



STRENGTHENING COLLABORATIVE RESEARCH PRACTICES IN ACADEMIA: FACTORS, CHALLENGES, AND STRATEGIES

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Abstract

This mixed-method research sought to identify the factors, challenges and strategies that enable and strengthen collaborative research practice in academia. Participants of the study are purposively chosen, self-selected faculty and students from an external campus and a unit in the main campus of a state university in Bulacan, Philippines, who have successfully completed collaborative research writing projects, presented collaborative research projects in conferences and symposia, or published said collaborative research projects. Data were gathered using a researcher developed instrument, validated, and checked for reliability. Analysis of results using principal components analysis led to the development of the DRREAM (Diversity, Role assignment, Relationship-building and peer interdependence, Ergonomic, flexible and adaptable processes, Acquisition of knowledge, skills and expertise, Motivation consideration) model, a conceptual framework on factors that strengthen effectual collaborative research writing; while the use of thematic analysis enabled the formulation of IPP (Individual, Professional and Personal) model, a conceptual framework on strategies to overcome challenges faced by collaborators in a collaboration research project. Finally, an Action Plan Framework for Effectual Collaborative Research Writing is proposed to promote the culture of collaborative research practices among the members of the academia.

Keywords: collaborative research writing, research collaboration factors, research collaboration challenges and strategies, research culture in academia

Introduction

Doing research work independently is a demonstration of intellectual grit, however, participating in collaborative research involves more intellectual virtues including curiosity, intellectual humility, attentiveness, intellectual carefulness, and open-mindedness, characteristics necessary to advance in the 21st century. Collaboration drives innovation and the creation and use of knowledge that enables an organization to be at-par with both its local and international counterparts (Duivenvoorde, et al., 2009). Working together and cooperating toward a common goal, the resolution of issues, problems, and crisis through collaborative research has never been more significant. It is only when people come together with their best ideas, harnessed skills, and talents and direct these toward a completion of a task, a project or overcoming a problem that has plagued institutions or societies at large that the best outcomes and products are produced. In fact, literature indicates that collaboration is one of the most crucial skills and competences that enable strong and successful organizations to continuously upgrade their performance (Simonin, 1997).

Even among professionals and learners, collaboration is shown to develop higher order thinking skills, boost one's confidence and self-esteem, enhance social and interpersonal skills

and hone leadership abilities (Gates, 2018). More significantly, the availability of plurality of perspective on a topic made available in a collaborative experience enables members to upgrade their learning experience (Repice, et. al., 2016). This is because the members of the group have their own expertise and personal insights that each member can learn from (Loveless, 2016). Participating in collaborative research promotes and improves a variety of competencies as humans develop and acquire skills by engaging in social activities according to Vygotsky's (1978) social-constructivism theory. Likewise, working together in teams or groups lessens the likelihood of procrastination because members wish to fulfill their tasks or role assignments at the time scheduled by the group (Ortiz-ortiz, 2017). Moreover, research on collaboration (Huerta & Bray, 2013; Kumar, 2017; Destriana, 2018) illustrated positive learning impact on the grade point average of learners and the use of collaborative learning strategies improved academic performance, enabling them to become efficient problem-solvers and further developing social skills.

In the Philippine context, studies on collaboration illustrate that learners who utilized collaborative activities such as peer mentoring, group problem-solving and group games better understand and acquire long term proficiency in concepts and skills (Gamit, et al., 2017). Likewise, in the study conducted by Gurat and Sagun (2017) collaborative learning technique improved the learners' problem-solving skills. Similarly, Laguador (2014) has claimed that using collaboration as a strategy in the delivery of teaching and learning in an outcomes-based environment encourages active participation among learners and cultivate leadership skills encouraging learners who may become future leaders devoted and committed to serve other people. However, review of literature illustrated that there is limited data on collaboration practices specifically geared towards research collaboration. Quitoras and Abuso (2021) have highlighted how valuable collaboration practices are in upgrading research capacity of higher educational institutions and their faculty. As Sprunger (2017) has underscored, when experts in diverse fields collaborate through research, the intersection of divergent fields leads to innovative and original ideas, products, technologies, and knowledge.

Several factors, challenges and strategies have been identified to influence collaboration practices in various fields. Mattessich, et. al (2001) have identified context, characteristics of members, process and structure, communication, purpose, and resources as significant factors contributing to successful collaboration. Chien et, al (2012) have identified similar factors, citing communication effectiveness, teamwork, safety culture, job satisfaction, work climate, and work pressure as factors influencing collaboration within a tertiary medical center. Patel, et. al. (2012) have recognized the significance of collaborative working environments, identified seven main categories of factors involved in collaboration including context, support, task, interaction process, teams, individuals, and overarching factors.

