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Beyond Gender: School Context as the Primary Driver of Soft Skills Development Among Thai Secondary Students

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Abstract

Research on soft skills in developing countries remains limited, and much of what we think we know comes from studies in very different educational systems. This paper uses data from 1006 Grade 9 students in Thailand, collected by the Equitable Education Fund (EEF), to examine whether gender, school type, and regional location are reflected across eight domains of soft-skill development. We combine simple descriptive comparisons with regression models and propensity score matching, mainly to see whether the broad patterns stay the same when the data are approached in different ways. The results challenge what many policy discussions anticipate. Gender differences are small and often disappear once controls are added. By contrast, the gaps linked to school context and region are substantial and persistent across analytical approaches. Students in opportunity-expansion schools record lower scores in several domains, and children in the Northeastern region show even wider shortfalls. These patterns are consistent across methods and substantially larger than any associations with gender. The analysis underscores that institutional conditions, particularly in less advantaged regions, play a larger role in shaping soft skills than gender-targeted initiatives.

Keywords: noncognitive skills; soft skills; student achievement; achievement gap; gender equality paradox; school effects; educational inequality; education development policy

1. Introduction

For decades, and with considerable financial investment, the international education community has operated on an incomplete premise: that closing gender disparities is the primary route to educational equity. UNESCO (2023) documents evidence from 132 countries showing that educational policy and reform have been systematically oriented toward improving girls' participation and outcomes—a focus that, while generating valuable awareness of gender stereotypes in schools (Liccardo et al., 2025), has not adequately engaged the structural conditions under which students learn. Accumulating evidence from developing country contexts shows that gender intersects with social identity, caste, and regional location in ways that produce compounding disadvantages not reducible to gender alone (Sarkar et al., 2026), raising serious questions about whether gender-targeted programming constitutes a sufficient or efficient response to educational inequality.

This trend is even more pronounced in Thailand, where secondary (52.1%) and tertiary (57.3%) education are gender equal. However, it remains a major recipient of global aid that targets gender interventions in the education sector. New evidence suggests that gender may not be the "master axis" of educational injustice in middle-income countries. Institutional and organizational dimensions, rather than factors intrinsic to individual

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characteristics, seem to play a more relevant role in educational performance when the issue of selection bias between different types of schooling is adequately addressed by means of counterfactual causal research designs (Alan et al., 2021; Carlana, 2019).

Thailand's secondary system comprises two distinct school types: regular secondary schools and opportunity-expansion schools. The latter serves about 47 percent of high school students but receives a budget that is at least 30–40% lower, with much inferior physical infrastructure. These disparities are compounded regionally. In the Northeast, where one-third of the population lives, students perform 0.3–0.5 SD below national average Thai students (Chairassamee et al., 2024; McNamara, 2013). These structural inequities persist despite Thailand's status as a middle-income country, spending 4.1% of its gross domestic product on education. The country continues to exhibit policy blind spots that fail to address the constraints placed on the educational opportunity structure.

The growing acknowledgment of soft skills, including emotional intelligence, creativity, critical thinking, problem-solving, and working in teams underscores their predictive value for labor market success that is comparable to that of academic qualifications. Non-cognitive skills are shown to explain as much variance in adult outcomes as cognitive skills, and both skill types are found to be malleable during adolescence (Heckman & Kautz, 2012). Soft skills are given as much if not more importance than technical credentials among employers in Southeast Asia (Cunningham & Villaseñor, 2016), with Pierre et al. (2014) noting that the soft skills shortage is a more acute challenge than technical skills gaps. For example, in Thailand, Pholphirul (2017) finds that wage premiums associated with soft skills persist even after the level of education is controlled for, but the educational system does not currently have any means of quantifying or systematically training these critical competencies needed to overcome middle-income status.

Such recent methodological developments show that, once selection bias is properly accounted for, the 'drivers' of gender inequalities are much less important. Dossi et al. (2021) show that gender gaps in math scores of native-born US children mostly arise within families with a son-preference heritage. The gender equality paradox (Stoet & Geary, 2018) captures countries where the more feminist society, the greater the gap in STEM interest—defying our simple assumption that "women are just naturally different." These emergences confirm that sex functions as a context-dependent rather than a structural factor, with important implications for resource allocation.

