

# Establishing a Research Program in a Philippine Senior High School: Perspectives, Opportunities, and Post-Pandemic Trajectories

Christian P. Gopez <sup>a</sup>, Liezl Rillera-Astudillo <sup>b</sup>, Feorillo Petronilo A. Demeterio III <sup>c</sup>

achristian.gopez@dlsu.edu.ph

#### **ABSTRACT**

The article describes and assesses the De La Salle University Senior High School's (DLSU SHS) Research Program. Six components of Fung's Connected Curriculum Framework were utilized to describe the perspectives and experiences of stakeholders. Using an explanatory sequential research technique, it was found that administrators, teachers, and students rated Dimension 5 (creation of outputs aimed at an audience) the highest, while Dimension 6 (student interaction with each other and with alumni) was evaluated the least. Stakeholders generally see the Research Program positively and as a vital college-preparatory experience. The findings situate the DLSU SHS in the ongoing transition of DLSU to a full-fledged research university, the Department of Education's direction to strengthen the research culture in basic education, and the post-pandemic education that highlights adaptable and resilient research programs that can continue to thrive amidst disruptions and unprecedented challenges. Furthermore, since research plays a vital role in the senior high school curriculum, the outcomes of this study may be used as a benchmark in the sphere of Philippine basic education.

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<sup>&</sup>lt;sup>ab</sup>Department of Humanities and Social Sciences, De La Salle University, Philippines

<sup>&</sup>lt;sup>c</sup>Department of Filipino, De La Salle University, Philippines

#### Introduction

Despite the implementation of various initiatives to promote research in Philippine basic education, research continues to receive low priority from elementary and high school teachers and students. Recent studies have highlighted the limited exposure of Department of Education (DepEd) teachers to research methodologies and dissemination, pinpointing areas for improvement (Gepila et al., 2018; Manila et al., 2022). Similarly, it has been noted that many teachers in public and private schools, despite recognizing the importance of research, do not actively engage in it, even though the DepEd mandates the conduct of research and includes it in the annual evaluation standards (Paymalan & Erno, 2020; Ulla et al., 2017). With the abrupt transition to online learning, the COVID-19 pandemic has further underscored these challenges (Bond, 2021; Toquero, 2020), exacerbating the difficulties in conducting and disseminating research (Noguchi et al., 2022).

Multiple studies have identified several challenges elementary and secondary school teachers face in conducting research. These challenges include a lack of research skills and interest among teachers (Ulla et al., 2017), limited time and heavy workload (Morales, 2016), inadequate resources, financial support, and funding (Gepila et al., 2018; Mapa, 2017; Ulla, 2018), perceived difficulty in understanding research concepts (Paymalan & Erno, 2020), and the prevailing notion that teaching should take precedence over research (Cardona, 2020). These issues have been further emphasized during the pandemic, as educators had to quickly adapt to new modes of teaching, often with limited resources and support, leaving little room for research activities (Dhawan, 2020; Erturk & Ekundayo, 2020).

Furthermore, some studies have examined basic education learners' perspectives, readiness, and research skills, specifically senior high school (SHS) students. Overall, students have a positive view of research and recognize its significance in their chosen specializations and future paths after SHS. However, they encountered various challenges, including the lack of knowledge of research concepts, limited exposure to essential activities such as presenting and publishing their studies, and the pandemic disruption that limited students' exposure to essential research experiences (Adedoyin & Soykan, 2020; Estacio et al., 2018; Gallos, 2017; Roxas, 2018).

Aside from the aforementioned challenges faced by teachers and students, it is evident that there is a dearth of scholarly articles addressing the current state of research in Philippine basic education and the efficacy of programs implemented by educational institutions to foster a culture of scientific inquiry. This disappointing status of research in the Philippine basic education may be rooted in various factors preventing stakeholders from engaging in research activities. It should be noted that the Philippines has shown remarkable research development during the last decade but still lags behind its neighboring countries in the production of knowledge (dela Cruz et al., 2023). Thus, establishing a formal and dedicated subject focused on research within the SHS curriculum is a significant stride toward cultivating a research-oriented culture across all levels of education in the country.

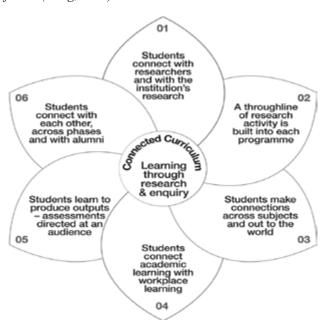
The integration of SHS in basic education represents a pivotal component of K-12, the biggest educational overhaul implemented in the Philippines. Despite criticism and many challenges, this shift has endured; the first batch of program graduates in 2018. DepEd emphasized that the main goal of the SHS curriculum is to produce well-rounded students with the necessary reading ability suitable for college, a career, or entrepreneurship. Concurrently, courses such Practical Research 1, Practical Research 2, and Inquiries, Investigation, and Immersion have been expressly designed to help students strengthen their critical thinking skills by means of qualitative and quantitative research methodologies.

In academic environments, research is rather appreciated; De La Salle University Integrated School Senior High School (DLSU SHS) is a prime example of an institution that shares this value. DLSU SHS, a research-oriented senior high school in the Philippines, has proactively responded to the curriculum reform by instituting a thorough program meant to develop the research capacity of SHS students, with an unwavering dedication to scholarly inquiry. Entering its seventh year in 2023, it became essential to participate in a thorough academic discourse on the DLSU SHS Research Program, critically analyzing its character, evaluating its execution, and following its transforming path over the last decade. This study aims to add to the body of current knowledge by highlighting the development, successes, and difficulties of the program and therefore support informed discussions on the effectiveness of research initiatives in SHS education.

