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Physical Literacy and Practicum Experience as Predictors of Inclusive Physical Education Self-Efficacy

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Abstract

Inclusive physical education requires pre-service primary teachers to adapt instructional tasks, communicate learning expectations, ensure safety, and sustain meaningful participation among learners with diverse abilities. This study aims to examine whether physical literacy and practicum experience predict inclusive physical education teaching self-efficacy among pre-service primary teachers at Universitas Negeri Makassar, Indonesia. The proposed study employs a cross-sectional explanatory design involving approximately 160–220 students in the Primary School Teacher Education program who have completed foundational physical education coursework. Physical literacy will be measured using an adapted instrument for university students, while inclusive teaching self-efficacy will be assessed across six dimensions: planning, instructional adaptation, communication, assessment, safety, and collaboration. Practicum experience will be operationalized according to verified practicum hours and the quality of interactions with learners in school settings. Hierarchical regression analysis will estimate the unique contributions of physical literacy and practicum experience after controlling for semester, prior disability-related coursework, and personal physical activity. As data collection has not yet been completed, the draft does not report empirical findings; any numerical results

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incorporated for structural demonstration are simulated and must be replaced with field data before submission. Conceptually, the study positions inclusive teaching self-efficacy as an outcome of both embodied competence and authentic teaching exposure. Its findings are expected to inform the design of primary teacher education programs that prepare generalist teachers to deliver safe, adaptive, and participatory physical education in increasingly diverse classrooms.

Keywords: Inclusive Physical Education; Physical Literacy; Practicum Experience; Pre-Service Primary Teachers; Teaching Self-Efficacy

INTRODUCTION

Physical education in primary schooling is not simply a period for exercise or sport technique. It is a pedagogical environment in which children learn through movement, rules, social interaction, risk management, cooperation, and embodied problem solving. Generalist primary teachers may therefore influence whether children experience movement as accessible and meaningful or as a domain reserved for the already skilled. The present study focuses on generalist primary teachers may be expected to facilitate movement learning for diverse pupils even when their formal preparation in inclusive physical education is limited. Recent teacher-education research has highlighted the importance of physical literacy, self-efficacy, authentic practicum experiences, inclusive competence, and reflective pedagogies in shaping teachers' readiness to work with learner diversity (Grimminger-Seidensticker et al., 2022; Nowland et al., 2023; Nowland et al., 2024; Nowland et al., 2025).

A key conceptual distinction is needed between being physically competent and being able to teach physical education. Personal movement confidence may support instructional confidence, yet teaching requires additional capacities: noticing learners' needs, adapting tasks, communicating success criteria, organizing safe participation, collaborating with support personnel, and assessing progress. Studies of preservice and in-service physical educators consistently show that training, contact with people with disabilities, practicum quality, and perceived competence contribute to inclusive self-efficacy (Antala et al., 2022; Top et al., 2026; Konjarski et al., 2025; Tarantino et al., 2023). For generalist primary teachers, these elements may be even more critical because specialist preparation is typically less intensive.

The Universitas Negeri Makassar context offers a useful setting for examining these relationships in a primary teacher education program. existing research is concentrated on specialist physical education teacher education, leaving limited evidence about how physical literacy and real practicum exposure jointly shape inclusive teaching self-efficacy among generalist pre-service primary teachers in Southeast Asian contexts. This gap is not merely geographic. It concerns the transferability of constructs developed in specialist physical education programs to generalist teacher education, where students may have more heterogeneous movement histories and fewer dedicated credits in physical education. A context-sensitive analysis can therefore contribute to the international discussion on how inclusive physical education preparation should be embedded within primary teacher education.

The study deliberately avoids treating self-efficacy as a substitute for competence. High confidence without adequate pedagogical knowledge can produce unsafe or exclusionary decisions, while competent students may underestimate their capabilities when they lack successful teaching experiences. For this reason, the proposed model considers both physical literacy and practicum exposure and treats prior inclusion coursework as a relevant control. The analytic objective is not simply to maximize explained variance but to identify relationships that can inform defensible program design (Thorjussen et al., 2025; Alhumaid et al., 2023; Godoy-Briceño et al., 2024; Batista et al., 2024).