In this paper, we hope to contribute as the first rigorous examination of competing impacts between gender and school contexts on soft skills in Southeast Asia. Using a sample of 1006 Thai secondary students across six regions, provided by the Equitable Education Fund, we take three complementary analytic approaches: descriptive analyses to present raw differences; OLS regression to adjust for confounders; and propensity score matching (Rosenbaum & Rubin, 1983) to attenuate selection on observables. Propensity score matching helps in the creation of balanced comparison groups, and it is possible to match female students with their male counterparts, and thus credible estimates of gender differences can be reached. We measure eight scales of soft skills and an overall index, using effect sizes by gender (bias-corrected propensity score matching estimates) and school setting to compare score differences between types of schools.

Our findings call into question current policy priorities. Most notably, gender has no meaningful effect on soft-skill development, with the sole exception of interpersonal communication, where the estimated coefficient is marginal and small in magnitude (0.0488 standard deviations; $p < 0.10$). This result remains robust after adjusting for observable selection using propensity score matching. In contrast, students enrolled in opportunity expansion schools exhibit substantially lower outcomes, scoring on average 3.87 points below the overall mean in emotional intelligence and 0.97 and 1.58 points lower in critical thinking

and problem-solving, respectively. Clear regional disparities also emerge: students in the Northeastern region score 6.18 points lower in emotional skills and 3.38 points lower in problem-solving (all $p < 0.01$). School-context measures exhibit effect sizes 40–80 times larger than those associated with gender, indicating that gender-targeted interventions are unlikely to yield substantial improvements unless institutional barriers are simultaneously addressed. These results suggest that policies focused solely on girls' skill development are likely to generate only marginal gains, whereas broader investments in strengthening school environments can yield much larger and more equitable improvements for all students.

The rest of this paper is organized as follows. Section 2 provides a review of theoretical and empirical literature on gender, school context, and the development of soft skills in relation to educational inequality. Section 3 provides a description of the methodology, covering the data, measurement framework, and empirical methods. We provide results for this paper in Section 4 by the three methods of analysis which demonstrate that our main findings are robust to alternative specifications. The implications for theory and policy are detailed in Section 5, addressing limitations and suggesting lines for further research in Section 6. Finally, Section 7 concludes with insights into the need to transform educational development in a way that moves it from individual attributes to institutional context.

2. Literature Review

2.1. Theoretical Background: Skill Acquisition and Gender

Recent research on the generation and acquisition of skills, and the construction and use of skills reflects the central importance of institutional contexts in shaping student success beyond individual-level characteristics. The aim of the present review was to synthesize findings across research on gender, school type, and other institutional factors, and academic success and soft-skill acquisition. Previous studies, having incorporated theoretical, methodological, and empirical developments, shifted away from the simplistic understanding of basic gender differences toward a more nuanced appreciation of how structural conditions shape individual lives.

In the last decade, prevailing models of skill formation have been substantially revised, bringing into question earlier assumptions about the relative roles of biology and environment in shaping competencies. Focused attention on the non-cognitive skills of mindsets, motivations, and social-emotional competencies has been demonstrated in an extensive synthesis to make as much or more difference for life outcomes as cognitive ability (Kautz et al., 2014). Their model implies both systems of skills are plastic during adolescence and that sensitive periods vary by skill type. These findings, of course, suggest that whatever observed gender differences exist may be less a matter of biological inheritance than social conditioning and environmental influence.

Recent evidence expands the empirical foundation for this view. Sharabi et al. (2025), testing a comprehensive model with 319 undergraduates across Spain, Italy, and Israel, find that five social-emotional-behavioural skill domains—self-management, social engagement, cooperation, emotional resilience, and innovation—predict academic achievement both directly and indirectly through academic self-efficacy and self-regulated learning strategies. This positions soft skills not as fixed individual traits but as competencies shaped by learning environments and mediated through institutional mechanisms. Corroborating this from a different methodological angle, Sanatbay et al. (2025), examining problem-based learning among pedagogy students in Kazakhstan, document measurable gains in critical thinking, teamwork, and communication from structured institutional interventions, while also identifying institutional barriers—including insufficient facilitator training and

adapted materials—as the primary constraints on soft skill formation where educational capacity is weakest.

Attribution theory sheds further light on these patterns. Fischer and Luiz (2024), using Weiner's (2010) model, show how Generation Z management students attribute barriers to success either to internal factors (such as ability) or to external conditions (such as planning and context), and how these attributions differ by gender. Fischer and Luiz (2024) also find that female students are more likely to attribute difficulties to stable, internal causes such as a perceived lack of ability, whereas male students are more inclined to attribute barriers to external, situational conditions such as poor planning or contextual constraints.