Within the field of educational research initiatives, Fung's (2017) Connected Curriculum Framework (CCF) becomes a major prism through which one may examine

Figure 1

The Six Dimensions of CCF (Fung, 2017)



and comprehend the design and learning results of such programs. This framework presents a distinct viewpoint, stressing an instructional strategy based on research instead of just sharing of data about research. Its main objective is to enable students to be active members of the research community, thereby developing their capacities as analyzers, investigators, and contributors. As rightly pointed out by Carnell and Fung (2017), the framework goes beyond conventional lines separating research and instruction, researcher and student, higher education institutions and society, hence encouraging the development of active scholarly communities. At the core of the CCF lie six pivotal dimensions firmly rooted in inquiry-based learning. These dimensions encompass (1) student engagement with researchers and the institution's research program, (2) effectiveness and appropriateness of research activities, (3) integration with other disciplines and real-life contexts, (4) relevance to the world of work, (5) production and presentation of research directed to an audience, and (6) student interaction with peers and program graduates. Figure 1 visualizes these dimensions as essential guideposts for cultivating an enriching research-based educational experience.

In this context, the primary objective of this paper is to provide a comprehensive description of the DLSU SHS Research Program and assess the perspectives and experiences of teachers, administrators, and students based on Fung's six dimensions. Additionally, the paper examines the program's strengths and weaknesses to guide its future advancement. This description and analysis hold significance for the school and all senior high schools nationwide that have implemented or are yet to implement research programs. By examining the experiences, challenges, and strategies in implementing the DLSU SHS Research Program, this study aims to offer valuable insights beyond merely contributing to the research culture. Additionally, it emphasizes the potential contributions of DLSU SHS teachers and students to the ongoing transition of DLSU into a full-fledged research university and the cultivation of a research culture within the basic education system of the Philippines. Moreover, it emphasizes the importance of flexible and strong research initiatives able to survive under uncertain conditions. The study intends to clarify the elements influencing the success of research programs and inclusive practices in educational environments by closely analyzing stakeholder experiences, thereby exploring the perspectives, possible opportunities, and postpandemic trajectories of the DLSU SHS Research program.

# Methodology

#### **Study Design**

Based on the Connected Curriculum Framework (CCF), this paper evaluated the DLSU SHS Research Program using an explanatory sequential methodology. The design included a two-phase method combining quantitative data collection and analysis with subsequent qualitative data collection and analysis. Combining statistical results with narrative insights sought to provide an all-inclusive knowledge of the Research Program.

# **Participants**

The study comprised administrators, teachers, and students from the DLSU SHS. A total of eight (8) administrators, fifty-one (51) research advisers, and four hundred and two (402) students (who have already completed all Practical Research courses) were invited to participate in the study through email invitations. This wide selection of stakeholders was selected to offer insightful analysis of the DLSU SHS research curriculum.

# **Quantitative Phase: Survey Questionnaires**

A survey questionnaire was developed based on the guiding questions proposed by Carnell and Fung (2017) to collect quantitative data. The questionnaire consisted of two parts. The first part comprised eighteen statements, with three items per dimension, describing the expected standards for each dimension of the research program. The instrument evaluated six dimensions of students' research engagement. Dimension 1, "Students connect with researchers and with the institution's research," included items such as "Research mentees have regular opportunities to learn about the institution's research and other current research relevant to their studies," assessing their connection to ongoing research. Dimension 2, "A throughline of research activity is built into each program," was represented by "Research mentees have some flexibility and even take risks with their research-related activities, for example by working towards a Showcase Portfolio for which they can curate their best work," emphasizing continuous research engagement. Dimension 3, "Students make connections across disciplines and out to the world," included "Research mentees are required to make explicit connections between disciplinary perspectives, for example by collaborating with students of other disciplines to analyze evidence and issues," promoting interdisciplinary collaboration. Dimension 4, "Students connect academic learning with workplace learning," was exemplified by "Research mentees are able to analyze the ways in which their academic learning is relevant to the world of work," highlighting real-world applicability. Dimension 5, "Students learn to produce outputs: assessments directed at an audience," included "The research mentees' assessments across the program are suitably varied, enabling them to develop a range of skills, including expertise in digital practices and communications," showcasing varied assessment methods. Lastly, Dimension 6, "Students connect with each other, across phases and with alumni," was represented by "Research mentees meet and learn from diverse alumni, and build a strong sense of belonging to an inclusive research and learning community," emphasizing community building. Participants rated their agreement with each item using a 4-point scale (strongly agree, agree, disagree, strongly disagree). To ensure accessibility and safety during the data collection process amidst the pandemic, an online platform was utilized for questionnaire administration.

# **Qualitative Phase: Open-Ended Survey Questions and Focus Group Discussions (FGDs)**

The second part of the survey consisted of open-ended questions, allowing participants to provide explanations, share their program experiences, and express their perspectives on the strengths and weaknesses of the research program.

Focus group discussions (FGDs) were convened with a purposive selection of administrators, research advisors, and students to explore further the initial survey findings. These FGDs were structured to facilitate the exploration of participants' experiences, perspectives, and reflections on the survey outcomes or quantitative results. A systematic approach was undertaken to iteratively develop and refine the discussion guide, thereby ensuring the validity and relevance of the inquiry. The overarching aim was to ascertain the efficacy of the questions in eliciting pertinent information and fostering substantive dialogues among participants. Given the constraints imposed by the pandemic, Zoom served as the virtual platform for conducting the FGDs. Consent was obtained from all participants prior to recording the sessions, which were subsequently transcribed for comprehensive analysis. This adaptation to virtual tools enabled seamless engagement while adhering to safety measures. The FGD focused on deepening the discussion on the results per dimension. The questions developed for the informants were focused on understanding the initiatives implemented by the institution to provide opportunities to learn more about the institution's research, the innovations made to enable a comprehensive and responsive research curriculum, the practices or factors that potentially increased the conference presentation and article publication, and the challenges experienced on the lack of activities that allow students to collaborate with students from different levels and program alumni. Each of the stakeholders were also asked to discuss their understanding of the research program, their insights on the different program features and elements, and their vision for its future. They were also asked to comment on what the school should uphold, enhance, and maintain in the program and provide corresponding recommendations.

