

Examining the relationship between social-emotional learning and research competency among undergraduate students

Alvin Ryan A. Dizon, Florina Padilla-Santiago, Catherine G. Javier

Faculty of College of Arts and Sciences, Batangas State University “The National Engineering University” JPLPC Malvar, Batangas City, Philippines

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ABSTRACT

The impact of social-emotional learning (SEL) integration on psychological research instructional material enhancement (PRIME) scores of undergraduate psychology students was investigated in this study. A quantitative non-experimental correlational design was used with 362 students who were sampled by the total population sampling technique. The five domains of research competency and SEL integration were measured using two researcher-developed instruments. The data were collected using a face-to-face survey technique and analyzed using descriptive statistics and Pearson correlation analysis. Results showed that both research competency and integration of SEL were high. Strong relationships were seen between the different domains of the SEL and research competency ($r=0.734-0.891$, $p<0.05$). The results indicate that SEL integration in teaching materials has a positive effect on students' abilities in research. The study offers empirical evidence to support curriculum development, curriculum innovation, and policy efforts for integrating SEL into higher education research training.

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Corresponding Author:

Alvin Ryan A. Dizon

Faculty of College of Arts and Sciences, Batangas State University “The National Engineering University”

JPLPC Malvar, G. Leviste St. Poblacion, Malvar, Batangas, Philippines

Email: alvinryandizon@g.batstate-u.edu.ph

1. INTRODUCTION

A basic competency of research is expected of all undergraduates, especially those who are involved in critical inquiry and evidence-based practice. It involves the development of research problems, analysis of data and the effective communication of results obtained. The ability to develop such capabilities is critical in higher education for equipping students to conduct academic and/or professional research activities [1], [2]. Compared to its significance, however, students' research skills are still not developed well, perhaps the teaching and learning process is still insufficient so that students are not interested in learning [3].

In recent years, social-emotional learning (SEL) has gained attention as a major factor in student development and accomplishment. Self-awareness, self-management, social awareness, interpersonal skills, and responsible decision-making are the SEL competences [4], [5]. These skills help to enhance motivation, teamwork, and resilience, essential for complex learning activities [6]. SEL being integrated into classroom learning may therefore support students' capacity to cope with difficulties and challenges that come up during research work [7].

While research and SEL are known to be essential and important, there is a missing link between the two in undergraduate education. When teaching students basic research skills, most traditional research instruction is directed at the technical skills, without paying attention to what are called socio-emotional aspects that affect the experience of students in learning research [8]. This can lead to a lack of confidence, persistence, and collaborative skills in students that are essential for successful research engagement [9].

To compensate for this, this study proposes the psychological research instructional material enhancement (PRIME) that incorporates SEL into research teaching and learning. This is designed to amplify students' research skill competencies by incorporating social/emotional skill development in the learning process. The study specifically intends to investigate the connection between SEL integration and undergraduate students' research competencies and provide empirical data on the efficacy of SEL-based training.

The specific novelty of this study lies in its empirical bridge between technical research training and systematic social-emotional pedagogy at the undergraduate level, an area traditionally overlooked by technical-centric curriculums. While previous literature thoroughly details individual technical research methodologies or isolated social-emotional frameworks, this paper explicitly introduces and measures the unified integration of the PRIME model. By demonstrating how targeted socio-emotional domains structurally enhance student proficiency in complex academic milestones, this research fills a distinct gap in literature, shifting the pedagogy of higher education research from a strictly cognitive load problem into an integrated socio-emotional growth process.

2. METHOD

The study used a quantitative, non-experimental, correlational research design with cross sectional survey approach, to investigate the relationship between SEL in instructional material and research competence of undergraduate students in the study of psychology. Identifying relationships between variables was primary, though the design was not intended to establish direct causal effects [10]. It explicitly adopted post-positivist paradigm, operating under the principle that educational phenomena can be observed and measured through standardized statistical analysis to discover patterns and underlying relationships between structural variables [11]. The conceptual framework of the study was made into five domains: self-awareness, self-management, social awareness, relationship skills and responsible decision making. In parallel, student research competency was measured based on key academic dimensions, including design formulation, literature review and synthesis, development of theoretical framework, data analysis and interpretation, and academic writing proficiency [12], [13]. As illustrated in Figure 1, the PRIME serves as integrated structural conduit bridging these foundational socio-emotional domains directly with the key dimensions of student research execution. These critical dimensions together represent the core baseline skills deemed essential for empirical research execution within modern higher education systems.