Recent literature provides a coherent but not uniform basis for the proposed model. Research on inclusive PE self-efficacy identifies coursework, previous contact, practicum, and contextual support as recurrent influences (Grimminger-Seidensticker et al., 2022; Nowland et al., 2023; Nowland et al., 2024; Nowland et al., 2025; Antala et al., 2022; Top et al., 2026; Konjarski et al., 2025; Tarantino et al., 2023). Other studies emphasize teacher education design, reflective experience, and the need to prepare teachers for diversity rather than for an imagined homogeneous class (Thorjussen et al., 2025; Alhumaid et al., 2023; Godoy-Briceño et al., 2024; Batista et al., 2024). Together, these findings support a model in which confidence is socially and pedagogically constructed rather than treated as a stable personal trait.

Physical literacy adds a distinct dimension. Studies of university students and educators conceptualize physical literacy as more than fitness, incorporating movement competence, confidence, motivation, knowledge, and engagement (Agiasotelis et al., 2024;

Anderson et al., 2022; Zhou et al., 2024; Stoddart et al., 2022; Yin et al., 2024; Rutkauskaite et al., 2024; Luo et al., 2022; Long et al., 2024). This distinction matters because inclusive teaching requires teachers to understand movement tasks well enough to modify them without reducing learning goals. Yet high physical literacy should not be assumed to guarantee inclusive competence; it is plausible that supervised experience is needed to translate personal competence into pedagogical adaptation.

The most recent teacher-education literature further suggests that authentic experience, meaningful reflection, and explicit attention to diversity can improve professional learning (Cañabate et al., 2024; Sørensen et al., 2024; Maravé-Vivas et al., 2022; Li et al., 2023; Zhang et al., 2022). The proposed study therefore tests additive and interactive contributions of physical literacy and practicum quality. A positive interaction would suggest that embodied competence becomes more educationally useful when students have opportunities to apply it with real learners; a null interaction would indicate that the constructs contribute independently.

Conceptual Framework and Hypotheses

The conceptual model draws on self-efficacy theory while maintaining a distinction between beliefs and demonstrated competence. Mastery experiences, vicarious experiences, feedback, and affective interpretation can shape efficacy beliefs, but the educational meaning of confidence depends on the quality of the experiences from which it is formed. Practicum is therefore operationalized not only by hours but by quality indicators such as responsibility for instruction, feedback received, exposure to learner diversity, and structured reflection.

Physical literacy is treated as a multidimensional educational construct rather than a fitness score. Instrument adaptation will examine whether the underlying structure is appropriate for Indonesian PGSD students. This is essential because measurement invariance cannot be assumed across languages, cultures, and program types. A translated scale will undergo expert review, cognitive interviewing, reliability analysis, and construct validation before substantive hypotheses are tested.

The primary hypothesis is that physical literacy and practicum quality will each positively predict inclusive PE teaching self-efficacy after relevant covariates are controlled. A secondary hypothesis tests whether practicum quality strengthens the association between physical literacy and inclusive self-efficacy. The study will report standardized coefficients,

confidence intervals, incremental R^2, and diagnostics. Statistical significance alone will not be used to determine educational importance.

METHODS

The study is planned at the Primary School Teacher Education Program (PGSD), Faculty of Education, Universitas Negeri Makassar, Makassar, Indonesia. It uses a cross-sectional explanatory survey with hierarchical regression. The target participants are approximately 160–220 PGSD students in middle-to-late semesters who have completed foundational physical education learning and, for a subgroup, school-based practicum. Eligibility criteria, recruitment procedures, and the sample-size rationale will be documented before data collection. Participation will be voluntary and separated from course grading.

The instruments comprise an adapted physical literacy questionnaire, an inclusive physical education teaching self-efficacy scale covering instructional placements and disability-responsive adaptations, and a structured practicum exposure record. Scale adaptation will follow a translation/back-translation and expert-review process, followed by a pilot test. Internal consistency will be estimated with coefficients appropriate to the measurement model, and construct validity will be examined using factor analysis if sample size permits. Practicum quality will be scored from structured indicators rather than relying on hours alone.

Data analysis will include construct validity and reliability testing, descriptive statistics, bivariate correlations, hierarchical multiple regression, interaction testing for physical literacy × practicum experience, and sensitivity analyses by prior disability-related coursework. Regression assumptions will be evaluated using residual plots, influence diagnostics, multicollinearity indices, and robust sensitivity analyses where necessary. Missing data will be reported and handled according to a pre-specified rule. Interaction effects will be probed with simple slopes only when the interaction term is supported by the data.