#### **Document Analysis**

In addition to the survey questionnaires and FGDs, the researchers conducted an intensive analysis of essential documents related to the DLSU SHS research program. These documents included the Research Manual, Practical Research curriculum, framework, syllabi, topic guides, and other relevant materials. This study gave important background knowledge and further understanding of the nature and execution of the program.

#### **Data Analysis**

Data for the quantitative phase were examined under a mixed ANOVA design with Fung's Six Dimensions as the within-subjects factor and participant roles—Administrator, Research Adviser, Student—as the between-subjects factor. This design made it possible to investigate

the interaction effect between the two and the primary impacts of the dimensions and roles of the participants. Later post hoc analyses were carried out to investigate any notable interactions that developed more.

Using Braun and Clarke's (2006) six-stage methodology, the open-ended survey questions' and FGDs' qualitative data underwent thematic analysis. Part of this method was familiarizing oneself with the data, learning coding, classifying, and grasping emergent themes. After that, the quantitative and qualitative results were combined so that the researchers may have a better understanding of the study program and their relationship with the specified research framework.

#### Reliability and Validity of the Survey Questionnaire

Inter-item consistency indices enabled the evaluation of the instrument's dependability, which Carnell and Fung developed in 2017. With the computed McDonald's  $\omega$  coefficient for the instrument—0.94—good internal consistency was demonstrated. Moreover, supporting the interitem consistency of the instrument was Cronbach's  $\alpha$  coefficient, which turned out to be 0.938. A confirmatory factor analysis (CFA) helped to evaluate the instrument's construct validity. The CFA looked at a three-variable model capturing construct dimensions. Fit indices were studied to assess the model's goodness of fit. Using indices RMSEA = 0.07 (0.067 - 0.082), CFI = 0.94, and SRMR = 0.04 the findings showed a satisfactory model fit.

These results suggest that the instrument exhibits good reliability; strong internal consistency is indicated by the high McDonald's Omega and Cronbach's Alpha coefficients. Moreover, supporting the construct validity of the instrument are the low SRMS (Hair et al., 2010), strong CFI, and adequate fit of the CFA model shown by the reasonable RMSEA value.

#### **Ethical Considerations and Researchers' Reflexivity**

Through careful data storage and data elimination throughout analysis and reporting, the researchers guaranteed participant anonymity and confidentiality. Two of the researchers are DLSU SHS administrators, hence they directly know the nature and execution of the program. Their positions allowed for a deeper insight into the research program's context and facilitated the interpretation of the findings.

#### Results

The researchers tested the within-subjects factor effects assessing the DLSU SHS Research Program across six dimensions. Table 1 displays the means and standard deviations for these dimensions. The violation of the assumption of sphericity was confirmed by Mauchly's test ( $\chi 2$  (14) = 363.93, p = .000). As a result, the researchers applied the Greenhouse-Geisser

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estimate of sphericity to adjust the degrees of freedom. The analysis indicated a significant effect with at least one pair of means demonstrating significance at the .05 level (F (4, 1629) = 25.633, p = .000, partial  $\eta$ 2 = .053). Effect size indicates a relatively small to medium effect.

As shown in Table 1, the post-hoc pairwise comparisons with a Bonferroni adjustment revealed that there were no significant differences among Dimensions 5, 2, and 1 ( $p_{52}$  = .429,  $p_{51}$  = .09,  $p_{21}$  = .31) in terms of how they were perceived to be exhibited in the SHS Research Program. Similarly, no significant difference was found between Dimensions 4 and 3 (p = .074). However, the mean for Dimension 6 was significantly lower compared to the other dimensions (p = .000).

Table 1

Descriptive Measures and Clusters Generated by Post Hoc Tests across Dimensions (Arranged from Highest to Lowest Means)

	Dimension	Mean	SD	Clusters Generated by Post Hoc Tests
Dimension 5:	Students learn to produce outputs- assessments directed at an audience	3.53	0.51	a
Dimension 2:	A throughline of research is built into each program	3.51	0.52	a
Dimension 1:	Students connect with researchers and the institution's research	3.50	0.54	a
Dimension 4:	Students connect academic learning with workplace learning	3.38	0.59	b
Dimension 3:	Students make connections across subjects and out to the world	3.34	0.65	b
Dimension 6:	Students connect with each other, across phases, and with alumni	3.09	0.75	С

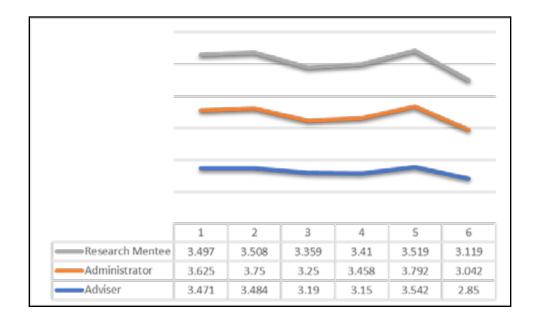
In terms of the descriptive analysis, it was observed that administrators and students provided higher ratings for the Research Program compared to research advisers. However, the analysis of the between-subjects effect indicated that the participant's role, F (2, 458) = 1.51, p < .223, did not yield a significant impact on the evaluation of the program across the six dimensions. These results suggest that administrators, research advisers, and research students generally had similar mean ratings for the program.