These skills are deemed to be core skills for effective research in higher education. The study was carried out in a natural classroom setting, applying the PRIME to the regular curriculum. In order to not manipulate variables, the study did not test for how students' perceptions of SEL integration varied across conditions, but rather it looked at the variation in how students perceived SEL integration and associated levels of research competency, in line with the general approach of correlational research in educational research [14]–[16] used to examine relationships between socio-emotional and academic variables.

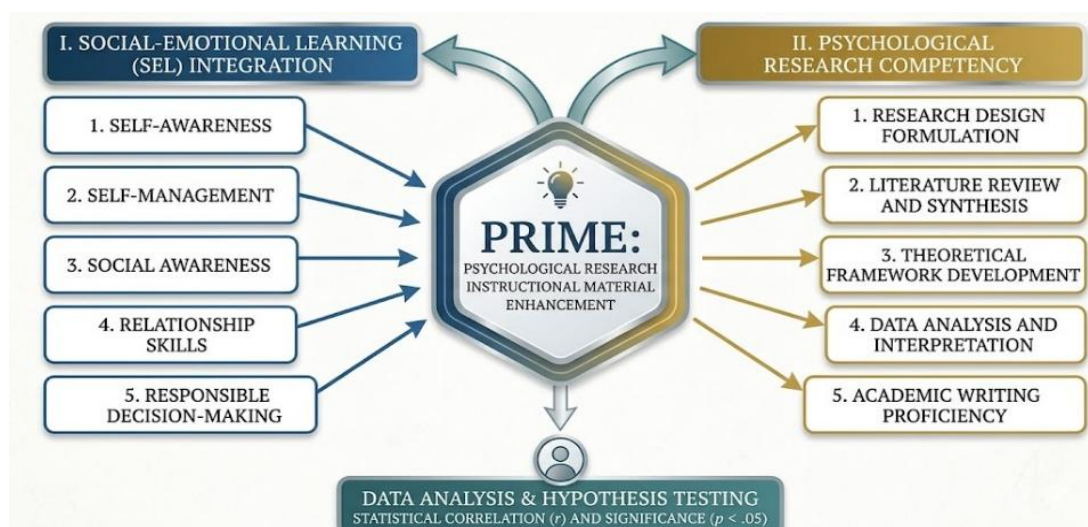


Figure 1. Conceptual framework: SEL integration and research competency

The subjects were 362 psychology undergraduate students from a state university in the Philippines who were taking a psychological research course. All students who were exposed to the PRIME instructional materials in the school term were studied and the total population sampling technique was employed. This method ensured full coverage of the sample and eliminated sampling bias, but it was not generalizable to other similar academic settings [17].

Data collection was achieved using two instruments, which were developed by the researchers. The first, 'research competency questionnaire (RCQ)' measured students' perception of research competency in five components: i) research design formulation; ii) literature review and synthesis; iii) development of the theoretical framework; iv) analysis and interpretation of data; and v) academic writing. The answers were rated on a 4-point Likert scale (not applied–1, highly applied–4 [12], [15]). The other instrument was the SEL integration questionnaire (SEL-IQ), which assessed the level of SEL integration into instruction based on the following frameworks [13], [18]. The SEL-IQ, similar to the RCQ, was on a 4-point Likert scale.

The instruments were content-validated by three experts in psychology, education and research methodology for ensuring academic rigor and item validity was assessed by using content validity index (CVI). A pilot test was then carried out to evaluate internal consistency reliability with the Cronbach's alpha. The reliability results indicated that the coefficient of the RCQ and SEL-IQ obtained were 0.91 and 0.93 respectively and both were greater than the acceptable coefficient of 0.70 [19]. Ethical clearance was obtained prior to the study, as far as the data collection method is concerned.

The informed consent was given by all the subjects, which included free choice, confidentiality and anonymity. The questionnaires were face-to-face in the class over a period of two weeks with respondents given 20–30 minutes to complete the questionnaires. Descriptive and inferential statistics were used for the analysis of data. The research competency and SEL integration levels were measured using descriptive measures: mean and composite mean. Assumptions of normality, linearity and homoscedasticity were tested and the common method biases were minimized by taking appropriate measures such as ensuring the anonymity of the respondents.

