model.

Consequently, the use of Utility Models and Websites have the only significant link (r = 0.310, p = 0.010). According to the p-values, none of the other relationships (Research Gate and Library with Copyright, Patent, and Utility Model) are significant (all > 0.05).

Table 20. Correlation Analysis between faculty and student collaboration in enhancing research expertise in terms of Research Publication

Research Expertise	**Research Publication**								
	1Journal Article			**Electronic Books**			**Research Output**		
	r-value	p-value	interpretation	r-value	p-value	interpretation	r-value	p-value	interpretation
Manuscript Writing	**.190**	**.121**	Not significant	.184	.132	Not significant	.172	.161	Not significant
Statistics Analysis	**.140**	**.256**	Not significant	**.122**	**.323**	Not significant	**.095**	**.440**	Not significant
Paper Lay	**.158**	**.199**	Not signi	**.130**	**.290**	Not signi	**.121**	**.324**	Not signi

-outing			ficant			ficant			ficant

Since the p-value is higher than the usual significance level (e.g., 0.05), Table 20 indicates that the correlation is not significant with regard to manuscript authoring. This implies that the creation of manuscripts and the publication of journal articles are not significantly related. Additionally, this association is not significant (p-value > 0.05), suggesting that there is no meaningful connection between the creation of electronic books and manuscript writing. Likewise, the correlation is not significant, indicating that there is no apparent strong relationship between manuscript writing and the total amount of research output. Additionally, the lack of significance in the correlation indicates that there is no meaningful relationship between Statistics Analysis and the total Research Output.

In conclusion, as every p-value above the standard cutoff of 0.05, none of the correlations shown in the table are significant. This implies that there is no statistically significant correlation between the three research expertise areas (manuscript writing, statistics analysis, and paper layout) and the various research output categories (journal articles, electronic books, and overall research output). We therefore draw the conclusion that there is no significant relationship between the measured research outputs and these particular areas of competence.

Table 21. Correlation Analysis between faculty and student collaboration in enhancing research expertise in terms of Research Utilization

Research Expertise	Research Utilization								
	Copyright			Patent			Utility Model		
	r-value	p-value	interpretation	r-value	p-value	interpretation	r-value	p-value	interpretation
Manuscript Writing	.1755	154	Not significant	.207	.090	Not significant	.342**	.004	significant
Statistics Analysis	.083	.499	Not significant	.126	.304	Not significant	.250*	.039	significant
Paper Lay-outing	.119	.335	. Not significant	.172	162	Not significant	.284*	.019	significant

With regards to three categories of research usage (Copyright, Patent, and Utility Model), Table 21 suggests the correlation coefficients (r-values) and p-values for three types of research skill (Manuscript Writing, Statistics Analysis, and Paper Layouting). The correlation between copyright usage and manuscript composition is not significant ($p > 0.05$), indicating that there is no substantial or significant association between the two. Additionally, this link is not significant ($p > 0.05$) in patents, indicating that there is no meaningful connection between manuscript writing and patent utilization. This utility model correlation is significant ($p < 0.05$), suggesting that the use of utility models and manuscript writing are significantly positively correlated. Accordingly, the more the amount of manuscript writing, the more probable it is linked to the use of utility model.

As to statistical analysis in copyright, this association is substantial ($p < 0.05$), suggesting that the use of Utility Models and manuscript writing have a meaningfully favorable link. This implies that the adoption of Utility Models is more likely to be linked to the amount of manuscript writing that is done. This link is likewise not significant ($p > 0.05$) in patents, indicating that statistics analysis and patent utilization do not significantly correlate. This connection is significant ($p < 0.05$) in utility models, suggesting a significant beneficial relationship between the use of utility models and statistics analysis. This implies that the usage of utility models is positively correlated with an increase in statistics analysis. There is no substantial association between paper layout and copyright utilization, as the correlation is not significant ($p > 0.05$) in this regard.

In conclusion, there is a strong positive link between Utility Models and Manuscript Writing. Significant favorable correlations have been found between Utility Models and Statistics Analysis and between utility models and proper layout. The use of copyright or patents, however, does not significantly correlate with any of the research expertise areas (manuscript writing, statistics analysis, and paper layout).

Overall, these results indicate that although the use of copyright or patents is not significantly correlated with manuscript writing, statistics analysis, or paper layout, all three have a significant relationship with the use of utility models, with each of these activities demonstrating a positive correlation with utility models.

5. CONCLUSIONS

This study about collaboration of faculty and students in enhancing research productivity as basis for research publication and utilization yielded the following conclusions:

1. Based on the result of the study there is a strong collaboration of faculty and students in enhancing research productivity in research work, research sources and research expertise.

2. There is high collaboration of faculty and students in enhancing research productivity that greatly affects their research publication and utilization.

3. The collaboration of faculty and students in enhancing research productivity is significantly related in the conduct of their research publication and utilization.

6. RECOMMENDATIONS

In view of the conclusion of this study, the following recommendations are hereby presented:

Provide trainings and education programs that emphasize the significance of IoT in technological advancement that will develop the necessary skills and knowledge to leverage IoT technologies effectively.

Regular monitoring and evaluation of IoT performance can help identify areas for improvement and optimize the use of IoT technologies to drive technological advancement.

Implement programs that can harness the potential of IoT to drive technological advancement and stay competitive in today's rapidly changing technology landscape.

Generate research endeavours focused on a deeper understanding of the level of awareness among college students regarding IoT technology and its potential impact on their academic and professional lives.

Researcher could design and develop an online platform that provide students with interactive learning experiences focused on IOT Technology potentially incorporating gamification, simulation, or other engaging activities.

1. The research chairperson and their respective heads may encourage all faculty members, regardless of profile, to perform studies that may be advantageous to both the researchers and extensionist and the entire institution.

2. Updated learning resources may be made available, and administrative assistance may be enhanced by establishing rules for rewards, incentives, and recognition in their research and extension.

3. Motivation and encouragement from the administration, notably the deans of the various departments, may increase the faculty engagement in research and extension.

4. Other studies concerning the level of faculty engagement in research and extension using other basis or input may be investigated by future researchers to improve research and extension in universities..

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