On the other hand, Figure 2 presents a significant interaction with a small effect size between the role of the participant and the ratings provided on the six dimensions of the SHS Research Program, F(7, 1629) = 3.50, p < .001, partial  $\eta^2 = .015$ . The ratings provided by administrators, research advisers, and students consistently indicated high evaluations for Dimensions 5, 2, and 1, while a lower mean rating was observed for Dimension 6. Notably, an interaction effect was observed for Dimensions 3 and 4. Specifically, administrators and

research students provided higher mean ratings for Dimension 4 compared to Dimension 3. In contrast, advisers rated Dimension 4 higher than Dimension 3.

Figure 2

Interaction between Role and Rating on Each Dimension



The overall mean rating for the program was 3.39, with a confidence interval of 3.39  $\pm 0.0452$  ( $\pm 1.3\%$ ), ranging from 3.345 to 3.435, indicating that respondents generally provided high ratings. Among the dimensions, Dimensions 5, 2, and 1 received the highest ratings, suggesting that the DLSU SHS Research Program likely exhibits these dimensions. These dimensions include aspects such as student assessments being outward-facing and directed at an audience, allowing students to connect with local or wider communities. The program also offers varied assessments that help develop students' digital practices and communication skills. Students are encouraged to revisit and utilize feedback on their tasks, both formative and summative, to improve their work.

Additionally, the program features a well-designed core sequence of modules, units, or learning activities that enable students to build their research skills and understanding progressively. Students are explicitly challenged to make intellectual connections between different program elements and are given the flexibility to take risks in their research-related activities. They also have regular opportunities to learn about institutional research and engage with researchers and their work. The program also allows students to explore their research's intellectual, policy-related, practical, and ethical challenges, recognizing their relevance to professional life. These results coincide with the great agreement (M = 3.76, SD =.61) on an area stressing the need of giving students comments as a useful component of the research program, so helping to develop their research projects. These findings show that the SHS

Research Program efficiently combines several aspects that support student involvement, skill development, and knowledge of the larger research scene.

Of special relevance is Dimension 5, where teachers, administrators, and students concur the program transcends imparting basic research skills. It gives students chances to present their work on a more extensive venue. Responses in open-ended questions and FGDs show that the strong scores in this dimension result from several projects the school runs to give students venues to publish their research. Among specific instances is the DLSU SHS Research Congress (RC). Students and professors from DLSU SHS, as well as, administrators from other institutions nationwide as well as worldwide are welcome here annually. It seeks to give young researchers a stage on which to present their findings to other SHS students. Over the six years of the congress, it has attracted thousands of students and featured hundreds of capstone projects or research papers.

This initiative started from the desire of teachers and administrators to provide young researchers with their own conference, which could boost their confidence in presenting to others and enhance their understanding of the importance of research dissemination. Before opening the congress to other schools, it was initially exclusive to DLSU SHS students in its first year. The congress provides students a platform and idea about the nature of a conference and motivates them to excel in their projects to be included in the DLSU SHS RC.

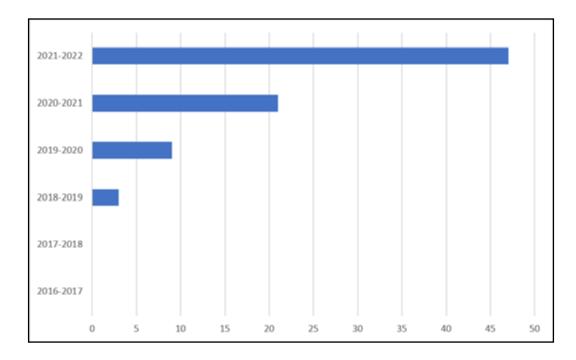
As one student described it, "The Research Congress is the motivation for our group, so we did our best for our paper. We wanted to present at the RC because we believe it is the best platform to showcase the hard work we put in throughout the year." Another student explained the significance of the congress:

The Research Congress acts as a goal/end in mind for the research students, a crowning achievement in their research ventures should their work be accepted in it, and an avenue to explore other research projects from within and outside of their field of study as well as to share their achievement with other mentees whose works got accepted.

Furthermore, it is noteworthy that the participation of students in both local and international conferences has been on the rise. Figure 3 illustrates the absence of research papers presented at conferences other than the DLSU SHS RC during its initial two years. However, there has been a substantial surge in the proportion of research presented, with a starting count of three papers in the 2018-2019 period and an impressive annual growth rate of over 150% by 2020-2021. Among the notable conferences attended by students are the International Academic Conference on Humanities and Social Science, ASEAN University Network on Culture and Arts (AUN-CA) Dialogues Research Forum, Asian Conference on Multidisciplinary Research 2021, Virtual 15th National eLearning Conference 2021, International Conference on Asian and Philippine Studies (ICAPS), DLSU Arts Congress, and Asian CHI Symposium.

Figure 3

Number of Presented Research Papers (Excluding DLSU SHS Research Congress)

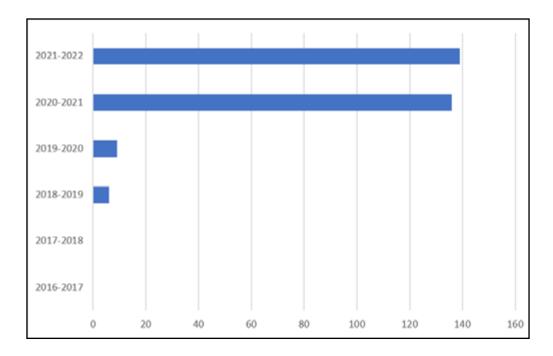


This trend highlights the increasing engagement of students beyond the DLSU SHS RC, as they actively participate in broader academic platforms and interact with scholars from various disciplines. As aptly described by one research adviser, even at the SHS level, students are already immersed in the culture of presenting and sharing their research. Consequently, they are gradually extending their reach beyond the confines of the school and venturing into national and international arenas where they can interact and collaborate with peers and scholars in diverse fields of study.

