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A Systems Approach to Investigating Research Engagement in Two Selected Local Higher Education Institutions in the National Capital Region

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Abstract: *This study sought to examine the research engagement of two selected local higher education institutions in the National Capital Region participating in the RD Lead Program of the Department of Science and Technology (DOST) through the lens of Systems Theory. After conducting a five-part online survey distributed through Google Forms to a total of 76 respondents (57 in School A and 19 in School B), the data revealed that knowledge of research was greatly oriented towards quantitative approaches and there was a continuous decline in research engagement as a respondent moves from knowing about research to leading a team of researchers. The study recommends that the DOST perform a more active role when dealing with smaller HEIs in need of research support and mobilizing state-funded HEIs to constitute a task force to remove bottlenecks that RD leaders in the RD Lead Program will not be able to accomplish. Given the data, Schools A and B, need assistance in creating the proper throughputs to facilitate improved research productivity.*

Keywords: Systems Theory,Input, Output, Throughput, Research Engagement

I. Introduction

Local colleges play a key role in the development of any country. They are considered "engines for accelerating growth through human capital development needed for knowledge-based economies" (Asian Development Bank, 2015, p. vii). They help develop and strengthen advanced skills, like research, which are important in a competitive world economy. Furthermore, several local colleges have been at the forefront of helping the environment significantly (Student Training and Education in Public Service, 2022) "by ensuring that their use of natural resources doesn't harm the environment, that their practices don't lead to the use of more resources than necessary, and that they educate students, staff, faculty, and the local community on what they can do to help ensure sustainability on campus and beyond" (para. 4). However, "there cannot be substantial measurable contributions without research" (Fayomi, Okokpujie, &Mfon, 2018, p. 2).

The Commission on Higher Education or CHED (2019) of the Philippines released Memorandum Order 15 last 2019 requiring students to publish before graduating in any graduate degree program in the country. This meant that even before any graduate student completes a thesis or capstone project, he/she/they must already have the competency to write for publication purposes. Many graduate students are in the teaching profession. Thus, the research competency of teachers will not only have an impact on graduate school completion rates but also on teaching research to students of all levels.

However, research courses in graduate schools are taken not quite early enough to prepare graduate students to publish before their thesis or dissertation writing period. Full-time students are better off in that they can take the courses earlier and practice research writing long before they finish their academic loads or pass their comprehensive examinations. Part-time students who also work outnumber full-time students, and, as such, have very little time to use for research work. Full-time employees or those who work for multiple employees are in worse situations.

Learning research while working, therefore, can work in favor of full-time teachers since they learn research as part of their official faculty development program and schedules supported by their schools. They do not need to find extra time to squeeze learning about research into their official work hours. Part-time teachers are also allowed to learn more about research in the schools where they teach. Therefore, training programs for research capacitation benefit all teachers and the schools that provide them. However, not all schools have the resources to conduct such training for their faculty. Lack of funding is always part of the problem. Lack of creativity among administrators also hinders training development and delivery.

The R&D Program or RD Lead Program of the Department of Science and Technology is a way by which the government can help in the research capacity-building of smaller and less financially endowed schools so that they can become better players in the development of local communities. The main author of this paper is one of the R&D leaders who were asked to help these types of schools so that they can get better access to government grants, many of which are opportunities to contribute solutions to local environmental problems. The two schools (named here as School A and School B) assigned to the main author experience environmental problems regularly. School A often undergoes flooding during the monsoon season. School B has had some outbreaks of water-borne diseases in the past. The challenge was to capacitate the faculty and staff of the two schools with research skills that are appropriate to address their unique environmental problems and other related issues.

Planning for capacity-building programs in research requires knowledge of the training needs of learners (teachers and staff) for whom they are intended. This paper is based on a research knowledge survey that was conducted in both schools to determine the gaps in research knowledge and surface processes that must be stimulated to facilitate a more contextualized and locally responsive local problem-solving process through research facilitated by the two local colleges.

Research Productivity in Higher Education in the Philippines

Research productivity studies started gaining momentum in the early 1970s (Dundar& Lewis, 1998). The CHED (n.d.) of the Philippines puts a premium on research productivity. Accrediting bodies like the Philippine Association of Accredited Schools, Colleges, and Universities (PAASCU, 2022) and the Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA, n.d.), among others, include research productivity as an area of assessment. Thus, schools that want to get accredited to improve their reputation mandate their teachers to undertake graduate studies to improve their research competencies. Increasing competitiveness in the ASEAN (Association of Southeast Asian Nations) region means greater demand for increasing research capacity at par with the top performers in research (Sombatsompop et al, 2011). For higher education institutions to contribute to the economic growth of the country, they have to improve their research productivity (Zaman, Khan, Ahmad, & Aamir, 2018). This means that for smaller higher education institutions to survive in their fields they need to perform like their more competitive and well-funded rivals and collaborators in the area of research.