Likewise, Kolfshoten, et. al. (2008) identified challenges and issues faced by collaborators engaged in collaboration including identifying the specific roles of members of the group, the group composition, the process of interaction among members, modelling rules, approaches, and quality. Similarly, Kwibisa1 and Majzoub (2018) noted common issues in collaboration activities namely: the lack of clear objectives and goals, lack of drive among collaborators, unclear division of responsibilities, lack of transparency, unclear shared benefit, absence of collective identity and conflict of interest. To address these challenges and issues, various strategies have been identified in literature including addressing mutual expectations, clear delineation of tasks, determination of authorship, frequent communication, recording of meetings, data access and expectations about data output, and shared responsibility for the integrity of the research project (University of Nebraska-Lincoln, 2022). In addition, Apostolakis (2003) has enumerated strategies involving member selection, shared vision, collaboration structure, planning and review of processes to address the issues and challenges of collaboration raised earlier.

The study looks into whether the issues identified in literature are experienced by participants in their research collaboration practices in the academia and how academics address these. This is the impetus for this study as it probes the factors, challenges and strategies utilized by members of Bulacan State University who have successfully completed research projects through collaboration. This study shall organize and foster productivity and creativity in research writing by looking into domains that enable the effectual implementation of collaborative research writing. This study has a possible impact in Bulacan State University's advocacy of delivering quality Education and the Pedagogy for the Filipino Learners.

The study aimed to develop a framework for strengthening effectual collaborative research practices in the academia which shall be used as basis in designing a program on how to effectively implement collaborative research projects. More specifically, this study sought to answer the following research questions:

1. What are the factors that enable the effectual conduct of collaborative research among members of Bulacan State University-Sarmiento Campus and College of Education (Main) who have successfully completed collaborative research?
2. What are the difficulties/ challenges encountered in collaborative research writing?
3. What are strategies for overcoming the difficulties/ challenges in collaborative research writing?
4. How can the results of the research be used as in designing a program/plan of action on how to effectively implement collaborative research writing?

Research Methodology

General Background

The present study employed mixed-method research design, with the first research question gathered and analyzed using quantitative techniques while research questions 2, 3, and 4 utilized qualitative methods. This study planned to collect data from the Likert scale survey questionnaire distributed to faculty members and students of BulSU-Sarmiento Campus and the BulSU-College of Education (CoEd), a state university in the Philippines, using Microsoft Forms. The study sample is limited to faculty members and students of BulSU-Sarmiento Campus and the BulSU-College of Education (CoEd) with experience in participating in research collaboration.

Sample

Study employed convenient sampling technique and collected data from faculty members and students of BulSU-Sarmiento Campus and the BulSU-College of Education (CoEd) with any one of the following experiences: (1) have successfully collaborated with colleagues in presenting a research paper at a national or international conference, (2) have successfully collaborated with colleagues in publishing a research paper in Scopus-indexed journals or other credible publications, and (3) have successfully collaborated with colleagues in the conduct, writing, and completion of a research. The study sought permission from the campus Dean of Sarmiento and the Dean of CoEd and then from the participants. Institutional ethical clearance was also sought from the university research management office to conduct the present study. The researcher assured the confidentiality of data collected, and that the data are accessible only to the researcher. The sample size is limited as responses from participants who did not have experience in collaboration research were not included in the analysis. The demographic profile of participants is shown in Table 1.

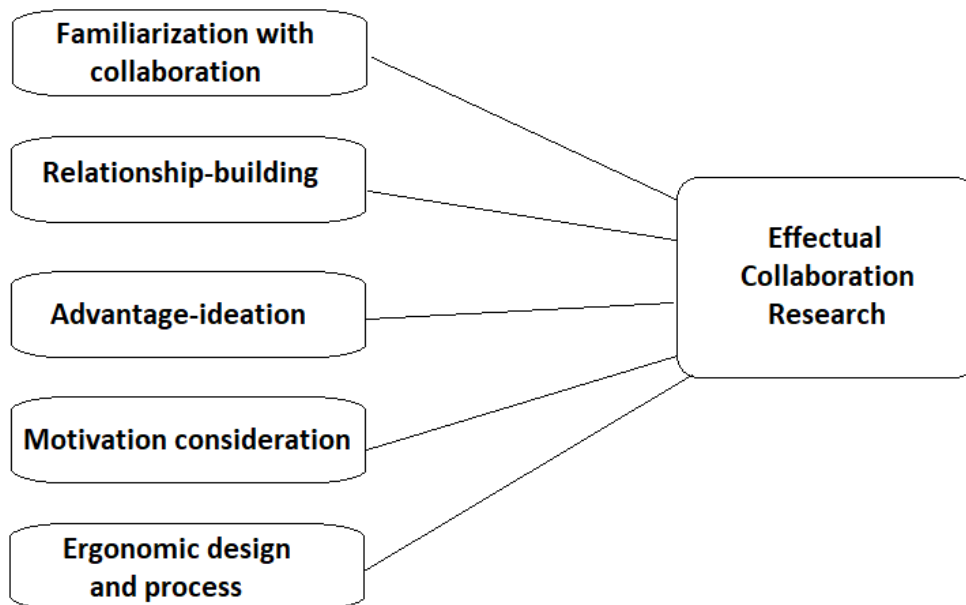
Table 1
Summary of Participants' Demographic Profile