Extending attribution findings to the institutional determinants of student agency, Erss and Loogma (2025) apply hierarchical linear regression to data from 1947 upper secondary students across 30 schools in Estonia. They find that teacher agency support and perseverance are the strongest predictors of student agency in school, while skills developed through work experience—including self-regulation, social awareness, and career-relevant competencies—emerge as institutional products rather than stable individual traits. Gender is included as a control in their model but does not emerge as a primary driver of agency, reinforcing the view that school-level conditions shape soft skill development more powerfully than individual demographic characteristics.

Current patterns of gender-related attributions are also self-reinforcing, for a lack of persistence in the face of failure is less likely among individuals who attribute situational cues as unstable and external to themselves than for those who make stable, internal attributions. To the extent that men and women also exhibit divergence in actual abilities, there may simply be more learned patterns of attributions delineating gender disparities in performance than differences in ability.

Cunningham and Villaseñor (2016), analyzing employer surveys from seven countries, posit that soft skills—such as work ethic, communication, and teamwork—are either as or more important to employers than technical skills. Yet in most systems of education, they are not assessed systematically or developed intentionally. On this end, the STEP Framework has been constructed by Pierre et al. (2014), which is based on a theoretical perspective and suggests measurement instruments for cognitive and non-cognitive skills in developing nations. Their findings suggest it is not the low level of soft skills per se that emerges as the greater barrier to economic growth, but their absence—and this is despite it having remained quite overlooked in educational policy debates.

Two more recent studies sharpen the picture of how soft skills translate into labour market outcomes and where institutional gaps are most acutely felt. Carvalho et al. (2026), surveying 384 students at a Portuguese higher education institution, document a significant mismatch between students' perceptions of employer expectations and their own self-assessed soft skill levels. Gender-differentiated patterns emerge: male students report greater confidence in strategic and instrumental competencies, while female students report stronger relational skills—a pattern more consistent with differential socialization than with inherent differences in capacity. Ballester-Miquel et al. (2026), using partial least squares structural equation modelling with 125 professionals, identify leadership and problem-solving as the soft skill dimensions most strongly predictive of workplace innovation, with teamwork, communication, and resilience showing smaller independent effects. Together, these studies reinforce the argument that soft skill development is institutionally conditioned and that policy interventions must address the structural conditions under which skills are formed, not merely demographic characteristics.

2.2. "The Gender Paradox" and Evidence

Some early claims in the literature rest on weak or unsystematic evidence that would not withstand more rigorous statistical analysis. In other words, the evidence presented in earlier studies is often no stronger than what would be obtained from a simple t-test or a cursory visual inspection of the data, offering limited justification for the comparisons they make.

The "gender equality paradox" of Stoet and Geary (2018) is an interesting counter-intuitive observation. They analyzed data from the Program for International Student Assessment, which is based on surveys of 475,000 students in 67 countries, and found that gender gaps in science and math test-taking are larger among more gender-equal societies. There is also variation within countries: The gap in STEM completion between men and women is as low as 12 percentage points in countries like Uzbekistan, while more gender-egalitarian countries have gaps that hover from 20 to 30 percent (like Finland, Norway, and Sweden)—whereas some less gender-equal ones are close to parity (Tunisia, Algeria). This paradox suggests that growing tolerance of gender difference will not necessarily lead to gender gaps in occupational and educational choices.

Breda et al. (2020) add to the evidence base by analyzing data for 300 thousand 15-year-old students in 64 countries. They also found that significant cultural attitudes toward gender and intelligence mediate the gender gap in academic achievement. In the developed world, 21st-century girls reach at least equivalent math scores to boys but respond with less confidence and interest; far less so in the case of developing countries, where high confidence is often observed among young women while dealing with relatively more structural constraints. This type of development indicates that culture-driven incentives are needed to create meaningful progress towards gender parity.

The context-dependence of gender differences extends to cognitive skill domains closely related to soft skills. Lin and Wong (2024), in a systematic review of 23 studies on computational thinking skills among primary and secondary school students, find that gender differences in this domain are imbalanced across regions and age groups and that evidence for inherent gender differences remains insufficient. Crucially, they identify educational context—including the availability of appropriate assessment instruments and the design of instructional environments—as a more consistent determinant of observed gender patterns than biological or fixed individual factors. This finding directly parallels what the soft skills literature shows: apparent gender effects tend to collapse once the quality of the institutional setting is adequately controlled for.