Research Engagement of Faculty in Higher Education

A study in Turkey reported that "positive experience with context-related research projects and dissemination of research results in various forms facilitate the sustainability of those impacts and efforts to engage in new projects, while constraints in time and institutional support hinder these" (Sakarkaya&Bümen, 2022, p. 325). Meanwhile, in Saudi Arabia, a study in a leading university revealed that modest levels of research activity came mostly from persons who had very technical views of research and that there were gaps found between research productivity and support (Borg &Alshumaimeri, 2012). Meanwhile, in research environments across Europe, North America, the United Kingdom, Australasia, and Asia, a study revealed that a radically changing research landscape heavily influenced by commercialization and corporatization, led to research mostly conducted for the private than public good, and "metrics focused university management control systems… (and) a contradictory focus on high-status self-referential journal publication venues… (that led to) increasing distance between university research and professional practice and between research and professional communities" (Parker, 2022, para. 1). These studies point out that research productivity is contextually constructed and that emphasis on areas of concern related to research depends on where the value is assigned in research engagement. Hence, to serve the interest of smaller higher education institutions, their upskilling in research must be shaped by their contexts and sets of values, and not by institutions that seek to advance their interests at the former's expense.

Determinants of Research Productivity

Early research on research productivity in the US by Dundar and Lewis (1998) revealed that research productivity is determined by several factors, namely, (1) a critical program and departmental size, (2) private ownership of the university, (3) higher percentage of full professors (except in the social and behavioral sciences), (4) large percentage of faculty publishing in a department, (5) financial support, (6) greater expenditures for research-related resources (except in engineering and the social sciences), (7) a higher ratio of graduate students to faculty, and (8) higher percentage of graduate students with research assistantships. In a later study in the US, contextualized in agricultural colleges and universities, "three variables explained 50% of the variance in research productivity… (namely), the number of doctoral students advised to completion in the last five years, faculty members' perceptions of their research confidence, and the number of graduate assistant hours allocated to the faculty member" (Kotrlik, Bartlett, Higgins, & Williams, 2002, p. 1).

A study in Spain (Verdú, Davia, &Legazpe, 2016), pointed out that productivity, measured in publications in three years, sex (male), age (youth), search for professional promotion, and international collaboration contribute positively to research productivity in academic publication. In Africa, it was found that both institutional (availability of funding, level of institutional networking, and research collaborations) and individual factors (personal motivation, academic qualification, and research self-efficacy) contributed to greater research productivity (Uwizeye et al., 2021). Meanwhile, a study on research productivity in the Philippines, particularly among Augustinian higher education institutions in Luzon, revealed that faculty research productivity is positively influenced by the promotion of the research environment and mentors' support (Nuqui& Cruz, 2012). Given all of these, determinants of research productivity vary across countries and both individual and social domains are contributory to it. This means that small schools cannot achieve research productivity without providing the resources that motivate teachers to do research and publish as frequently as they can.

Trends in the Field of Research Methodology

Walsh, Huang, and Felix (2019) wrote that three academic research trends were reshaping university spaces, technology, support services, and staffing before the pandemic: (1) “More Complex, Coordinated, and Collaborative Research Methodology” (para. 3); (2) “Applied Research with Social and Economic Impact” (para. 8);

and (3) "Technology-enabled Research and Scholarly Communication" (para. 14). During the pandemic. Karakose and Demirkol (2021) found that research, mostly coming from the United States of America, the United Kingdom, Canada, and Spain, gravitated towards "online education" and "teacher education", preferred "theoretical model", and implemented "scale/interview forms". Meanwhile, Bian and Lin (2020), wrote that the COVID-19 pandemic resulted in more COVID-19 studies at the expense of those unrelated to the pandemic. These studies indicate that researchers must be ready to adapt to the changing knowledge needs and that not all research designs are created equal. Given that disruptions are expected to occur more often and the nature of information is evolving quickly, smaller higher education institutions have no reason to lag behind larger schools that are at an advantage. A case study on the Pangasinan State University in the Philippines, on the other hand, identified lack of financial resources, teaching overload, and multiple functions of the faculty inhibit research productivity, which aligns with some of the findings of the American study above.

The RD Lead Program of the Department of Science and Technology (DOST)

The DOST's RD Lead or R&D Leadership Program was established to "help develop and strengthen further the research capabilities of the academe, research and development institutions (RDIs), and other government line agencies nationwide" (Department of Science and Technology, 2022, para. 1). DOST invites local science and technology experts "with strong leadership and innovative policy proficiencies" (para. 1) to capacitate, guide, and assist those in need of government support in this area. The said experts are doctorate holders from esteemed higher education institutions with at least 10 years of research and development work in respectable research institutions, outstanding contributions to their fields of practice, leadership and training competencies, and publications in refereed journals.

Study Framework

The study was guided by System Theory originating from Von Berthalanffy which is defined as the composite of interrelated distinct elements, the whole of which is greater than the sum of its parts (communicationtheory.org, nd.). The system is sustained by key processes (elements) such as input (any information needed by the system to achieve an end, throughput (the process undertaken to achieve an end), and output (that which is produced by the system after undergoing the throughput). This is relevant to this study because research training has become the means toward research productivity and, often, the resource speaker is the one who brings in the needed information to achieve said goal. However, in a complex system, ends are multi-, if not overly-, determined, that is, certain outputs are often the result of many inputs. This study sought to figure out if inputs aimed at enhancing research knowledge could point to a possible relationship with research productivity.