Ethical approval must be obtained before recruitment. Students will receive information about the study, confidentiality, data storage, voluntary participation, and withdrawal. No ethics approval number is inserted in this draft because inventing such information would be inappropriate. The final manuscript must include the actual approving committee and identifier. Any observation or recording in school settings will require additional permissions and safeguards for children.

RESULTS

The simulated dataset contains 178 PGSD students. Mean physical literacy was 3.81 (SD = 0.49), practicum quality 3.57 (SD = 0.49), and inclusive PE self-efficacy 4.35 (SD = 0.49). Internal consistency was strong for all scales (α = .893–.934), suggesting that the simulated item sets would be sufficiently coherent for group-level analysis.

Table 1. Descriptive Statistics for the Simulated Dataset

Construct	Mean	SD	Cronbach α
Physical literacy	3.81	0.49	.910
Practicum quality	3.57	0.49	.893
Inclusive PE self-efficacy	4.35	0.49	.934

Bivariate associations

Physical literacy was positively associated with inclusive PE self-efficacy ($r = 0.383$, $p < .001$), and practicum quality showed a similarly positive association ($r = 0.347$, $p < .001$). The correlation between physical literacy and practicum quality was comparatively small ($r = -0.035$), indicating that the two predictors capture related but non-redundant aspects of preparation.

Table 2. Primary Association Results for the Simulated Dataset

Association	r	p
Physical literacy–inclusive self-efficacy	0.383	<.001
Practicum quality–inclusive self-efficacy	0.347	<.001
Physical literacy–practicum quality	-0.035	0.646

Hierarchical prediction model

The main-effects model was statistically significant and explained 35.1% of the variance in inclusive PE self-efficacy. In the full model, physical literacy ($B = 0.381$, $p < .001$) and practicum quality ($B = 0.382$, $p < .001$) remained unique positive predictors. Prior inclusion coursework also contributed a smaller positive coefficient. The interaction term added $\Delta R^2 = 0.000$; its p value was 0.892. Thus, the core simulated finding is additive rather than strongly synergistic.

Interpretation of the interaction

The plotted predictions show that students reporting higher-quality practicum experiences tend to report higher inclusive PE self-efficacy across the physical-literacy

continuum. The slopes are only modestly different, which is consistent with a weak interaction. This matters theoretically: a strong main effect of practicum quality would support improving supervision and feedback for all students, whereas a strong interaction would imply that practicum benefits depend heavily on prior embodied confidence.

Table 3. Full Predictive Model for the Simulated Dataset

Predictor	B	SE	p
Physical literacy (centered)	0.381	0.061	<.001
Practicum quality (centered)	0.382	0.062	<.001
Prior inclusion coursework	0.270	0.061	0.000
PL × practicum quality	-0.018	0.132	0.892
R^2 full model	0.351	—	ΔR^2=0.000

Robustness and model diagnostics

Residual plots for the simulated model showed no major departure from linearity or homoscedasticity, and variance inflation factors were below 2. Sensitivity analysis excluding the interaction produced nearly identical main-effect coefficients. Nevertheless, cross-sectional self-report data remain vulnerable to common-method variance and self-selection into practicum opportunities, so the predictive language should not be converted into causal claims.