Sex	n	%
Male	(12)	35.29
Female	(22)	64.71
Total	(34)	100
University Unit Affiliation		
Sarmiento Campus	(14)	42.3
College of Education	(20)	57.7
Total	(34)	100
Educational Qualification		
Undergraduate	(17)	50
Bachelor's Degree	(8)	23.52
Master's Units	(2)	5.88
Master's Degree	(7)	20.59
Doctorate Degree	(0)	0
Total	(34)	100
Experience in Research Collaboration		
I have successfully collaborated with colleagues in presenting a research paper at a national or international conference.	Yes (13)	38.24
	No (21)	61.76
I have successfully collaborated with colleagues in publishing a research paper in Scopus-indexed journals.	Yes (7)	20.59
	No (27)	79.41
I have successfully collaborated with colleagues in the conduct, writing, and completion of a research project.	Yes (34)	100
	No (0)	0

Instrument Used

The present study used researcher-made questionnaire on factors, challenges, and strategies for effectual collaborative research based on the literature. The questionnaire had consent forms and personal demographic details in the first section and the second section had items on factors, challenges, and strategies for effectual collaborative research. Figure 1 is forwarded containing integrated factors that may influence collaboration research practices in the academe.

Figure 1
FRAME Model: Proposed Conceptual Framework on Factors that Strengthen Effectual Collaboration Research in Academia



The conceptual framework proposes five factors that may strengthen effectual collaboration research practices in the academia which include familiarization with collaboration, relationship-building, advantage-ideation, motivation consideration and ergonomic design process. Familiarization with collaboration deals with a collaborator’s understanding of what it means to be part of a collaboration, his role, contribution to the completion of the task, expertise offered, individual differences that influence team dynamics, experiences in collaboration and individual values. The second factor is relationship-building which refers to support from management and colleagues, peer interdependence, respectful interaction among collaborators, and development of professional linkages. Third is advantage-ideation referring to mostly individual development and growth experienced by a collaborator in terms of enhancement of independent learning, metacognitive awareness, communication skills, upgraded content knowledge and broadened perspective, improved expertise and rigor in research methodology and critical thinking skills. The fourth factor deals with the collaborator’s intrinsic desire to participate in collaboration research, external factors such as funding, incentives, and utility of research outputs, outcomes, and products for the institution, identified as motivation consideration. Finally, ergonomic design and process factor involves goal setting, efficiency in preparation and implementation of research tasks, providing and gathering feedback through purposeful interactions, safe and non-competitive work environment and flexibility and adaptability of team-members. The opinion of participants on the five identified components shall be collected and evaluated to identify how much of a factor these are in strengthening effectual collaborative research in the academia.

The identified factors and challenges based on literature were utilized as basis for development of a 6-point Likert scale research questionnaire, which was validated by three experts, and was tested for reliability with a Cronbach α of .860 (High Reliability) for

Familiarization component, .763 (High Reliability) for Relationship-building, .930 (High Reliability) for Advantage-ideation, .779 (High Reliability) for Motivation, and .954 (High Reliability) for Ergonomic design (Nunnally, 1979).

Data Collection Procedure

Research sought the permission of the head of the units identified to collect the required data. The questionnaires were sent to the program heads of the BulSU-Sarmiento Campus and CoEd. The researcher assured the anonymity of the data collected to the participants. The questionnaire was available from the 2nd week of April until April 30, 2022. Out of the total forty-five responses, the researcher included thirty-four completely filled-out responses from participants that have experience participating in collaborative research. Afterwards, researcher cleaned the quantitative data and then fed into SPSS version 22 to conduct the quantitative analysis, while the qualitative data was utilized using thematic analysis.

Data Analysis

The study used mean, standard deviation, and principal component analysis (PCA) to identify the significant factors that strengthen collaborative research as perceived by participants in the present study. The qualitative data was analyzed using thematic analysis. The thematic analysis provided a significant amount of flexibility that enabled researchers to look deeper into the participants' individual experiences. The thematic analysis method is composed of six steps: (1) familiarization with the data, (2) coding, (3) generating themes, (4) reviewing the themes, (5) defining and naming themes, and (6) interpretation and reporting (Braun & Clarke, 2013).

Research Results

The researcher conducted summary statistics test to find out the mean perception of participants on the factors that influence their collaborative research practices based on their experience. Table 2 shows the results of the scale statistics test.