As regards the evidence of the emergence of a publication culture in the program, despite being at the SHS level, a significant number of publications have already been produced, with a total of two hundred ninety (290) published thus far (see Figure 4). The frequency of publications has exhibited a noticeable upward trend over the years. Notably, these student research works have found outlets in reputable journals such as Sinaya Journal, LWT - Food Science and Technology, Sensing and Bio-Sensing Research, Asia Pacific Journal of Education, Arts and Sciences, Philippine Institute of Chemical Engineers Journal, Philippine Journal of Materials Science and Nanotechnology, Cosmopolitan Civil Societies: An Interdisciplinary Journal, Frontiers in Education, Educational Philosophy Theory, and Frontiers in Psychiatry.

Figure 4

Number of Published Articles by DLSU SHS Students



The increase in the number of featured research presented at conferences and published in journals according to the FGDs may be rooted in several factors:

- 1. Transition to Journal Format: Starting from 2020-2021, the program followed the recommendation of Dr. Feorillo Demeterio III, the director of the University Research Coordination Office, to transition from the traditional research format consisting of five chapters to the journal format. This means that while in the earlier years of the program, students were required to follow a traditional template, in 2020-2021, students were allowed and encouraged to select a journal suitable for their research and format it according to the author guidelines of their chosen journal.
- 2. Launching of the Sinaya Journal: it is noteworthy to mention a recent collaboration between the school and De La Salle Santiago Zobel School and De La Salle Lipa, resulting in the establishment of a journal during the early part of 2021. Entitled "Sinaya: A Philippine Journal for Senior High School Teachers and Students," this journal stands as the pioneering publication platform dedicated exclusively to teachers and students in SHS nationwide. Its principal objective is to provide a conducive avenue for SHS-level publication, fostering and nurturing a culture of scholarly dissemination within the SHS community.

- 3. Incentives and Recognition: The incentives and recognition provided by the school have also had a significant impact on students' participation in conferences and journal publications. Students who have an accepted manuscript or capstone project in any academic journal and in internal or external conferences will automatically get the full mark for the Performance Product component in Practical Research 4 and will receive a Gold Medal during the Recognition Ceremony. Moreover, the University recognizes students who published works in Scopus, ISI, CHED-listed, or ASEAN Citation Index Journal." Additionally, the school awards the St. Br. Miguel Febres de Cordero Award during the Graduation Day to a student from each strand who has excelled in the field of research.
- 4. Introduction of the Congress Proceedings: The DLSU SHS RC also started to officially publish full papers of the accepted and presented articles at the Congress in 2021. The introduction of the Congress Proceedings provides opportunities for students to publish their paper projects in a platform recognized by the larger scientific community.
- 5. Collaboration between Teachers and Students: Many of the published research papers in SHS involved teachers as co-authors. The school encourages collaboration between teachers and researchers to further develop ideas and the manuscript itself, and for students to experience interaction with scholars in their respective disciplines. This collaborative endeavor is rooted in the strong research and mentoring program of DLSU SHS.

In general, the high level of agreement among administrators, teachers, and students in the fifth dimension is rooted in the school's initiatives that emphasize the importance of sharing research findings and provide platforms for students to showcase their projects to a wider audience.

Based on the results for within-subjects effects, it is evident that the mean ratings for Dimensions 1 and 2 are similar to those for Dimension 5. Two reasons consistently emerged from the respondents as factors contributing to the high ratings in Dimensions 1 and 2. First, they highlighted the progressive and innovative flow of research courses in SHS. Second, they emphasized the positive impact of the research advising program implemented by the school. According to administrators and teachers involved in designing the program, the curriculum is deeply rooted in the research-oriented culture of the university. As DLSU positions itself as a research university, it places significant value on research, which is also reflected in the vision and mission of SHS: "Research and service-oriented Lasallian ready to respond to the University's vision and mission." Thus, the curriculum of the program surpasses the standards set by DepEd.

When comparing the DepEd curriculum, which consists of separate courses such as Practical Research 1, Practical Research 2, and Inquiries, Investigation, and Immersion,

with the curriculum of DLSU SHS, it becomes evident that the latter follows an integrated and developmental approach. This strategic design aims to provide students with a deep understanding of research and meaningful research experiences (see Table 2). While acknowledging the additional costs associated with the research advising program in SHS, the administrators recognize its positive impact on students' research proficiency. Starting from Practical Research 2, the school assigns a dedicated research adviser, in addition to the course teacher, to each group or individual based on their respective topics and the expertise of the teacher. This approach not only equips students with fundamental knowledge about the research process from their course teacher but also allows them to explore specific and advanced concepts directly related to their own studies.

One student expressed their satisfaction with the research advising and mentoring program, stating, "My wonderful experience is rooted from my wonderful research adviser. I have truly felt their genuine intent on guiding me to be able to develop my research to the best that it can possibly be. The wide variety of disciplines that us students were able to choose from also gave me satisfaction in knowing that the department is always open to new ideas."

In summary, the high level of agreement among administrators, teachers, and students regarding Dimensions 1, 2, and 5 is attributed to the school's initiatives that emphasize the importance of sharing research results and provide a platform for showcasing student projects to a broader audience.