II. Methodology

This quantitative study involved the use of a six-part 58-item researcher-developed online survey through Google Forms (covering demographics, quantitative and qualitative research approaches, research methods, conceptual tools, and research skills), two government-selected local government tertiary schools (screened by the DOST based on their need for technical assistance), and 19 and 57 volunteer and dominantly college teachers (73.7% of the total from the School B established in 1993 and 80.7% from School A established in 1994, respectively). The two schools are part of the RD Lead Program of the DOST, under the guidance of one of the authors (Bantugan). The data were analyzed via descriptive statistics, involving analysis across data sets. The results were interpreted vis-a-vis the input-throughput-output processes of Berthalanffy's System Theory.

III. Results

Input: What do teachers know about research?

Quantitative Research Approaches. Overall, across quantitative and qualitative research approaches, both School A and School B revealed that most of their faculty members attest to having learned research either from a class/training (the overwhelming majority) or self-study. However, their knowledge of the quantitative approaches far outweighed the qualitative ones. For quantitative approaches, the multiple/case study, testing, and experimental approaches were reported as being the most known through formal classes or training sessions (the former way ahead of the latter). Conversely, the quasi-experimental, data mining and meta-analysis approaches were the least known. (Refer to Table 1 for the details.)

This indicates several things. First, given that the respondents come from a variety of higher education institutions (HEIs), research training is still heavily biased toward conventional quantitative approaches. Less conventional and standardized approaches requiring more complex decision-making processes are not yet quite as mainstream in HEIs. Second, while quantitative studies aim at generating generalizable data, most teachers admit to knowing a quantitative approach, multiple/case study, that the natural sciences consider unable to generate them. Third, the most known quantitative research approaches are characteristic of positivism. The multiple/case study, quasi-experimental, and polling approaches are common in the social sciences; and yet, the respondents report knowing the second and third approaches the least of the seven, revealing the post-positivist approaches as a non-dominant player in the research education of teachers in HEIs. Thus, the heaviest input in research knowledge comes from positivist research schools and disciplines.

Table 1. *Self-reported knowledge of quantitative approaches*

Quantitative Research Approach	**School A**		**School B**		**Total**	
	Percentage (%)	**Rank**	**Percentage (%)**	**Rank**	**Mean (%)**	**Rank**
Polling	71.9	2	57.9	5.5	64.9	4
Testing	**70.2**	**3**	**68.4**	**1.5**	**69.3**	**2**
Data Mining	66.7	5	47.4	7	57.1	6
Meta-Analysis	57.9	6	63.2	3.5	60.6	5
Experimental	**68.4**	**4**	**63.2**	**3.5**	**65.8**	**3**
Quasi-experimental	52.6	7	57.9	5.5	55.3	7
Multiple/Case Study	**73.7**	**1**	**68.4**	**1.5**	**71.1**	**1**

However, in a scenario where there is a very limited chance for unsupported researchers to arrive at representative sample size, randomization, and the gold standard control and experimental set-ups, the respondents

have their options reduced to other quantitative approaches that are less known to them (especially through self-initiated or independent learning) and potentially less accessible, too, if not led to actively seek them.

Qualitative Research Approaches. In general, qualitative research approaches are not as well-known to the respondents as previously mentioned. However, quantitative research approaches adapted to qualitative studies (multiple/case study, polling, and meta-analysis) rank highest vis-a-vis other qualitative approaches indicating that the respondents may be able to use knowledge of quantitative approaches to generate qualitative data. The research approaches that are often discussed as uniquely part of the qualitative tradition (except for narrative inquiry) were found to be less known, especially grounded theory, phenomenology, and ethnography. (Refer to Table 2 for details.)

This means several things. First, many teachers find themselves teaching in college without knowledge of key qualitative research approaches. This means that many teachers would not be able to teach them in college as they do not know said content. Second, because qualitative research approaches are not within the respondents' comfort zones, it would be difficult to expect them to produce research by way of those approaches. Third, there is a need to capacitate the respondents in those approaches in Schools A and B if the graduate education of the respondents is still dominated by quantitative research approaches.

Table 2. *Self-reported knowledge of qualitative approaches*

Qualitative Research Approach	**School A**		**School B**		**Total**	
	Percentage (%)	**Rank**	**Percentage (%)**	**Rank**	**Mean (%)**	**Rank**
Polling	**71.9**	**2**	**57.9**	**3.5**	**64.9**	**2**
Meta-analysis	**57.9**	**7**	**63.2**	**2**	**60.6**	**3.5**
Data Mining	66.7	3	47.4	8	57.1	5
Narrative Inquiry	**63.2**	**4**	**57.9**	**3.5**	**60.6**	**3.5**
Phenomenology	56.1	5.5	52.6	7	54.4	7
Grounded Theory	47.4	8	57.9	3.5	52.7	8
Ethnography	56.1	5.5	57.9	3.5	57.0	6
Multiple/Case Study	**73.7**	**1**	**68.4**	**1**	**71.1**	**1**

In a scenario where research teachers only know quantitative approaches, they are likely to use those approaches to study phenomena that are more fitting for the qualitative approaches. This can be seen in the earlier observation that quantitative approaches are likely adapted to qualitative studies. Hence, researchers in both HEIs may be considered either more positivist or post-positivist-oriented, given their orientations in data processing.