Table 2
Factors Enabling the Effectual Conduct of Collaborative Research Writing

Factors	<i>n</i>	\bar{x}	SD	Interpretation
Familiarization with collaboration	34	5.35	0.59	To a moderate point
Relationship-building	34	5.34	0.66	To a moderate point
Advantage-ideation	34	5.34	0.69	To a moderate point
Motivation consideration	34	4.35	1.05	To some extent
Ergonomic Design and Process	34	5.33	0.73	To a moderate point
6-To a great extent	3-Very little			
5-To a moderate point	2- Unsure			
4-To some extent	1-Not at all			

The results illustrated in Table 2 show that among the five factors that influence successful collaborative research practices of BulSU Sarmiento Campus and College of Education faculty and students, being familiar with collaboration was the most significant factor with $\bar{x} = 5.353$, *to a moderate point*.

Table 2.1
Level of Familiarization with Collaboration

Components	n	\bar{x}	SD	Interpretation
I understand what collaboration means.	34	5.50	0.75	To a great extent
I understand my role as a part of a collaborating group.	34	5.50	0.75	To a great extent
I expect all the members of my team to contribute equally to the group task.	34	5.24	0.92	To a moderate point
I understand that each member's task must be aligned with his/her expertise for optimal performance.	34	5.35	0.85	To a moderate point
I understand that individual personalities and differences may influence team dynamics.	34	5.38	0.82	To a moderate point
I understand that prior experience influences the performance of team members in task assignments.	34	5.47	0.66	To a moderate point
I understand that differences in advocacies may influence the team's interpretation of data collected.	34	5.02	0.83	To a moderate point
Mean		5.35	0.59	To a moderate point
6-To a great extent		3-Very little		
5-To a moderate point		2- Unsure		
4-To some extent		1-Not at all		

Table 2.1 illustrates the different components of Factor 1: Familiarization with Collaboration which showed that participants understand to a great extent what it meant to take part in a collaboration, $\bar{x} = 5.5$, and they understood to a great extent their role as a part of a collaborative research group, $\bar{x} = 5.5$.

Table 2.2
Level of Relationship-Building

Components	n	\bar{x}	SD	Interpretation
Involvement or support from Top management and colleagues enable me to successfully complete collaborative tasks.	34	5.15	1.07	To a moderate point
Peer interdependence is evident in the way the members of my team trust and rely on each other.	34	5.29	0.87	To a moderate point
Respectful interaction is evident when our team members discuss issues, problems, or difficulties with the project.	34	5.51	0.71	To a great extent
My collaborative experiences enable the development and creation of new professional connections and relationships.	34	5.41	0.78	To a moderate point
Mean		5.346	0.66	To a moderate point
6-To a great extent		3-Very little		
5-To a moderate point		2- Unsure		
4-To some extent		1-Not at all		

Relationship-building scored a $\bar{x} = 5.346$, *to a moderate point*, however, one of most significant components in Factor 2: Relationship-building was the respectful interaction among members of the collaborative research group with a $\bar{x} = 5.51$, *to a great extent*. Expanding networks and professional connections and relationship was also highly regarded with a $\bar{x} = 5.41$, *to a moderate point* as shown in Table 2.2.

Table 2.3
Level of Advantage-Ideation

Components	<i>n</i>	\bar{x}	<i>SD</i>	Interpretation
Engagement in collaborative tasks promotes my independent learning as I need to prepare well to be able to actively participate in brainstorming and discussions.	34	5.41	0.78	To a moderate point
My metacognitive awareness is enhanced.	34	5.32	0.77	To a moderate point
My communicative skills are enhanced as collaboration involves interaction with my team members.	34	5.41	0.86	To a moderate point
My content knowledge is upgraded as the experts in my team contribute to the team discussion.	34	5.41	0.74	To a moderate point
My perspective is broadened as plurality of perspective creates a rich and robust pool of knowledge.	34	5.38	0.82	To a moderate point
My acquired knowledge and information have more rigor as variety of expertise and perspective guides methodology and interpretation.	34	5.26	0.83	To a moderate point
Problem-solving has become more efficient as more people may present viable solutions when problematizing research issues and trends.	34	5.24	0.99	To a moderate point
Mean		5.349	0.69	To a moderate point
<i>6-To a great extent</i>				<i>3-Very little</i>
<i>5-To a moderate point</i>				<i>2- Unsure</i>
<i>4-To some extent</i>				<i>1-Not at all</i>

The second most significant factor on effectual collaborative research practices was Factor 3: Advantage-ideation with a $\bar{x} = 5.349$, *to a moderate point*. Table 2.3 illustrates those three elements of Factor 3: Advantage-ideation showed that participants believed that participating in collaborative research promoted their independent learning, enhanced their communication skills, and upgraded their content knowledge with a $\bar{x} = 5.41$, *to a moderate point*.