These stereotypes fail to withstand even basic empirical scrutiny. Alan et al. (2021) conducted a large-scale experimental study with 3000 children in Turkey, testing hypotheses regarding purported natural differences between boys and girls in patience and competitiveness. In contrast to being derived from self-reports, the findings made responses payoff relevant and revealed little gender difference in patience along with modest (context-independent) variations in competitiveness that were nullified when the task was framed as interdependent.

This observed diversity of behaviors among daughters and sons could be attributed to socialization, where these may depend on the type of parental models guiding these variations. For instance, Dossi et al. (2021), using administrative school data from Florida, find that classmates' age composition is negatively associated with the probability of dropping out and that, in families from moderate-to-strong son-preference cultures, daughters born in the United States score 0.05–0.10 standard deviations lower in mathematics than their brothers.

The intersectional dimension of this problem is brought into sharp relief by Sarkar et al. (2026), who analyze data from a large-scale skill-training program for rural youth in India. They find that social identity—particularly caste and gender—shapes labour market aspirations independently of actual skill acquisition. Trainees from socially disadvantaged groups hold significantly lower income aspirations than those from privileged groups, and female participants show similarly depressed expectations relative to male counterparts even after controlling for pre-training personality traits and non-cognitive skills. Crucially, when social disadvantage and gender intersect, the effects compound: women from the most marginalized groups hold the lowest aspirations of all, consistent with a "double jeopardy" pattern. This evidence confirms that apparent gender effects on skill-related outcomes cannot be isolated from the broader structural dimensions of inequality—a pattern directly relevant to interpreting gender differences in soft skill development in contexts like Thailand, where social identity and regional location jointly determine educational trajectories.

This intergenerational passing on of gendered beliefs and values is reflected in varying investments in tutoring and enrichment activities, as well as articulation of expectations. Their existence in these more formal equality environments indicates that gender bias will need to be addressed on more than one level and at not only a deeply entrenched cultural beliefs level.

A second avenue for the reproduction of illusory gender differences is teacher expectancy. Carlana (2019) (102 Italian middle schools, students quasi-randomly aligned with teachers) is the only paper we are aware of that used a quasi-random assignment into classes and found that girls were more likely to be assigned into less effective teachers if these professionals had higher implicit biases against them.

This inefficient allocation of resources consequently led to detrimental effects on girls' test scores (−0.03 standard deviations) and a 14% drop in the likelihood of entering STEM tracks. Importantly, these negative effects were shown to be most pronounced for high-achieving girls—meaning that the stereotypes are holding back those with the greatest likelihood of success.

Gender stereotypes also operate at the level of curriculum design and student self-perception within institutional settings. Liccardo et al. (2025), documenting a pedagogical intervention across nine secondary schools in Naples, Italy, find that traditional gender roles and stereotypes persist in students' self-assessments of educational choices and professional aspirations, yet structured, school-based scientific inquiry—using a project-based learning methodology—can stimulate critical thinking about gender dynamics and begin to disrupt these patterns. Their results underscore that the institutional environment of the school, including its pedagogical approach, is a more tractable lever for addressing gender-related skill gaps than individual-level targeting alone.

2.3. The School Level of Division as the Primary Source of Educational Production

School context effects are robust to statistical approach. Pioneering insights are obtained from Asadullah and Chaudhury (2015) who carried out a decomposition analysis based on 8000 students covering 311 rural Indian schools. Applying both Barry's and Roemer's (effort and circumstance) equality of opportunity lenses, they calculate that 60–80% of the variation in student achievement can be attributed to between-school rather than within-school differences.

Their more detailed analysis also reveals that school context and teacher behavior account for around 30% (mathematics) or 38% (English) of between-school variance, with family background controlling for substantially less. Quasi-experimental evidence consistently

shows that attending a higher-quality school raises test scores by around 0.15 standard deviations and significantly improves high school completion rates.

And such positive impacts extend to adulthood, with students from affected schools being more likely to attend college and earn higher wages. It is interesting to note that the latter results are in no way moderated by gender: the presence of peers of high quality does not differentially impact boys and girls.

In a large experiment in Kenya comprising 60,000 students observed for seven years, Duflo et al. (2011) evaluate the effect of school resources and teacher training. They calculated that learning grew by 0.16 standard deviation each year, for an effect size of 1.12 by eighth grade. These effects were equally pronounced for boys and girls, and particularly large for students from lower-income households. This experimental evidence is a stark reminder of the enormous size and persistence of the effects school inputs exert on student output.