Information Gathering Methods. In both schools, the three most traditional methods in social science research (survey, interview, and Focus Group Discussion) were found to be most familiar to the respondents. Consistent with the findings under research approaches, the survey tops the three most chosen methods (Refer to Figure 1). The least known in both schools are the Delphi method, netnographic methods, and immersive activities (Refer to Figure 2 for School B data) - the last two are currently implemented using the latest online tools such as network mapping applications and virtual reality gadgets, respectively.

Surprisingly, a fairly recent method called Social Listening ranked higher than the latter two previously mentioned methods. That finding, however, has to be further validated. Overall, the findings in Figures 1 and 2 reveal that the respondents in both HEIs are fairly traditional in their self-reported research knowledge. More than half of the 17 choices (82%) under research methods are not yet known by more than half of the respondents. This means that there is a lot of reason to create a research methods enrichment and capacity-building program in Schools A and B.

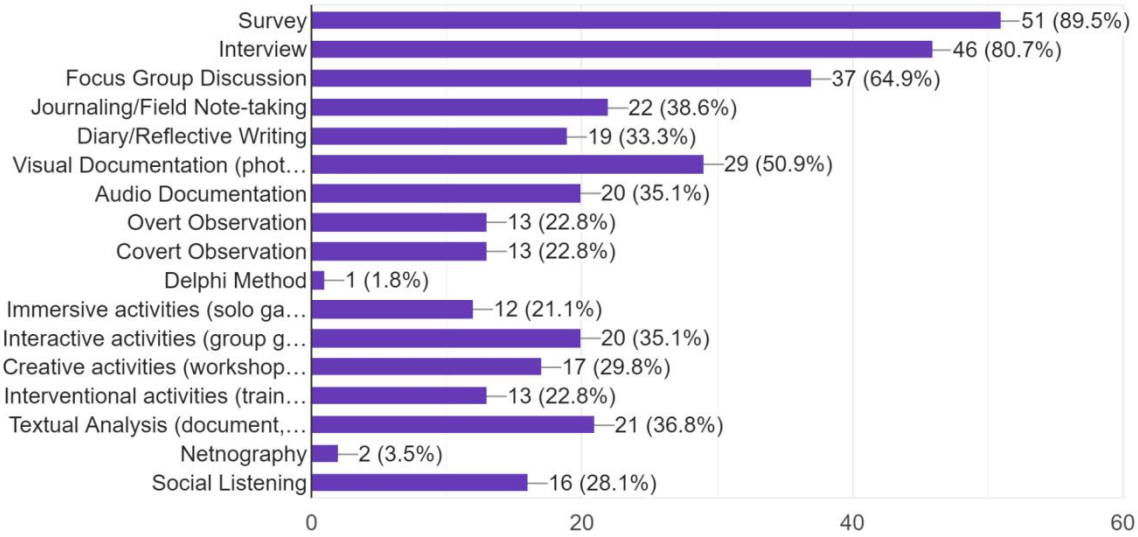


Figure 1. Research methods reported as known by the respondents in School A

Given the data under the domains of "research approach" and "research method" it was observed that the two schools are quite similar, indicating that the data are governed more by factors beyond their respective local contexts. The DOST is in a good place to help expand the repertoire of research options of the two schools. Both HEIs depend on social science and applied research disciplines, subverting the default input route for research capacity-building for teachers - that is, undergraduate and graduate school. It also suggests that it is apt to create an inventory of researchers who are highly knowledgeable in non-conventional research areas so that, instead of HEIs being limited to one RD Leader, they can choose from a range of experts that can address their specific research interests and needs. Before making that choice, however, it is important to make the respondents aware of what they have yet to know and what options can better address what their respective school needs to accomplish its institutional goals and pursue its research agenda, if any, strategically and effectively. That said, the DOST can help bridge the gap in or compensate for the inadequacies of research education in the country's higher educational system.