Table 2.4
Level of Motivation Consideration

Components	<i>n</i>	\bar{x}	<i>SD</i>	Interpretation
I have an intrinsic desire to participate in collaboration.	34	5.03	0.90	To a moderate point
External factors contribute to why I participate in collaboration tasks.	34	4.94	1.15	To a moderate point
I receive funding for collaborative research projects.	34	3.55	1.78	To some extent
I receive incentives offered by the university for participating and completing collaborative projects.	34	3.74	1.81	To some extent
Collaborative projects I participate in are utilized for accreditation and audit requirements of the institution.	34	4.53	1.38	To a moderate point
Mean		4.359	1.05	To a moderate point
<i>6-To a great extent</i>				<i>3-Very little</i>
<i>5-To a moderate point</i>				<i>2- Unsure</i>
<i>4-To some extent</i>				<i>1-Not at all</i>

On the other hand, internal and external motivation scored the lowest mean evaluation among the factors that enabled effectual collaborative research practices of BulSU Sarmiento Campus and College of Education faculty and students, with $\bar{x} = 4.359$. *to some extent*. Table 2.4 illustrates the different components of Factor 4: Motivation consideration which showed that participants received *to some extent* funding for participating in collaborative research projects with $\bar{x} = 3.55$, and they also received *to some extent* ($\bar{x} = 3.73$) incentives offered by the university. Internal motivation, however, was the most significant motivation consideration of participants as it influenced their collaboration practices *to a moderate point* ($\bar{x} = 5.03$).

Table 2.5
Level of Ergonomic Design and Processes

Components	<i>n</i>	\bar{x}	<i>SD</i>	Interpretation
Collaboration enables me to identify more clearly the goal of a research project and achieve the intended outcomes.	34	5.32	0.77	To a moderate point
Preparation and implementation are more effective and efficient with collaboration.	34	5.47	0.75	To a moderate point
Peer feedback and interactions provide for a more purposeful research design.	34	5.35	0.81	To a moderate point
Collaboration has fostered non-competitive and a safer work environment.	34	5.24	0.85	To a moderate point
Collaboration enhances flexible work experience as adaptability of team members are improved.	34	5.29	0.80	To a moderate point
Mean		5.33	0.73	To a moderate point
6-To a great extent		3-Very little		
5-To a moderate point		2- Unsure		
4-To some extent		1-Not at all		

Finally, Ergonomic design and process ranked as fourth in the level of influence that enabled effectual collaborative research practices of the participants with a $\bar{x} = 5.335$, *to a moderate point*. Of all the components, Table 2.5 shows participants believed that the preparation and implementation of research were more efficient and effective with collaboration with a $\bar{x} = 5.47$, *to a moderate point*. Moreover, peer feedback and interaction among members of the collaborative research project were also identified as factors that enabled effectual collaborative research practices with $\bar{x} = 5.33$, *to a moderate point*.

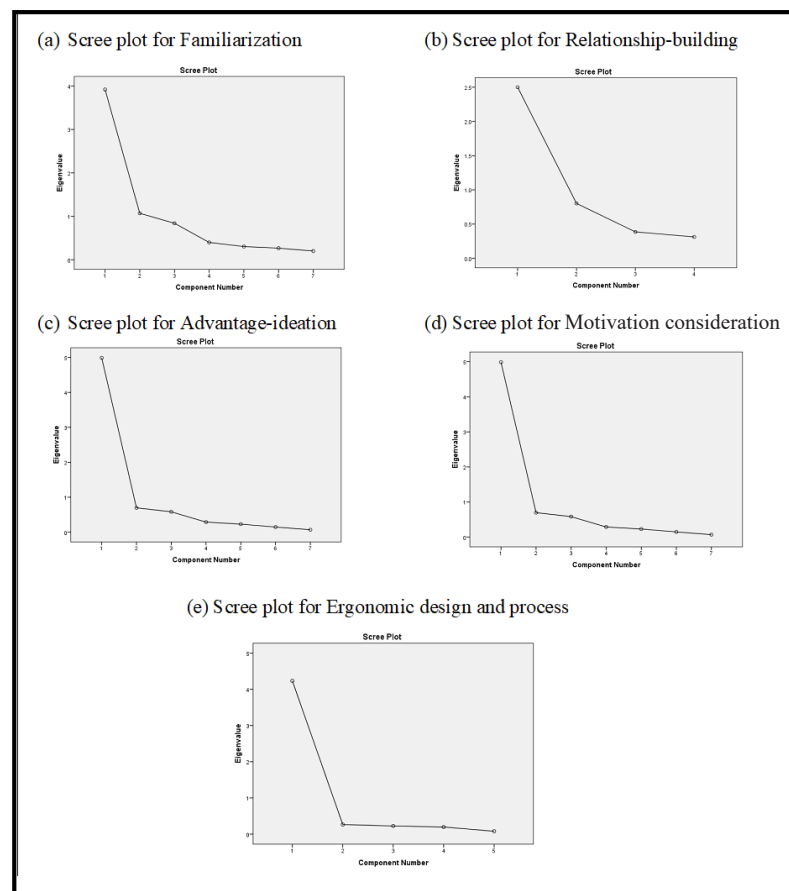
However, using principal component analysis (PCA), the factor loading result of the components of each factor illustrated changes in the FRAME Model. Table 3 shows the results of PCA illustrating two components extracted from Factor 1-Familiarization with collaboration, while the individual components of the four other factors loaded or related to only one principal component.