The Pearson product-moment correlation coefficient (r) was used to investigate the relationship between SEL integration and research competency [10]. This is a typical method that is used to determine the strength and direction of the association between quantitative variables in educational research [20]. Data collected was analyzed for strength of the correlations and level of statistical significance ($p < 0.05$). In non-experimental designs, correlation analysis provides information about the relationships, but does not provide the information for causation, and the results should be interpreted with caution [14]–[16]. Finally, the moral aspects of research were well respected and informed consent was given, with no consequences for students who opted in or out.

3. RESULTS AND DISCUSSION

3.1. Assessment of social-emotional learning integration

The scores for the respondents on the extent of integration of the SEL practices into teaching-learning process of the psychological research course based on PRIME are presented in Table 1. Results revealed that SEL was widely implemented in all five domains, as seen by the composite mean scores of 3.40 to 3.58. Responsible decision making ($M=3.58$) was the highest rated indicator followed by relationship skills ($M=3.56$), social awareness ($M=3.49$), self-management ($M=3.46$), and self-awareness ($M=3.40$).

The findings indicate that the learning atmosphere went beyond the mere transmission of research knowledge, and included opportunities for emotional management, moral reasoning and joint participation. Overall, students' ratings were high and uniform across all domains, suggesting that they felt SEL was part of the learning process. Higher education research has shown that SE skills are crucial for the student's engagement and motivation in the learning process, particularly in tasks that involve higher order thinking, such as research [21], [22]. The use of SEL in instruction can also help to establish a positive instructional climate that supports reflective learning, responsible learning, and building positive social relationships.

Table 1. Respondent's assessment in the practice of SEL in the teaching-learning process of psychological research

No.	Indicators	Composite mean	Verbal interpretation
1.	Self-awareness	3.40	Highly applied
2.	Self-management	3.46	Highly applied
3.	Social-awareness	3.49	Highly applied
4.	Relationship skills	3.56	Highly applied
5.	Responsible decision-making	3.58	Highly applied

Theoretically, the findings of this study are congruent with the SCT which has indicated that the self-efficacy of a learner and his/her motivation and persistence in learning complex tasks are correlated. Self-efficacy is likely to be fostered by activities that involve reflection, collaboration and will foster students' willingness to engage in research-related activities [23]. Furthermore, socio-emotional skills, such as self-awareness, and emotional regulation, aid students in handling the cognitive load associated with research, and in sustaining focus and effort in order to perform better.

In addition, SEL practice is also good for promoting the concepts of self-regulated learning (SRL) as a self-directed cognitive, emotional and motivational monitoring and control during learning. With materials that are designed to engage in reflective and inquiry-based learning activities, adaptive learning strategies for the complex research task can be developed, such as the materials used in PRIME [24], [25]. The results reflect the growing awareness that socio-emotional learning is a critical aspect of learning that needs to be integrated in effective research instruction to enable students to achieve better learning outcomes.

3.2. Assessment of research competency

The perceived research competency among the student respondents in psychological research course is shown in Table 2. The results show that the overall mean score 3.32 implies that the students' perception of research competence was found to be at a high level, indicating that students overall have a high level of research competence. The competencies that scored highest are paraphrasing literature (M=3.50); formulating specific, measurable, attainable, realistic, and time bound (SMART) research topics (M=3.49); and searching for relevant conceptual and research literature (M=3.47). The results from these findings reveal that students have the ability to conduct literature review and problem formulation in the process of research which is very important. Relatively low mean scores, on the other hand, were found in research design planning competencies (M=3.19) and theoretical framework (M=3.17), which suggest that instruction may be needed in these competencies.

Table 2. Respondent's assessed competency in psychological research based on their application of the topic outcomes

No.	Item statement “In terms of my competency in psychological research, I am able to...”	Mean	Verbal interpretation
1.	...paraphrase the sentences and paragraphs of the literatures used in the study.	3.50	Highly applied
2.	...determine if the proposed topic is SMART.	3.49	Highly applied
3.	...search for conceptual related and research literature that describes the variables.	3.47	Highly applied
4.	...exclude the factors and variables that will and would not be tried to achieve in the study like age, sex, socioeconomic status etc.	3.19	Applied
5.	...devise a plan on the best and correct research design to be used.	3.19	Applied
6.	...form a foundation using an existing theory that will serve as a map to arguments.	3.17	Applied
7.	...distinguish the different types and classification of Research and when they are used.	3.16	Applied
Composite mean		3.32	High competence

This pattern indicates that the use of the PRIME may have helped with the development of fundamental research abilities, but in order to do so, it is still important to reinforce the more sophisticated methodological skills. Research in higher education has shown that structured instructional content and competency-based pedagogies can significantly influence students' ability to acquire complicated abilities [26]–[28]. Instructional materials that make the connection between instruction and research outcomes can be used to build the skills and increase students' confidence in research.