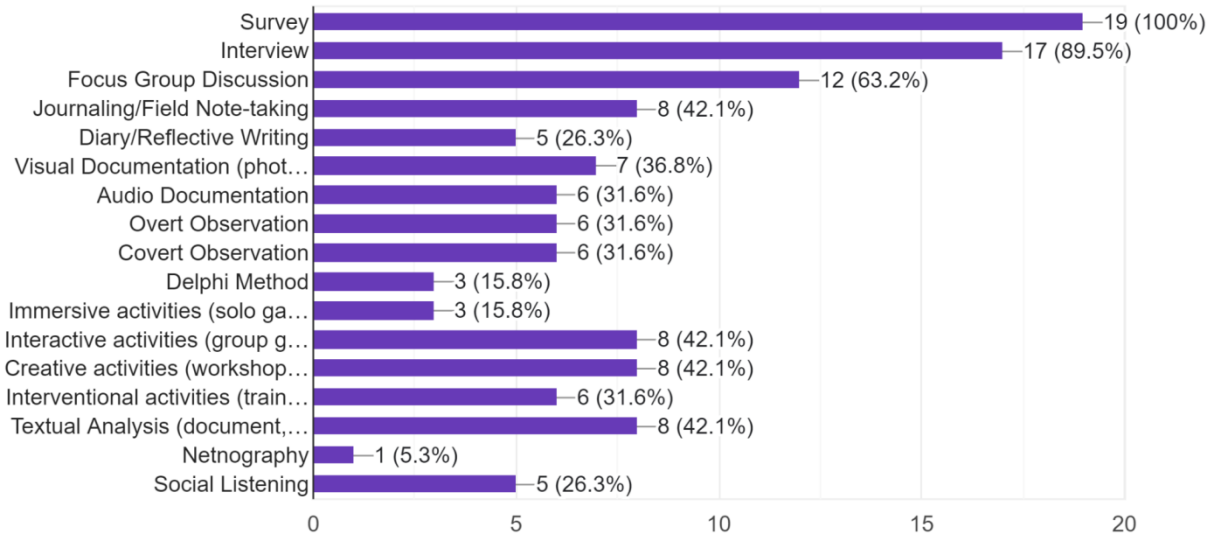


Figure 2. Research methods reported as known by the respondents in School B

Analytical and Data Processing Techniques. Data under this domain from School A (Figure 3) and School B (Figure 4) still reveal the dominance of quantitative techniques. Descriptive statistics rank the highest among the other techniques reported as known by the respondents. SWOT Analysis, ranking second in School A (Figure 3) and third in School B (Figure 4) suggests the influence of business education on the teachers of both HEIs. Inferential statistics, a positivistic tool, ranks second in School B. Content Analysis, also a quantitative technique, mostly used in the processing of non-numerical information to arrive at quantitative data, is the third most known analytical technique in School A. This points out that both HEIs are strongly influenced by positivism in research, which can pose challenges if they are not capable of providing the tools to implement research approaches and methods required by said research paradigm. The lack of such resources may impede the research productivity of the two schools. Strengthening their qualitative competencies can help compensate for those inadequacies, however.

The least known among the provided analytical techniques are cybernetic analysis, network analysis, and grounded theory coding (for School A) (Figure 3). All three techniques enable more complex analysis compared to quantitative ones. The first two are more associated with developments in networked phenomena. In addition to the three, School B added hermeneutic analysis as one of the least known (Figure 4). Hermeneutic analysis, aside from being a qualitative technique, is also a useful process of understanding and interpreting complexity in specific socio-cultural contexts.

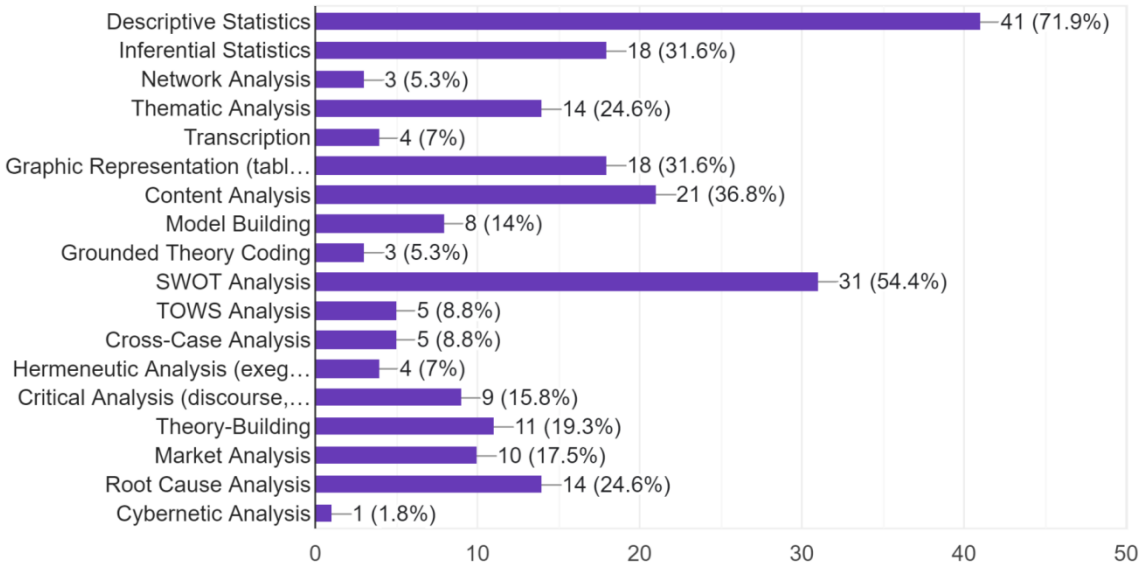


Figure 3. Data analytical techniques reported as known by the respondents in School A