Table 3
Results of Principal Component Analysis - Component Matrix

	Familiarization		Relationship-building	Advantage-ideation		Motivation Consideration	Ergonomic design & process	
	Component 1	Component 2		Component 1	Component 1		Component 1	Component 1
Item7	.877				Item 12	.751	Item 19	.751
Item6	.839		Item 8	.561	Item 13	.748	Item 20	.748
Item5	.778		Item 9	.876	Item 14	.862	Item 21	.862
Item1		.840	Item 10	.855	Item 15	.924	Item 22	.924
Item2		.743	Item 11	.829	Item 16	.896	Item 23	.896
Item3		.643			Item 17	.836	Item 24	.836
Item4	.560	.585			Item 18	.875	Item 25	.875
							Item 26	.923
							Item 27	.899
							Item 28	.924
							Item 29	.910
							Item 30	.946

The components extracted from each factor is illustrated in the scree plot illustrated in Figure 2.

Figure 2
Scree Plot Results of Factors for Effectual Collaboration Research



Further, Table 4 illustrating the results of KMO, and Bartlett's Test showed that all six factors, as a set, significantly correlates at p -value .0001 ($\alpha \leq 0.05$), thus, the model shows interconnection among the factors.

Table 4
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.848
	Approx. Chi-Square	121.862
Bartlett's Test of Sphericity	<i>df</i>	10
	<i>p</i>	.0001

Challenges encountered in collaborative research writing

There are challenges in conducting collaborative research projects. Table 5 illustrates twelve challenges faced by participants in conducting collaborative research projects ranked according to the number of participants who encountered the said problem.

Table 5
Challenges of Collaborative Research Writing

Challenges	<i>f</i>	%	Rank
Accepting that you are not the only expert in the group	19	55.88	1
Conflicting priorities, misunderstandings	16	47.06	2
Unclear or uncomfortable roles or task assignments	15	44.12	3
Accepting that you do not have expertise in specific areas or subject matter	14	41.18	4
Shift from "I tell, you do" to "We talk, we work together."	11	32.35	5
Oversharing information	8	23.53	6
Conflict in taking responsibility for problems or credit for success	7	20.59	7.5
Time management and scheduling	7	20.59	7.5
Unequal opportunity due to employment status	6	17.65	9
Friction of ideas	5	14.71	10
Lack of access to credible sources	4	11.64	11
Barriers in communication	2	5.88	12

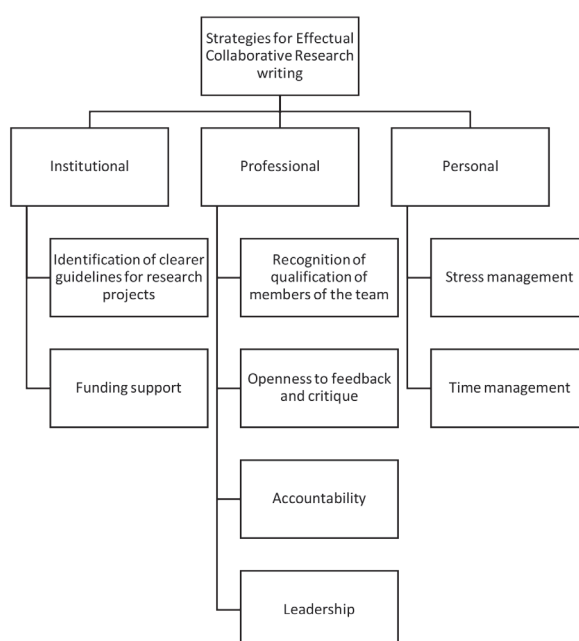
The results showed that the primary problem faced by 55.88 percent of the participants was *accepting that they are not the only expert in the group*. This may mean that ideas relevant to the topic, or decisions about the research are reached through consensus and participants may find it hard to reach a consensus because expert members may have differing opinions. This possibly leads to *misunderstanding and conflicting priorities* which is the second most experienced challenge in the conduct of collaborative research project with 47.06 percent of the participants claim to have experienced. Third, 44.12 percent of participants also experience unclear role assignments or feel uncomfortable in the tasks assigned to them. The fourth most experienced challenge in collaborative research writing is *accepting the one is not an expert in a specific area* with 41.18 percent of the informants. This may mean that participants may

feel uncomfortable not being as knowledgeable as other members in certain aspects of the research work. Despite the limited physical interaction in the last two years because of the pandemic, *barriers in communication* were the least identified challenges in the conduct of effectual collaborative research writing with only 5.88 percent of the participants claiming to have experienced it. This may be because access to digital technology and the internet may have been useful to bridge communication barriers despite the physical distance. Moreover, the second least experience challenge is lack of access to credible sources with only 11.64 percent of participants claiming to experience it, despite lack of access to physical libraries and books. This again may be explained by availability of digital tools and internet access of participants which enable them to access digital libraries and resources.