Moreover, reflective learning activities that are incorporated in instructional materials could play a role in fostering metacognitive awareness of the learners. SRL theory states that students who self-regulate and manage their cognitive and motivational processes will be able to adapt better to academic challenges [29], [30]. Such instructional methods can be used to enhance learning strategies needed to research effectively in addition to the learning of technical research skills.

3.3. Relationship between research competency and social-emotional learning integration

The Pearson product-moment correlation analysis results for the research competency and the five domains of SEL integration are shown in Table 3. The results show that the correlation coefficients are all strong and very strong and significant ($p < 0.001$) positive values between the five variables. The findings suggest that the more SEL is integrated, the more research competency the respondents had.

Conventional interpretations of effect size define a coefficient > 0.70 as a good correlation, meaning that, for students, socio-emotional competencies have a significant impact on their performance of research-related tasks. Social awareness ($r = 0.891$) and self-management ($r = 0.881$) had the highest correlation with research competency, followed by relationship skills ($r = 0.862$) and self-awareness ($r = 0.858$) among the

domains. The association is moderately strong and significant for responsible decision making ($r=0.734$), it is slightly lower.

The results confirm that socio-emotional competencies serve as facilitator mechanisms that help students in their ability to handle cognitively complex learning tasks. According to the SRL theory, SRL learners who have high self-awareness and self-management tend to plan, monitor and modify their learning strategies in response to complex research tasks [31], [32]. This is crucial in research situations as they tend to be time consuming, problem solving, and independent.

The results are also in line with the social cognitive theory (SCT), which emphasizes how behavior, personal characteristics, and environmental cues interact dynamically to affect learning. A learning environment that fosters the growth of students' socio-emotional abilities and improves their engagement in research tasks may have been created by the PRIME instructional materials. The skills acquired, including emotional regulation, can decrease anxiety about academic research tasks, and relationship skills can support group-based academic tasks [33].

The results indicate good relationships, but care needs to be taken in interpreting the results. High correlation coefficients could be attributed to common method variance between the two instruments; both the research competency and integration of SEL were assessed via self-report instruments in the same instructional setting. The current findings are further supported by similar findings in the context of higher education, where a substantial association between academic achievement and social and emotional skills (SES) was discovered [34], [35].

The overall findings indicate that SEL principles are important to incorporate into instructional design. Educational programs can further use cognitive research skills and socio-emotional competencies to better equip students for research-based learning and for evidence-based decision making. The results confirm that the importance of SEL in improving academic performance and research capacity in higher education is a rapidly expanding body of literature.

Table 3. Relationship between research competency assessment and SEL Integration

No.	SEL parameters	r	p-value	Decision	Conclusion
1.	Self-awareness	0.858	0.000	Reject H_0	Significant
2.	Self-management	0.881	0.000	Reject H_0	Significant
3.	Social-awareness	0.891	0.000	Reject H_0	Significant
4.	Relationship skill	0.862	0.000	Reject H_0	Significant
5.	Responsible decision-making	0.734	0.000	Reject H_0	Significant

3.4. Theoretical contribution

The present study builds on SCT and SRL theory in showing that the SEL competencies are highly related to undergraduate research competency. Socio-emotional skills, like self-awareness, self-management, and relationship skills, may boost students' self-efficacy, motivation and persistence in completing complex learning tasks, consistent with SCT [9], [23]. Similarly, the results validate SRL theory positing that self-regulated learners who manage their cognitive, emotional, and motivational processes well can control problematic learning tasks, including research tasks [29], [30]. In addition, the SRL and SCT are conceptually integrated by the framework PRIME, which conceptualizes SEL as a prerequisite mechanism that supports development of the research competencies. As such, this study contributes to more comprehensive theoretical research on research education that asserts that both socio-emotional and cognitive processes play a role in the development of students' research skills.

4. CONCLUSION

This study aims to ascertain the connection between the integration of SEL in the improved instructional materials based on the PRIME and the psychological research competency of undergraduate students. The findings showed that the students have strong research abilities in a number of areas, including research design, literature synthesis, data analysis, data interpretation, and academic paper writing. In the meanwhile, there was a strong sense of integration in the domain of responsible decision-making abilities, and SEL practices were perceived as being well incorporated into instruction. The results also showed that all five SEL domains were highly correlated with research competency, meaning that SEL domains serve as enabling factors that facilitate the development of research skills and help increase motivation, collaboration, ethical reasoning, and perseverance in complex academic tasks.