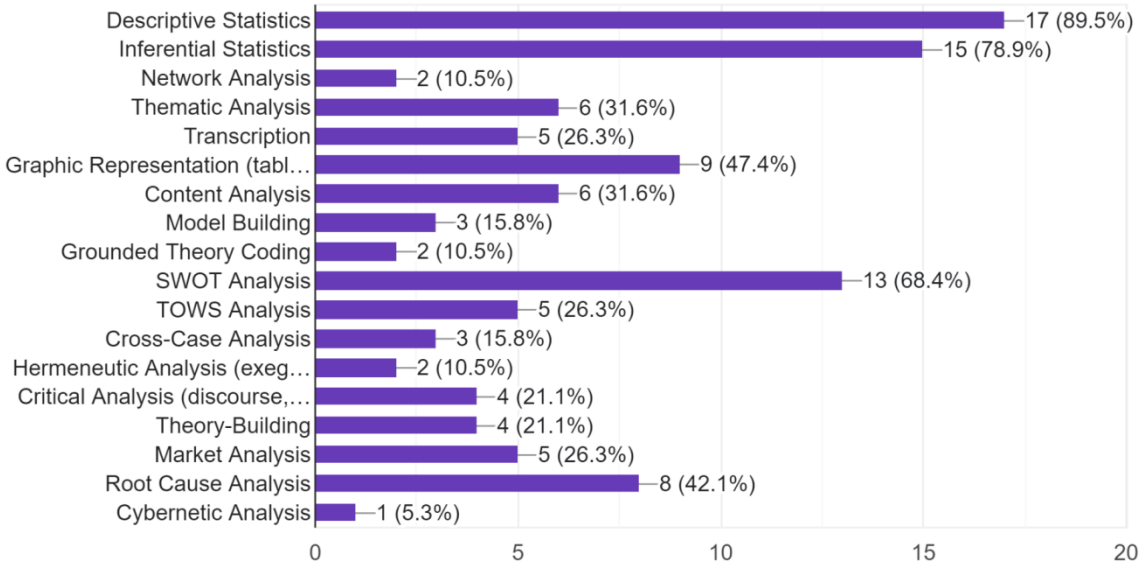


Figure 4. Data analytical techniques reported as known by the respondents in School B

Both data sets suggest that both HEIs are limited to more linear data processing techniques, and, as a consequence, may have limited capacity to process and gain insights from more context-based data sets. This will further complicate the problem of not having the resources to conduct quantitative research in that they certainly report the presence of (quantitative research) knowledge inputs but they may not be able to process these inputs due

to the absence of required resources for conducting quantitative research and produce the outputs that lead to research productivity (despite more accessible qualitative data and open access online tools).

Research Writing Process

Proposal Writing: Introduction. Data from the 4-point Likert scale survey from both HEIs revealed that the respondents admit to being most knowledgeable in formulating the research problems and objectives (with a mean of 3.0 out of 4.0 or quite "knowledgeable") and doing the literature review (with a mean of 2.9 out of 4.0, also "quite knowledgeable"). Constructing the study framework had a mean of 2.8 which also translates to "quite knowledgeable" in quantitative methodology. The said data indicates that writing the introduction of a research paper is not an area of difficulty among the respondents.

Proposal Writing: Methodology. Regarding methodology, respondents from School A reported the highest level of knowledge in research design (2.8 or "quite knowledgeable"), followed by instrument development, descriptive statistics, visual representation, and use of online applications (all with a mean of 2.7). Inferential statistics and mixed methods resulted in a mean of 2.6. Meanwhile, respondents from School B reported the highest level of knowledge in research design (2.9 or "quite knowledgeable"), followed by visual representation (2.8), instrument development (2.7), and inferential statistics (2.6). Mixed methods (2.5), use of online applications (2.4), and descriptive statistics (2.2) were areas where the respondents in School B admitted that they were "not so knowledgeable" of. The mixed method had the lowest mean in both HEIs under quantitative and qualitative (2.6 for School A and 2.5 for School B) methodology. School B's mean of 2.5 falls under the "not so knowledgeable" category. (Refer to Table 3)

Ironically, while both HEIs' respondents considered themselves "quite knowledgeable" in research design, their weakness lies in the use of the mixed method design. Hence, it seems that their self-reported knowledgeability in research design, if connected to the results under the research approach and methods domains, is limited to a quantitative design, potentially supported by qualitative methods. Likewise, their knowledge of the domain of 'methodology' is reported lower compared to the domain of 'background' (refer to Table 3). While the respondents were found generally more informed about quantitative approaches and analytical techniques, they admit to a lower level of knowledgeability of descriptive (2.2 in School B) and inferential statistics (2.6 in School A).

Output: What is the extent that research inputs in teachers are translated into outputs?