Strategies for overcoming the challenges of collaborative research

The participants identified strategies to overcoming the difficulties/ challenges they faced in collaborative research writing. The responses were analyzed using thematic analysis and were coded and classified into three major themes – Institution, Professional and Personal (IPP) strategies for effectual collaborative research writing. As shown in Figure 3, under institutional strategies, the (1) identification of clear set of guidelines in the conduct of the research project and (2) provision of funds to support the conduct of the research projects are strategies that are identified to enable the effectual conduct of collaboration in research. Under professional strategies, there are four strategies enumerated: (1) that members duly recognize each member's qualification to take part in the collaboration, (2) that members are open to feedback and critique, (3) that members are accountable to the roles and tasks assigned to them, and (4) that each member is ready to step up and take leadership role when necessary. Finally, in personal strategies include (1) making the research writing process less stressful and (2) managing the time well.

Figure 3
IPP Model: Strategies for Overcoming the Difficulties / Challenges in Collaborative Research Writing



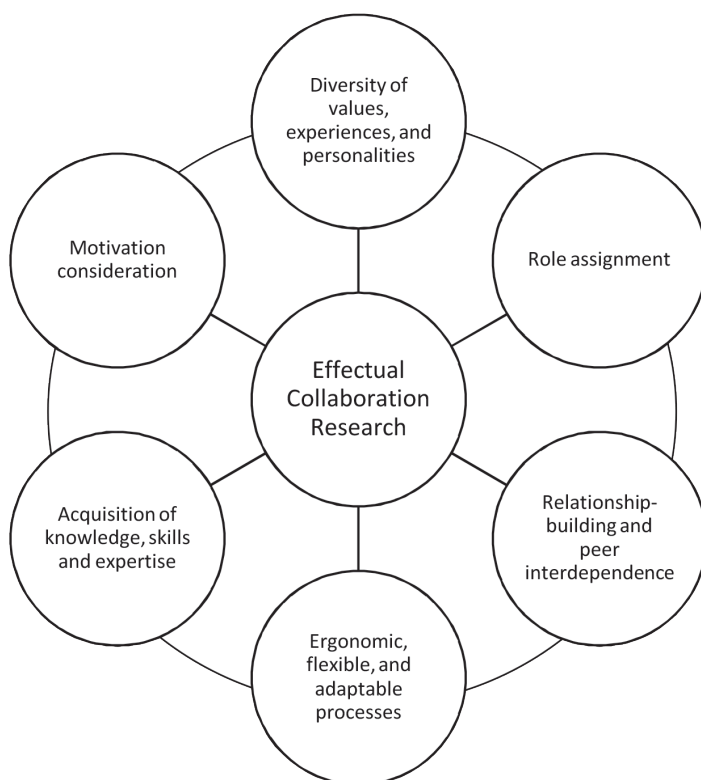
Based on the results, the Action Plan Framework for Effectual Collaborative Research Writing is forwarded (see appendix a). In this framework, the DRREAM factors identified in the study, the challenges, and the IPP strategies must be recognized, addressed, applied, and included as part of a training program to encourage collaboration in research projects so that the goal of Bulacan State University to produce Innovative, Advanced, and Relevant Research projects may be accomplished.

Discussion

As the value of research collaboration is highlighted in higher education institutions, the demand to capacitate and upgrade collaboration research skills among members of the academia is also more significant than ever. The results showed that there are six factors that contribute to strengthening the effectual collaborative research practices of members of the academia who participated in the present study and these support works by Mattessich, et. al (2001), Chien et, al (2012), and Patel, et. al. (2012) who have identified factors contributing to successful collaboration practices in varied fields. This implies that collaboration practices are influenced by similar factors across disciplines and that capacitating members of the academia to manage the factors identified may enable them to participate more in collaborative activities, more so collaborative research.

Given the results of the analysis, the following changes in the proposed FRAME Model, the conceptual framework on factors that strengthen effectual collaboration research in academia shall be made, as shown in Figure 4.