Table 2

The DLSU SHS Research Roadmap

Research Course	Schedule	Content and/or Expected Output
Practical Research 1	Term 3, Grade 11	Understanding the nature, process, importance, and approaches of research
		• Overview of Quantitative and Qualitative Research
		• Characteristics, Importance, Strengths, and Weaknesses of Qualitative and Quantitative
		Overview of Research Practices in Different Disciplines
		• Formulation of Feasible Research Problems
		• Comprehensive Review of Related Literature
		• Writing a Concept Paper (Chapters 1 & 2)
Practical Research 2	Term 1, Grade 12	In-depth understanding of qualitative, quantitative, and research in different disciplines
		• Process of refining research objectives and review of literature
		General orientation on research methodology

		• Understanding of data-collection, analysis, and interpretation methods
		<ul> <li>Process and ethics of data collection, analysis, and dissemination</li> </ul>
		• Proposal Defense (Chapters 1-3)
		Creation of a Revision Matrix
Practical Research 3	Term 2, Grade 12	• Revision of Research Proposal Document
(Inquiries, Investigation, and Immersion)		• In-depth understanding of data-collection, analysis, and interpretation methods
		• Data Gathering, Interpretation, and Analysis
		• Preliminary Parts of the Research Journal Article
		Milestone Presentation
Practical Research 4	Term 3, Grade 12	Finalizing data analysis
		<ul> <li>Writing effective research conclusions, recommendations, and abstract</li> </ul>
		• Presenting and Publishing Research Outputs
		• Final Defense or Conference Presentation
		• Final Revisions and Proofreading
		• Final Research Manuscript (Journal Format) or Published Article
		Research Portfolio

It is important to note that the results also indicate that Dimension 6 received the lowest rating, suggesting that this particular aspect of the SHS Research Program may require further improvement. Specifically, the ratings suggest that there is room for enhancement in providing students with more opportunities to engage in collaborative inquiry with their peers in diverse groups. Focusing on fostering connections among students from different year groups, facilitating interactions with diverse alumni, and cultivating a sense of belonging within an inclusive research and learning community can be key areas to address. These findings highlight the need to strengthen efforts in this dimension to create a more robust and inclusive research environment for students.

Despite Dimension 3 receiving higher ratings than Dimension 6, within the realm of this study, it is crucial to delve into the analysis and interpretation of the ratings attributed to the two dimensions, as they exhibit a profound interconnectedness in terms of practical application. Administrators, teachers, and students unanimously agree that there are limited opportunities for students to engage in collaborative endeavors with others, including students from different strands, tracks, streams, or even program alumni within DLSU SHS.

This consistent outcome aligns with the existing programs and regulations in place, as there are no specific or direct activities that provide a platform for students to learn from those outside their immediate level or group. This limitation can be attributed to two main reasons. Firstly, the SHS program places a strong emphasis on specialization, particularly

since each strand, track, or stream at DLSU SHS offers distinct programs aimed at developing students' expertise in their chosen fields. Consequently, collaborations primarily occur among classmates or individuals within the same strand, track, or stream. This means that students do not have the opportunity to engage in research projects involving students from other tracks, strands, or streams. Furthermore, there is a lack of collaboration between Grade 11 and Grade 12 levels. While it would be ideal to facilitate interactions between these two levels during the DLSU SHS Research Congress, logistical constraints such as venue capacity during face-to-face events and the limitations of online platforms at present make this challenging.

Secondly, it is important to consider the relative youth of the program itself. The school has only conducted six graduation ceremonies thus far, and the majority of its graduates are still in college, which restricts their involvement in sharing their knowledge within the field being studied by SHS students. In line with Fung's suggestion, it is crucial to foster collaboration among students from different disciplines, streams, tracks, and strands, even in simple activities. It would be beneficial to create activities that provide a platform for students to interact and learn from one another. Additionally, interdisciplinary or multidisciplinary projects could be allowed, and program alumni could be invited to share their experiences when they were part of the program.

A student participant aptly described their experience, stating that while the Research Program effectively imparted valuable skills, there were certain aspects they did not have the opportunity to explore fully. Interactions with program alumni were limited, with students primarily relying on their Research Adviser for guidance. Furthermore, their group lacked diversity since they were all preoccupied with biology, therefore limiting access to a wider spectrum of ideas. Improving the student experience via more contact and teamwork would have been quite good.

All things considered, the results highlight the interdependence of Dimensions 3 and 6 and demand a thorough examination in the framework of actual application. The program's relative young nature and the limited chances for student collaboration draw attention to areas for development, such as encouraging multidisciplinary cooperation, interacting with alumni, and offering venues for knowledge sharing. These initiatives can enhance the research experience, extend students' horizons, and support their whole growth inside the SHS program.

#### **Discussion**

Fung's Connected Curriculum approach stresses the need of combining several learning angles to increase student involvement and skill growth. According to the analysis, which follows Fung's approach, the DLSU SHS Research Program successfully combines several learning dimensions. This probably helps to provide a more all-encompassing learning environment and promotes student development outside of only intellectual understanding. Consistent impressions of Dimensions 5, 2, and 1 point to the program's successful integration of

features including student assessments targeted at an audience, a continuing research subject inside each program, and student interactions with researchers and the institution's research activities. This coherence represents the interconnection promoted by Fung's paradigm, in which several learning components complement and reinforce each other to produce a coherent educational experience.

The COVID-19 pandemic has underlined the need of linked and adaptable learning environments. Programs including many learning dimensions and enabling significant interactions between students and teachers were more resilient as educational institutions all around adjusted to remote and hybrid learning environments (Bao, 2020; Dhawan, 2020). The ability of the SHS Research Program to sustain high degrees of participation and learning results during the pandemic emphasizes the success of its combined strategy.

The lack of appreciable variations in mean evaluations among several participant roles suggests a common view of the efficacy of the program among several stakeholders. As stressed in Fung's approach, this alignment is essential for maintaining a coherent learning environment in which cooperation among several stakeholders helps students to develop holistically. The pandemic has underlined the need of stakeholder cooperation since the fast transition to online learning depends on coordinated efforts by students, teachers, administrators, and parents to guarantee continuity and quality of education (Bozkurt & Sharma, 2020).

The discovered interaction effect emphasizes the need of taking into account several points of view of different stakeholders while assessing instructional initiatives. By incorporating diverse viewpoints, institutions can gain insights into areas of strength and weakness, as highlighted by Fung's model, which emphasizes collaboration and shared responsibility for curriculum development and assessment.