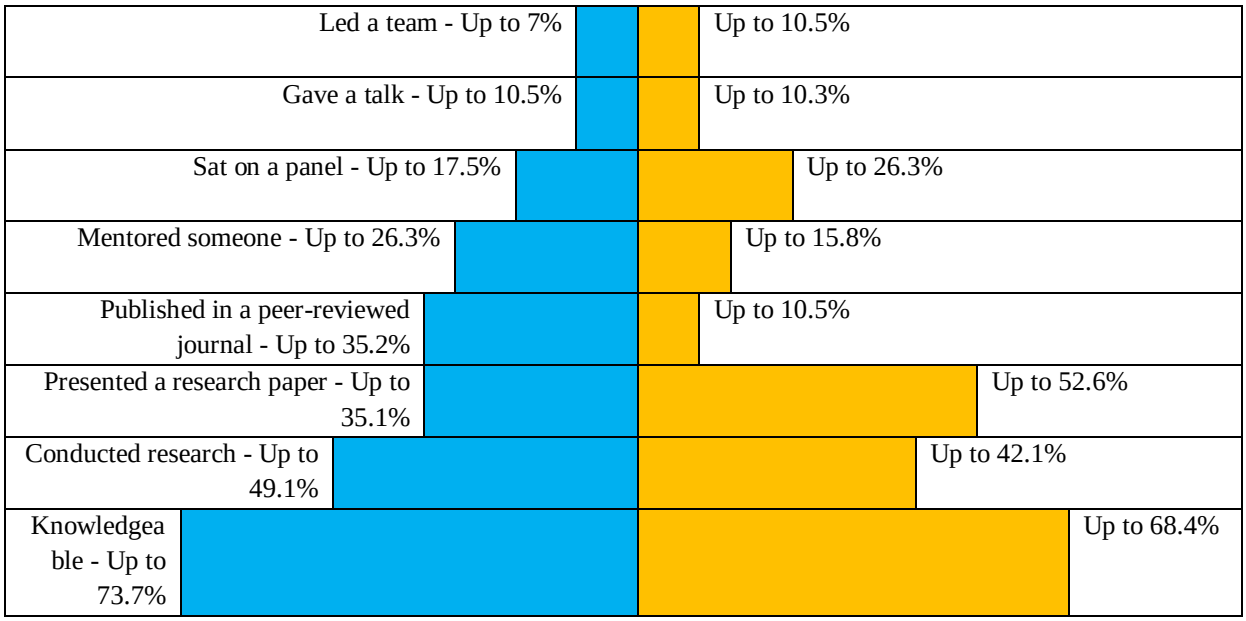
This study considers outputs as the ways by which knowledge of research is used. The outputs are indicators of research productivity. Data indicate that there is a wide gap between input and output. Figure 5 captures this by revealing that while up to 73.7 percent of the respondents report knowledge of any of the research approaches in the survey options, only up to 49.1 percent end up doing research in their selected approaches. Deeper engagement in research taper down to at most 10.5 percent (leading a team) from a high of 73.7 percent. School A data present a continuous tapering down from conducting research to leading a research team. School B data show a more erratic progression. These data reveal that it requires more than the input to arrive at the desired output. The throughputs in both HEIs seem to create stumbling blocks, instead of stepping stones, toward achieving deeper engagement in research.

Table 3. *Level of Knowledgeability on Domains and Dimensions of Research Proposal Writing*

Domain	Dimension	Mean (School A)	Qualitative Interpretation	Mean (School B)	Qualitative Interpretation
Background		2.9	QK	2.9	QK
	Formulating objectives and research questions	3.0	QK	2.9	QK
	Literature Review	2.9	QK	2.9	QK
	Constructing the Study Framework	2.8	QK	2.8	QK
Quantitative Methodology		2.7	QK	2.6	QK
	Design	2.8	QK	2.9	QK
	Mixed Method	2.6	QK	2.5	NK
	Instrument Development	2.7	QK	2.7	QK
	Descriptive Statistics	2.7	QK	2.2	NK
	Inferential Statistics	2.6	QK	2.6	QK
	Visual Representation	2.7	QK	2.8	QK
	Use of Online Applications	2.7	QK	2.4	NK
Qualitative Methodology		2.7	QK	2,6	QK
	Design	2.8	QK	2.6	QK
	Mixed Method	2.6	QK	2.5	NK
	Instrument Development	2.7	QK	2.7	QK
	Narrative Analysis	2.8	QK	2.6	QK
	Use of Online Applications	2.7	QK	2.4	NK

Legend:
3.26 - 4.00 - Very knowledgeable (VK)
2.51 - 3.25 - Quite knowledgeable (QK)
1.76 - 2.50 - Not so knowledgeable (NK)
1-00 - 1.75 - Without knowledge (WK)

Given that most of the respondents are more informed about quantitative research approaches, methods, and analyses, the tapering down of research engagement from conducting research to leading a research team puts qualitative research at a disadvantage. This means that the quantitative approach would likely be imposed on research that is better conducted using qualitative approaches. Likewise, if a qualitative research approach is used, the competency of advisers and panel members may not to the best interest of any specific qualitative research conducted in both HEIs. Therefore, a balance must be achieved between quantitative and qualitative research approaches known to the respondents in both HEIs.



Legend: Blue - School A; Orange - School B

Figure5. Research Productivity Comparison across Different Research Activities

IV. Discussions

Throughput: What interventions can help remove the bottlenecks in research engagement?

To help both HEIs more effectively, the above questions must be answered. As HEIs, they are expected that, at the very least, their respondents would know about research, especially because they have gone through undergraduate thesis writing. If some of the respondents have not undergone undergraduate thesis writing, their respective administration's task is to provide them with institutional learning sessions on research. For now, the data suggest that there is nothing in that regard or, if there are such sessions in place, those who do not know any research approach have not taken part in them. Self-driven or independent learners are minorities in both schools.

One assumes that knowledge of research translates to the actual conduct of research. Data suggest that some who report knowledge of research do not proceed to do actual research. This means that some are inhibited or not motivated to do so. The reasons may be institutional or personal. Regardless, it is the institution's responsibility to determine the reasons for not doing research and address them without demotivating the concerned respondents further. A corrective throughput may be in the form of programs that ease concerned respondents into doing actual

research, like working in a team, mentorship, and, perhaps, confidence-building. It may also be considered that the local government unit's(LGU's) role is crucial. An additional corrective action may be in the form of incentives from grant-giving institutions like the DOST that will activate, if not compel, LGU participation and involvement. By promoting research that the locality needs, local universities and colleges (LCUs) could be lead implementers -a case of hitting two birds with one stone: The LGU recognizes the role of research in creating and establishing programs while the LCU delivers the output, with assured support from the city and the national agency like the DOST that will augment the budget, or award a cash prize and/or plaque for the research accomplished and disseminated.