The following are some important implications for educational practice and policy derived from these findings. Higher education institutions (HEIs) are encouraged to incorporate SEL into the research

teaching in a systematic manner by developing modules for SEL and implementing reflective activities and collaborative tasks. Also, faculty development programs should integrate SEL-informed pedagogy to create supportive and engaging learning environment for HEIs. The study has a few limitations, however, due to its non-experimental correlational design, exclusive reliance on self-reported data, and single institutional context, which naturally limit the immediate through a correlational approach, observed outcomes may be vulnerable to common variance stemming from students self-evaluating both variables simultaneously. To address these boundaries, future studies should utilize experimental and longitudinal designs involving multi-institutional and culturally varied settings to definitively isolate causal mechanisms and gain deeper understanding of the longitudinal role of socio-emotional competencies on long-term research development in the higher education.

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AUTHOR CONTRIBUTIONS STATEMENT

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Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Alvin Ryan A. Dizon	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Florina Padilla-Santiago		✓				✓		✓	✓	✓	✓	✓		
Catherine G. Javier	✓		✓	✓	✓			✓	✓				✓	

C : **C**onceptualization

M : **M**ethodology

So : **S**oftware

Va : **V**alidation

Fo : **F**ormal analysis

I : **I**nvestigation

R : **R**esources

D : **D**ata Curation

O : Writing - **O**riginal Draft

E : Writing - Review & **E**ditng

Vi : **V**isualization

Su : **S**upervision

P : **P**roject administration

Fu : **F**unding acquisition

CONFLICT OF INTEREST STATEMENT

The author states that no financial and personal conflicts of interest are known that might have manifested themselves in the described work in this paper.

INFORMED CONSENT

Each and every study participant provided informed permission. Participation was entirely voluntary, and participants were informed of the study's purpose, confidentiality, and their right to discontinue participation at any moment without facing consequences.

ETHICAL APPROVAL

The study was carried out using human subjects in accordance with the Declaration of Helsinki's ethical guidelines and institutional research policy. The National Engineering University, the appropriate academic body of Batangas State University, examined and approved the research methodology prior to data collection.

DATA AVAILABILITY

The authors may obtain the data supporting the findings of this study upon reasonable request. Due to concerns about the confidentiality and privacy of the student participants, the data cannot be made public.

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BIOGRAPHIES OF AUTHORS



Alvin Ryan A. Dizon    is a teacher, a psychologist, and an academic administrator at Batangas State University-The National Engineering University, JPLPC Malvar Campus, Malvar, Batangas, Philippines. He graduated with the Bachelor of Arts in Psychology degree in San Beda College Alabang, Master of Education major in Psychology in Batangas State University, and Doctor of Philosophy in Psychology at the Lyceum of the Philippines University-Batangas. He is licensed psychologist, professional teacher, psychometrician, civil service professional, and real estate broker. He is interested in conducting research in the areas of mental health literacy, employability skills, as well as higher education research competency. He can be contacted at email: alvinryandizon@g.batstate-u.edu.ph.



Florina Padilla-Santiago    is a college teacher and a practicing clinical psychologist. Aside from teaching, her administrative roles have been focused on job placement, guidance counseling, testing and admission, and human resource management. She graduated Bachelor of Science Psychology from New Era University, Master of Science in Psychology major in Clinical Psychology at De La Salle University, and Ph.D. in Psychology from Lyceum of the Philippines-Batangas. Her interests include research and community services focusing on mental health, policies, intervention programs, and development. She can be contacted at email: florina.santiago@g.batstate-u.edu.ph.



Catherine G. Javier    is a licensed psychologist, licensed psychometrician, and educator who currently serves as the Head of the External Affairs Office, Focal Person for Internationalization, and Psychology Instructor. She graduated cum laude with a Bachelor of Science in Psychology from Batangas State University–JPLPC Malvar and earned her Master of Science in Psychology at the Laguna College of Business and Arts, where she received the Best Thesis award. She is also a certified human resource associate and an active member of the Psychological Association of the Philippines. Ms. Javier is committed to advancing psychology, academic excellence, and international collaboration. She can be contacted at email: catherine.javier@g.batstate-u.edu.ph.