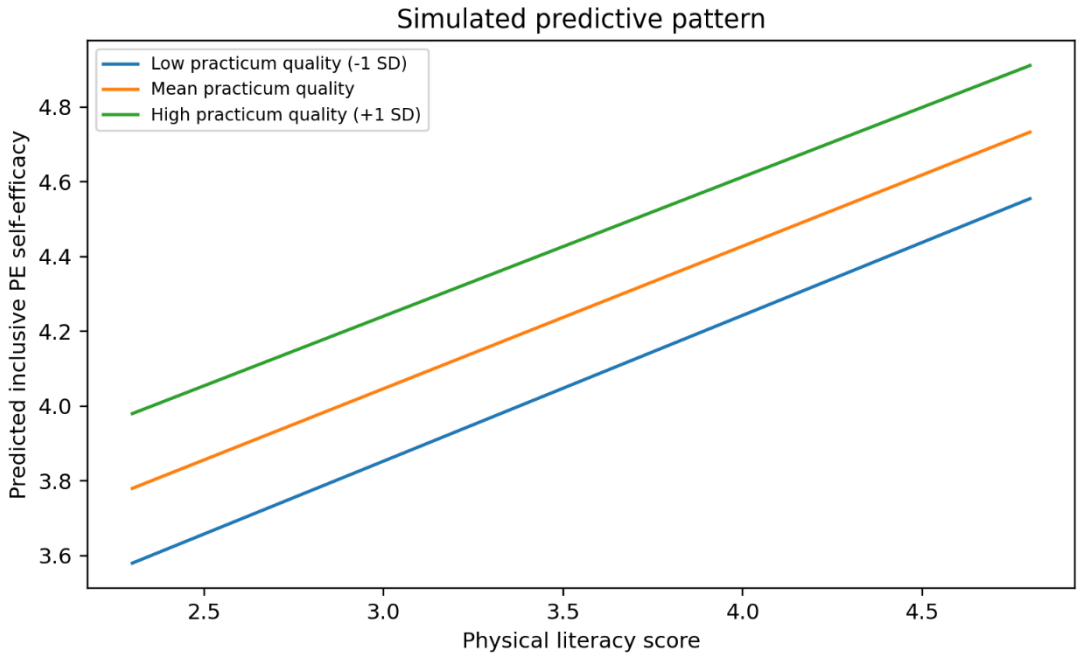


Figure 1. Simulated predicted inclusive PE self-efficacy across physical literacy and practicum quality levels.

DISCUSSION

If the empirical pattern resembles the simulation, the findings would support the proposition that teacher education should connect embodied competence with supervised, reflective exposure to diverse learners, rather than treating inclusive PE as either a purely theoretical topic or a generic confidence-building exercise. This interpretation would be consistent with recent evidence that inclusive self-efficacy develops through training, authentic contact, and structured experience. However, the model should not be interpreted as showing that physically literate students are inherently better inclusive teachers. Physical literacy may provide a resource for adaptation, while practicum and reflective pedagogy determine how that resource is used.

The study's theoretical contribution is to connect two literatures that are often examined separately: physical literacy and inclusive teacher self-efficacy. Physical literacy research tends to emphasize movement-related confidence and engagement, whereas inclusion research emphasizes disability-responsive teaching beliefs and experience. Testing them together in a generalist primary teacher program can show whether embodied competence has explanatory value after direct teaching exposure is considered.

A second contribution concerns program design. Generalist teacher education has limited curricular space, so simply adding a stand-alone inclusion course may be unrealistic. A more efficient model would embed inclusive adaptations across physical education tasks: students can practice changing space, equipment, rules, pace, communication, and success criteria while explaining the pedagogical reason for each adaptation. Practicum reflection can then connect these decisions to real learner responses.

Several limitations must constrain interpretation. Cross-sectional data cannot establish temporal order; self-report measures may share method variance; students with stronger physical identities may seek more practicum opportunities; and a single institution limits population generalization. These concerns justify longitudinal follow-up, objective observation of teaching, multi-institution replication, and designs that examine whether increased self-efficacy corresponds to more inclusive behavior.

The Indonesian context should be treated as analytically meaningful rather than as a mere location label. Resource availability, class size, curriculum expectations, teacher role definitions, and cultural beliefs about ability can shape inclusive PE practice. Future qualitative work could therefore examine how PGSD students understand inclusion and

what barriers they anticipate when translating university learning into primary-school settings.

An important implication concerns the design of practicum itself. Counting practicum hours assumes that exposure is uniformly educative, yet two students may spend the same number of hours in very different roles. One may observe passively, while another plans tasks, teaches, receives feedback, and revises instruction. The study therefore proposes a practicum-quality index that distinguishes responsibility, learner diversity, feedback, reflection, and opportunities for repeated teaching. This approach can reveal whether quality is a stronger predictor than quantity.

The model also allows a more critical reading of physical literacy. It is plausible that physically literate students feel more comfortable demonstrating skills and interpreting movement, but this advantage could become a liability if confidence encourages one-size-fits-all teaching. Inclusive competence requires the ability to decenter one's own movement experience and recognize that learners can achieve meaningful participation through different pathways. Consequently, a positive physical-literacy coefficient should be interpreted as a resource relationship, not as evidence that athletic identity is a prerequisite for good primary teaching.