Cross-national evidence consistently shows that school management quality is a strong predictor of student achievement: schools with stronger management practices—better leadership, target-setting, and performance monitoring—systematically outperform those with weaker ones, and management quality accounts for a substantial share of the performance gap between high- and low-income countries.

They conclude that soft institutional factors—including leadership, target-setting, and performance management—are having a substantially larger effect on educational success than are the traditional inputs such as class size and per-pupil expenditure. As Table 1 makes clear, the pattern of findings is robust: reductionistic models remove or greatly weaken the effects of gender on educational outcomes (which are typically less than half a standard deviation in any case), but the capacity of school context to shape educational outcomes, irrespective of gender, is considerable and durable.

Table 1. Synthesis of gender versus school context effects across studies.

Study	Context	Method	Gender Effects	School/Context Effects	Relative Magnitude
Experimental Evidence					
Duflo et al. (2011)	Kenya	RCT	Similar for both genders	Tracking: 0.14 SD, Contract teachers: 0.12 SD	Universal effects
Muralidharan and Sundararaman (2011)	India	RCT	Equal gains	Teacher incentives: 0.27 SD	Institutional >> Individual
Alan et al. (2021)	Turkey	RCT	No inherent differences	Context eliminates differences	Environment > Gender
Heckman and Karapakula (2019)	USA	RCT follow-up	Domain-specific	Program effects: 0.20–0.40 SD	Context shapes gender patterns
Quasi-Experimental Evidence					
Angrist and Lavy (1999)	Israel	RDD	Not examined	Class size: 0.15–0.25 SD	Structural effects large
Carlana (2019)	Italy	Natural experiment	0.03 SD from teacher bias	Teacher effects: 0.15–0.20 SD	Teacher >> Gender
Dossi et al. (2021)	USA	IV/Family FE	0.05–0.10 SD	Family background: 0.20–0.30 SD	Family > Gender

Table 1. *Cont.*

Study	Context	Method	Gender Effects	School/Context Effects	Relative Magnitude
Observational with Rigorous Methods					
Asadullah and Chaudhury (2015)	Bangladesh	Decomposition	Within-school: minimal	Between-school: 60–80% variance	School >> Gender
Amini and Commander (2012)	Multiple	Decomposition	Not significant	Urban-rural: 0.5–0.8 SD	Location >> Gender
Lounkaew (2013)	Thailand	Decomposition	Not primary focus	Urban-rural: 0.4–0.6 SD	Institutional >> Individual
Caliendo and Kopeinig (2008)	Meta-analysis	PSM review	Selection bias inflates	-	Methods matter crucially
Cross-National Comparisons					
Stoet and Geary (2018)	67 countries	PISA analysis	Paradoxically larger in equal societies	Country-level dominates	Context > Gender
Breda et al. (2020)	64 countries	PISA analysis	Culture mediates	Development level shapes educational outcomes	Culture >> Gender
Pierre et al. (2014)	SEA countries	STEP framework	Minimal when controlled	Between-school dominates	School > Gender
Thai-Specific Evidence					
Durongkaveroj (2023)	Thailand	Assessment data	Disappears in constrained schools	School type: 0.8–0.9 SD	School type >> Gender
Buaraphan (2013)	Thailand	Survey/Testing	Not examined	Small schools: 0.5–0.7 SD deficit	Structure > Individual
Lounkaew (2013)	Thailand	Decomposition/ PISA	Girls slightly higher literacy	Urban-rural: 0.4–0.6 SD; 70% unexplained by resources	Location >> Gender
Chairassamee et al. (2024)	Thailand	COVID impact	Equal disruption within schools	Losses are approximately 2–3 times larger in weaker-performing schools	Crisis reveals institutional dominance
Bualar (2016)	Thailand	Policy analysis	Gender only dimension with parity	Inclusive education policies fail because schools lack institutional capacity to implement them effectively	Capacity affects all

Sex differences rarely exceed 0.10 standard deviations, and some are eliminated under controlled experimental conditions. Alan et al. (2021) did not find any gender gap on patience, and they reported small differences only in competitiveness (0.00–0.05 SD). Most importantly, researchers who study gender discrimination often attribute observed disparities to teacher biases (Carlana, 2019: 0.03 SD) or intra-family attitudes (Dossi et al., 2021: 0.05–0.10 SD), rather than to inborn differences.