Emphasizing student involvement, practical connections, and skill development, high ratings in Dimensions 5, 2, and 1 line up with the ideas of Fung's Connected Curriculum approach. Through emphasizing outward-facing assessments and building relationships with scholars and the larger community, the program improves students' educational opportunities and gets them ready for active involvement in society. Given the difficulties of the pandemic, when digital literacy and communication skills are becoming more important, this is especially pertinent. The capacity of the SHS Research Program to keep students involved through virtual platforms and online conferences during the pandemic shows its will to uphold high educational standards in front of outside obstacles. Moreover, the alignment of these characteristics points to connectivity among the main elements of the SHS Research Program—a basic feature of Fung's approach stressing the integration of knowledge across disciplinary lines. The program goes beyond conventional pedagogical limits and promotes a whole approach to learning by encouraging a research-oriented culture anchored in the vision and mission of the institution (Sharma, 2024). Furthermore, the focus on research advising underlines the program's dedication to customized learning experiences, in which

students get customized support and mentoring—a fundamental element of Fung's approach stressing the need of student agency and autonomy in the learning process (Fung, 2017).

Fung's model emphasizes on intellectual connections and the need of progressive learning experiences and relevance, therefore the methodical approach to research skill development and the resonance with it. The curriculum gives students chances to participate actively and holistically in research, therefore arming them with the tools and information required for success in both academic and professional spheres. This strategy is especially pertinent in the framework of pandemic and post-pandemic education since handling uncertainty calls both flexibility and critical thinking. As teachers and students have had to rapidly adjust to online learning environments and new forms of communication, the pandemic has sped up the demand for such abilities (Bozkurt & Sharma, 2020).

The focus on giving students venues to present their findings fits the ideas of Fung's Connected Curriculum model, which supports significant links between classroom instruction and practical practice. Through events like the DLSU SHS Research Congress, the program gives students chances to interact with a larger audience and experience several points of view—a vital component of 21st-century education stressed by Fung's approach. In line with studies on the need of encouraging intrinsic motivation and self-efficacy in learning contexts, the congress also acts as a catalyst for student motivation and confidence-building (Deci & Ryan, 2000). Maintaining student motivation and participation during the pandemic has been very difficult, so these projects are especially important (Kuhfeld et al., 2022).

The development of the DLSU SHS Research Congress highlights the importance of adjusting courses and responsive teaching techniques as advised by Fung's method. Knowing and fulfilling the needs of management, teachers, and students helps the program grow and show more valuable learning opportunities. The linked courses of Fung emphasize global citizenship and transdisciplinary collaboration. Students attending conferences outside of the DLSU SHS Research Congress are one instance of this rising interest. By allowing students opportunities to engage with peers and academics from diverse backgrounds, the curriculum develops cross-cultural communication skills and a more thorough awareness of difficult societal issues. Attending outside conferences enhances students' academic and professional networks and therefore supports their intellectual and personal growth (Campbell et al., 2021; Chapman et al., 2009).

Complementing Fung's emphasis on intellectual curiosity and breadth of knowledge, the development of a publication culture among SHS students reveals the program's commitment to academic rigor and excellence. Encouragement of student publication of research results in peer-reviewed periodicals fosters academic ownership, critical thinking, and good communication skills. Moreover, publishing in reputable journals increases the validity and visibility of students' work, therefore boosting their scientific identity and future academic prospects (Osborne et al., 2018; Pinheiro et al., 2014).

The discovered elements highlight the several approach of the program to inspire among SHS students a culture of academic dissemination. Combining teaching and research and adhering to best standards in academic publishing, the program provides incentives for research excellence thereby enabling students to actively participate in intellectual debate. Moreover, the cooperative nature of research output matches Fung's vision of a linked learning community in which teachers, researchers, and students work to advance knowledge and solve pragmatic concerns.

Emphasizing community involvement and teamwork, the SHS Research Program reflects a basic principle of Fung's Connected Curriculum philosophy. The alignment of stakeholders acknowledging the need of spreading research results shows the program's commitment to inspire responsibility and ownership among students. In research techniques and findings, this promotes openness and responsibility. Fung's view of education as a catalyst for beneficial societal change fits the program's attention to social effect and pragmatic relevance indicated by the focus on outward-facing assessments (Fung, 2017).

Emphasized by Fung's Connected Curriculum approach, the comparison between the DepEd curriculum and the DLSU SHS curriculum stresses the program's commitment to innovation and educational accomplishment. A fundamental aspect of post-pandemic education, the curriculum fosters transdisciplinary thinking and cooperation by means of an integrated and progressive approach to research education (Ye & Xu, 2023), therefore transcending traditional academic boundaries. The availability of dedicated research advisers highlights the program's commitment to tailored learning opportunities whereby students receive specific help and mentoring. This aligns with Fung's approach, which places student interaction in the learning process first importance (Fung, 2017).

#### Conclusion

The primary objective of this article was to describe the nature of the research program at De La Salle University Senior High School and examine the perspectives and experiences of teachers, administrators, and students based on the six dimensions presented by Fung. Three significant methods were employed to gather information (questionnaires, focus group discussions, and intensive reading) to achieve triangulation and analyze quantitative and qualitative data using an explanatory sequential design. In general, stakeholders have a positive perception of the school's research program and consider it a meaningful experience that can be utilized in college. The highest agreement among administrators, teachers, and students was found in Dimension 5. This indicates that respondents perceive that students not only learn to produce research outputs but also acquire the ability to present them to a wider audience. On the other hand, the lowest agreement was observed in Dimension 6. This highlights the lack of activities that provide opportunities for students to interact with students from different levels, specializations, and even program alumni. The high agreement in the fifth dimension is rooted in the nature of the program itself and the various initiatives

that promote the importance of research presentation and publication as early as senior high school. The low score in the sixth dimension can be attributed to the absence of activities that allow students to collaborate with students from different levels and program alumni. This may be linked to the program's focus on specialization based on strands, tracks, or specializations. Moreover, since the program is still relatively young, there are only a few alumni, and most of them are still in college.