Disseminating one's findings is considered the responsibility of any researcher. However, not all who conduct research share their findings, the data show. Today, the ways to disseminate research findings are not limited to presenting at research conferences or other similar venues. It can be used in one's teaching practice. Research papers can be uploaded without a cost on websites like ResearchGate or Academia. To insist that the presentation of research findings must be done only through conferences would give researchers limited options and further limit their ability to share data given that conferences tend to be costly. If any, these HEIs must engage in a peer-review process and create events where the concerned respondents can share their findings. The concerned respondents must also be made to understand that research ends not only with a manuscript but also with sharing what is beneficial the public in alternative venues. There are many ways to share research findings and the CHED and DOST should be the ones leading the way towards their popularization among those in the academe.

Publishing in peer-reviewed journals is evidence of having passed evaluations by experts. Publishing in a peer-reviewed journal, therefore, serves as a seal of high-quality research. However, the quality of research is not solely measured by publishing in peer-reviewed journals.Peer review has become contested in the time of the pandemic (Chirico, Teixera da Silva, &Magnavita, 2020) and researchers urged better practice. This means that peer-review, while useful, is not always dependable. Using research findings to solve problems in particular communities accomplishes something much greater than what publication can do - making a difference directly in the lives of people in need, which publication cannot claim to do. However, if the HEIs concerned are not aware of other ways to provide evidence of high-quality research, they must be informed and they should do the same to their concerned respondents. The CHED and DOST must encourage this as well.

A research mentor or adviser guides a beginner researcher to complete a research project. A researcher mentor also has the responsibility to ensure the formation of future research mentors by facilitating the learning of the beginner researcher during the actual conduct of a research project. When some respondents do not or refuse to become mentors, critical working knowledge about research is not shared with the new generation of researchers. This means that some researchers in the HEI are not used effectively and opportunities that allow researchers to perform a greater social role in the development of research culture are curtailed. Thus, it is necessary to ensure that researchers who are ready to be mentors become mentors and those who are not ready are prepared for the task.

Technical panels guarantee the production of high-quality research without the benefit of personal engagement with a researcher. If research mentors are deemed qualified to guide a researcher to produce high-quality research by working directly with a mentee, they should be capable of functioning as members of a review panel. The HEI with decreased engagement in review panels (vis-a-vis mentoring) should determine the impediments and make it less difficult for their more accomplished research mentors to become review panel members. The other HEI with greater involvement in panel reviews (vis-a-vis mentoring) must figure out why those panel reviewers are not able to become mentors and address them well.

Normally, resource speakers who give talks on research are considered very knowledgeable, if not experts, in specific areas of research. On average, there is, at most, only one out of seven respondents in this research (who report knowing about a specific area of research) give talks in their area of knowledge. Some people may find it intimidating to do an oral presentation, more so, give a talk as an expert. However, giving talks could be less intimidating if the target audiences are customized to the speaker. This means, making more seasoned researchers resource speakers for more demanding audiences and less seasoned ones for the less demanding ones like senior high school or undergraduate students. These audiences will require less use of jargon and more focus on practical applications. Academic administrators must create avenues like this and make room in the regular schedule for said talks.

Like giving talks, managing a research team is often associated with a researcher who has become an expert in his/her/their field. The suggestion above to find appropriate audiences for a particular speaker applies here. One need not be an expert to manage a research team. A beginner researcher can manage a team of student researchers. Course requirements can take the form of a research project done by a class or groups within a class with the teacher serving as the team leader. This also helps to prepare future research team leaders for a higher level of research, especially those funded by grants.

Given the above, the RD Leader tasked to assist HEIs in need of research support must bring in throughputs that are not limited to more additional inputs. Data suggest that some institutional throughputs, or the lack thereof, that inhibit deeper research engagement must be identified and addressed appropriately. The support of the RD leader must be focused not so much on increasing participation in grants or achieving national targets but on understanding the context of each HEI concerning research capacitation. Research, as a highly contextualized practice, will render each HEI a unique case. However, because the RD leader is an outsider who does not know the organizational processes and management processes of the HEIs assigned to him/her/them, he/she/they are often limited to performing the task of a resource speaker. Unfortunately, this only adds to the input that, given the present internal institutional dynamics invisible to the RD leader, will eventually just result in the same lower participation in deeper research engagements. Given one year, the RD leader can only be a resource speaker, not a real problem-solver.

The Department of Science and Technology, having the administrative power to enhance research productivity in all HEIs, must deal with smaller HEIs differently given their limited resources. A task force that is mandated to troubleshoot bottlenecks in HEIs that are not able to remove them on their own must be created. In this, the CHED, in particular, should be called upon to assist LUCs in producing research, in partnership with LGUs and coordination with agencies like DOST and NCCA. National and local government HEIs, already funded by the State, must be commissioned to assist smaller and less performing HEIs within their geo-political jurisdiction. Similarly, the smaller HEIs must feel free to approach any state-funded HEI for research support. Ultimately, the success of the smaller and less performing HEIs will lead to greater research productivity for the local and national governments.

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