Figure 4
DRREAM Model: Revised Framework on Factors Strengthening Collaborative Research



The revised model illustrates six factors that strengthen effectual collaboration in the academia as compared to the original five factors. The first factor, familiarization with collaboration, upon analysis extracted two principal components. Items 5, 6 and 7 factor loads with component 1, with item 7 having the highest factor loading at .877. This new factor is renamed diversity of values, experiences, and personalities of collaborators. Items 1, 2, 3, and 4 loads with component 2, with item 1 having the highest factor loading (.840), thus identifying the second component and new factor as role assignment. The originally second factor, relationship building, only had one principal component, but since item 2 of the components (peer interdependence) had the highest factor loading (.876), the factor is renamed relationship-building and peer interdependence. In terms of ergonomic design and process, the last item for factor 5 had the highest factor loading (.946) emphasizing flexibility and adaptability of processes, as such the factor is renamed ergonomic, flexible, and adaptable processes. Advantage-ideation is also renamed acquisition of knowledge, skills, and expertise to best illustrate item 4 which has the highest factor loading (.924) for what initially was factor 3. Finally, motivation consideration is retained which illustrates both intrinsic and extrinsic motivation to participate in collaboration research projects.

There are also challenges that collaborators face when doing research collaboration. The results affirmed previous studies on challenges in collaboration by Kolfshoten, et. al. (2008) and Kwibisal and Majzoub (2018), and ranked the challenges based on the opinion of participants on how frequently the challenges were experienced. The *acceptance that they are not the only expert in the group* proved to be the most common challenge faced by participants. This may imply that brainstorming ideas relevant to the topic, or decisions about the research are reached through consensus but participants may find it hard to reach a consensus because expert members may have differing opinions based on their expertise. This leads to *misunderstanding and conflicting priorities* which is the second most experienced challenge in the conduct of collaborative research like how the process of interaction among members of the collaborative group in a different discipline is also one of the most common problems according to Kolfshoten, et. al. (2008).

Despite these challenges though, strategies relating to the institution, professional and personal (IPP Strategies) domains contribute to overcoming challenges identified. Contrary to Apostolakis (2003) and University of Nebraska-Lincoln (2022), the strategies drawn from the results do not only focus on the dynamics of the members of the collaboration group but include the role of higher institutions, as well as professional and personal aspects that may enable a member of the academia to successfully take part in research collaboration.

The factors, challenges and strategies that emerged from the study affirm research on collaboration discussed in the literature review despite the varied context from the current study. This means that collaboration practices in various fields and areas of study share commonalities in factors, face similar dilemmas, and may adapt similar strategies for success.

Conclusions and Recommendations

In the context of the research, based on the results, the Sarmiento Campus and the College of Education may include in the faculty development seminars and student trainings topics that deal with Diversity of values, experience and expertise, Role assignments in collaboration, Relationship-building and peer interdependence, Ergonomic, flexible and adaptable processes, Acquisition of knowledge, skills and expertise, and Motivation consideration (DRREAM model) as these are factors identified to significantly influence effectual conduct of collaborative research projects. Likewise, a colloquium may also be organized where faculty and student researchers may share not just their research projects and results, but also the actual experiences, struggles and challenges in conducting research and listen to how these are overcome. Such

activity will surely inspire researchers old and new alike, as stories of the fall and the conquest, the highs, and lows, the good and the bad, serve as true narratives that can provide rich and meaningful content for reflection.

Finally, trainings and workshops on Institutional, Professional, and Personal (IPP) Strategies for Effectual Collaborative Research Writing may also be conducted which would include orientation on university research guidelines, timelines and dissemination of information on university funding support, training and workshop on professional strategies which include research project leadership, accountability, accepting feedback and critiquing, and communication skills development, and personal strategies – time management skills development as well as stress management skills.

For future researchers, the study may be replicated in all other external campuses and colleges in the university to further establish, affirm or negate the conceptual frameworks developed.

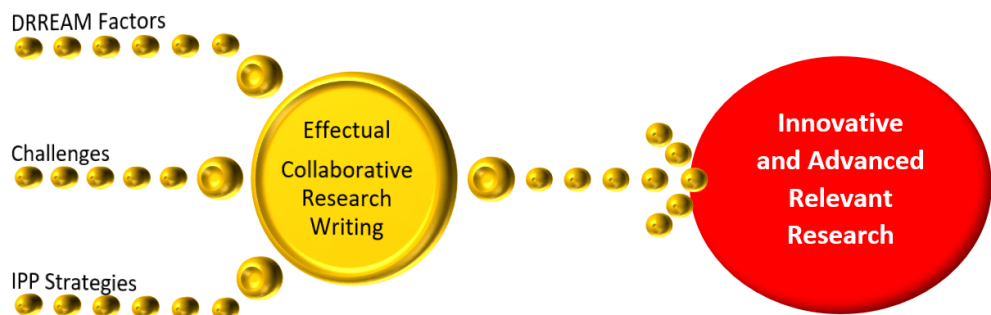
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Appendix A

Action Plan Framework for Effectual Collaborative Research Writing



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