The study is of great importance in the ongoing transition of DLSU towards becoming a full-fledged research university. It implies that the senior high school community may be considered an active participant in building a culture of research not just in basic education but also in higher education institution settings. Since the basic education level in the country faces even more challenges in terms of research, the findings of this study serve as a foundation for secondary schools in the Philippines to learn from the experiences, challenges, and strategies implemented by DLSU SHS in the implementation of their own research programs. Furthermore, in this post-pandemic education that highlights adaptable, resilient, and sustainable research programs, the Department of Education may use the results of this study to strengthen the research culture in basic education and emphasize the need to design programs that will thrive amidst disruptions. Finally, in the implementation of the MATATAG Curriculum and the ongoing curriculum reviews, this article may be a concrete basis for the improvement of Practical Research courses in senior high schools.

#### Recommendations

Since the study discovered that the nature of the program is rooted in the research-oriented culture of DLSU, it is recommended that DLSU SHS continue and further enhance the value placed on research presentation and publication. Additionally, the school could consider developing strategies and programs that create opportunities for students to interact with students from different levels and program alumni and promote interdisciplinary projects. This will contribute to the expansion of the goal of building a community of researchers. Furthermore, since DLSU SHS offers different strands and tracks (Accountancy Business and Management, Arts and Design Track, Science Technology, Engineering, and Mathematics, Humanities and Social Sciences, and Sports Track), future researchers may also delve deeper into the data based on stakeholders' program to further contextualize the findings and deepen the analysis.

While the research program of DLSU is impressive and has been positively perceived by its stakeholders, the challenge for other Philippine senior high schools is to evaluate their own practices to create a program contextualized to their own experiences, challenges, and directions. It is therefore recommended that education institutions, government agencies, and school administrators support the enhancement of research programs in basic education by innovating research curriculum, designing responsive research infrastructure and ecosystem, strengthening student and teacher collaborations, designing relevant teacher training and

student exposure, producing accessible presentation and publication platforms, and creating merit-based incentive systems.

This project has proven that a research program can succeed in a basic education setting and cultivate a culture of critical inquiry among senior high school students amidst unprecedented circumstances.

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#### **Disclosure Statement**

The authors declare no conflict of interest.

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### Author's Bionote

Christian P. Gopez is a faculty and Chair of the Department of Humanities and Social Sciences of De La Salle University. He is also the editor-in-chief of *Sinaya: Philippine Journal for Senior High School Teachers and Students* and managing editor of *Dalumat E-Journal*. In 2020, he received the *Gawad PSLLF sa Saliksik* from the Pambansang Samahan sa Linggwistika at Literaturang Filipino for his remarkable research on Philippine alternative media. De La Salle University Integrated School also recognized him in 2023 as the Most Outstanding Teacher. He graduated with the degrees BSE-Filipino and Diploma in Teaching Reading, *magna cum laude* and Balagtas Awardee, from Philippine Normal University Manila and with the degree of Master of Arts in Philippine Studies – Language, Culture, and Media from De La Salle University Manila and was awarded Outstanding MA Thesis and Outstanding Contribution to the Department. Currently, he is finishing his PhD Philippine Studies at De La Salle University Manila.

Liezl Rillera-Astudillo is an HR Practitioner with over five years of experience and an accomplished educator in Behavioral Sciences and Social Science Statistics. She has served as an Assistant Professor at De La Salle University Manila and the University of the Philippines Baguio. Her academic career has enabled her to mentor various sectors, including the Department of Health, the Philippine National Police, the Armed Forces of the Philippines, and several educational institutions. She has authored numerous academic and commissioned research papers. In 2014, she was conferred the title of best consultant and adviser by the AFP Civil-Military Operations School for her outstanding contributions. During curricular restructuring, she helped establish a Senior High program in Baguio and served as its academic head. Currently, she is the Research and Development Director at De La Salle University Integrated School and is often invited as a resource person and training facilitator. She holds BS in Psychology (Cum Laude) and MS in Psychology (Magna Cum Laude) degrees from Saint Louis University and is completing her Doctorate in Psychology, specializing in Human Development. She is also a registered psychometrician and a licensed professional teacher.

Feorillo Petronilo A. Demeterio III is a Distinguished Full Professor of the Department of Filipino, College of Liberal Arts and the Executive Director of the Research and Grants Management Office at De La Salle University Manila. He is the author of the books Ang mga Ideolohiyang Politikal ng Catholic Bishops' Conference of the Philippines (2012), Ferdinand Blumentritt and the Philippines (2013), The Socio-Political Discourses of the Catholic Bishops' Conference of the Philippines (2018), and Ang Mindanao sa Hiraya ni Ferdinand Blumentritt (2022). He co-authored the books From Exceptionality to Exceptional: Inclusion of Differently Abled Persons in the Workplace (2014), and Cataloging and Baselining the Filipino-Spanish Churches of the Diocese of Maasin, on the Island of Leyte (2020). He is the author/co-author of over a hundred articles on hermeneutics, cultural studies, Philippines studies, and Filipino philosophy that are published in a number of local and international journals. He served as a visiting research professor at the Council for Research in Values

and Philosophy, Catholic University of America, Washington, D.C., in 2013, and at the Divinity School of Chung Chi College, Chinese University of Hong Kong, in 2021. In 2014, Dr. Demeterio was recognized as an outstanding alumnus in the field of philosophy by the Graduate School of the University of Santo Tomas. In 2022, he was given the Matthew Eichler Memorial Fellowship in Education by the Asia-Pacific Consortium of Researchers and Educators. He is a co-founder of the Andrew Gonzalez Philippine Citation Index.