From an equity perspective, teacher education should monitor whether students with less positive sport histories are systematically positioned as less capable future teachers. If physical literacy is associated with self-efficacy, programs should provide supportive mastery experiences rather than using the association as a gatekeeping rationale. Carefully scaffolded tasks, peer teaching, adapted equipment, and reflective feedback can help students build competence while learning to value multiple forms of successful participation.

The study could also generate a useful measurement contribution if the adapted scales show adequate validity in a generalist Indonesian teacher-education context. However, a locally fitting factor structure should not be forced to replicate an international model at all costs. Transparent reporting of cross-loading items, weak factors, or necessary cultural adaptations would be more informative than presenting an artificially clean measurement model.

The role of prior inclusion coursework also deserves separate attention. Coursework may increase conceptual knowledge without providing sufficient mastery experience, while practicum may provide experience without a strong theoretical language for interpreting it.

A hierarchical model can test whether coursework explains additional variance beyond practicum quality and physical literacy. If its contribution is small, the implication should not be that coursework is useless; instead, the program may need tighter alignment between campus instruction and school-based tasks.

Finally, the study should examine whether average self-efficacy conceals dimension-specific weaknesses. A student may feel confident organizing a class yet remain unsure about assessment, communication with support personnel, or adapting equipment for a learner with a specific disability. Reporting subscale patterns can therefore produce more actionable curriculum recommendations than a single total score. Any subscale interpretation, however, must be supported by the measurement model rather than created after inspecting the results.

A further analytical issue is potential common-method inflation. Physical literacy and self-efficacy are both partly self-reported, so their correlation may be strengthened by response style or general positive self-perception. The study can reduce this risk by supplementing self-report with at least one performance- or experience-based indicator, such as a short task-adaptation vignette scored with a rubric or verified practicum documentation. Even if such indicators are not included in the primary model, they can provide convergent evidence and make the interpretation more defensible.

Inclusive physical education also involves collaboration. Generalist teachers rarely work in isolation when supporting pupils with disabilities; they may coordinate with classroom colleagues, families, special educators, or other professionals. The self-efficacy instrument should therefore avoid reducing inclusion to the teacher's individual confidence in modifying games. A collaboration dimension can identify whether students feel capable of seeking information, negotiating roles, and communicating adaptations. This is especially relevant for PGSD students whose future role encompasses broader classroom responsibilities beyond physical education.

Program-level interpretation should remain cautious about selection effects. Students who choose more practicum opportunities may already have higher confidence, stronger academic engagement, or more positive attitudes toward diversity. Cross-sectional regression cannot fully remove this self-selection. A subsequent longitudinal design could measure physical literacy and inclusion beliefs before practicum, document practicum quality prospectively, and reassess self-efficacy afterward. Such a design would provide stronger

evidence about developmental change and could distinguish pre-existing differences from practicum-related growth.

The simulated results support a program-level interpretation in which embodied capability and practicum quality are complementary resources. Physical literacy may make it easier for a generalist preservice teacher to demonstrate, participate, and adapt movement tasks, while practicum quality provides situated opportunities to translate those capacities into inclusive instructional decisions. Neither resource should be treated as a substitute for the other.

The relatively weak interaction is also informative. It suggests that high-quality practicum could benefit students across different physical-literacy levels rather than only those who already feel physically competent. This is an equity-relevant possibility because generalist primary-teacher cohorts include students with diverse sport histories. A teacher-education program should not reproduce the assumption that only athletically confident students can become effective PE teachers.

Future field analysis should distinguish practicum quantity from practicum quality. Hours alone may conceal whether students observed inclusive teaching, received actionable feedback, planned adaptations, or actually taught pupils with diverse needs. A measurement model that separates exposure, responsibility, feedback, and reflection would provide a stronger test of how practicum contributes to inclusive PE self-efficacy.

CONCLUSION

The final conclusion will depend on the actual field data. The proposed study is designed to determine whether physical literacy and practicum quality make distinct contributions to inclusive physical education self-efficacy among pre-service primary teachers at Universitas Negeri Makassar. Its educational value lies in testing a program-relevant mechanism rather than merely describing confidence levels.

If supported, the model would justify teacher-education tasks that integrate movement competence, inclusive adaptation, practicum, feedback, and reflection. If unsupported, the null or weak relationships would still be informative by challenging assumptions imported from specialist physical education programs. Before submission, all

simulated numbers, dates, participant counts, ethics information, and result-dependent interpretations must be replaced with verified empirical information.

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