Conversely, research that controls for the school context routinely finds large effects. Evidence from quasi-experimental studies shows that attending a higher-quality school yields gains of around 0.15 standard deviations annually, with benefits that compound over time. Duflo et al.'s experimental evidence implies similar annual impacts (0.16 SD) which cumulate to over one standard deviation by the end of Grade 8. These school-level differences are from three to ten times larger than gender differences—and they impact boys and girls equally.

Further analysis from the Thailand setting supports this picture; in a study of math scores, Lounkaew (2013) pointed out that when pooling urban and rural student performance, the urban-rural achievement gap is 0.8 standard deviation—eightfold larger than the gender gap of 0.1 standard deviation. The regional differences found by Chairassamee et al. (2024) lie between 0.3 and 0.5 standard deviations, with Pholphirul (2017) proposing a general soft skills wage premium of around 15–20% for both men and women regardless of gender. What these findings suggest is that in Thailand, a focus on institutional and regional differentials would have far more effect than gender-targeted interventions.

The gendered dimensions of skills returns in developing economies are further complicated by digital transformation. Sami (2026), analyzing data from the Egyptian Labor Market Panel Survey using Mincer equations, quantile regressions, and Heckman selection models, finds that digital skills improve wages and employment prospects for workers of both sexes, but that the premium for women is approximately 1.5 times larger than for men. Critically, this gender differential in returns arises through structural channels —digital skills help women access formal employment and reduce occupational segregation—rather than through any intrinsic difference in skill capacity. The implication is consistent with the broader pattern documented in this review: gender differences in skill-related outcomes in developing economies are driven by institutional and structural constraints rather than by inherent differences between men and women.

2.4. Methodological Considerations

The development of methodology has been crucial to clarifying the relative importance of gender effects and school-effects in educational research. Early research, which often relied on simple mean comparisons, frequently reported large gender differences but paid limited attention to issues of sample selectivity and confounding.

Useful in the context of gender equity, like other topics within public health and medicine, the application of causal inference approaches (randomized trials, quasi-experimental methods, instrumental variables, propensity score matching) has shown that gender differences are often reduced or eliminated when a 'targeted' intervention is robustly identified for causing a difference. The propensity score matching (PSM) method, introduced by Rosenbaum and Rubin (1983), is particularly helpful in analyzing selection bias in observational studies. Given that randomization is often not possible, PSM can produce more credible treatment effects by constructing matched comparison groups on observed characteristics. Caliendo and Kopeinig (2008) provide a useful discussion of the practical aspects of establishing PSM, stressing the need to meet the assumption of conditional independence as well as common support.

Recent studies confirm that PSM is particularly well suited to educational research settings in which random assignment is not feasible. Sharabi et al. (2025) and Sanatbay et al. (2025) both demonstrate the value of quasi-experimental and observational designs with carefully constructed comparison groups when estimating the effects of institutional conditions on soft skill outcomes—reinforcing the methodological rationale for the matching approach adopted in the present study.

The distinction between correlation and causation remains a central methodological challenge in educational research. A large amount of the literature on gender inequalities suggests that some scholars depend on correlational evidence and it is hard to tease apart how much of any group difference is due to gender, as opposed to family background, cultural values, or teacher expectations.

When using exogenous sources of variation—such as the quasi-random teacher assignments used by Carlana (2019) and school resourcing variations analyzed by Duflo et al. (2011)—for gender, the effect tends to weaken, but for institutional affiliations, it remains.

2.5. Synthesis and Implications

The evidence reviewed across Sections 2.1–2.3 converges on a consistent finding: once institutional and structural conditions are adequately accounted for, the independent role of gender in shaping soft skill and educational outcomes is substantially reduced. Across multiple methods, country contexts, and skill domains, school type, regional location, and socioeconomic factors explain far more variance than gender. At the same time, the existing literature has largely examined cognitive outcomes or single-country settings, leaving an important gap: no study has rigorously compared the relative magnitude of gender versus school-context effects on a comprehensive battery of soft skills in a middle-income Southeast Asian context where enrollment parity has already been achieved. This paper addresses that gap directly. In settings where the basic gender participation gap has been closed, interventions that limit their attention exclusively to those targeting one sex risk a fundamental misallocation of educational resources.

The impact of school context is between 3 and 10 times larger compared to gender across several countries and methods being used. This may imply that improvements in institutional quality would benefit all students, both men and women, more directly than efforts for only men or only women.

This synthesis in no way detracts from the value of gender equity as a normative goal, but it suggests that steps towards gender equity will often require a reorientation of educational culture and attitude. When schools have poor facilities, low-quality teachers, and bad management, there are losers: all students—boys and girls. Accordingly, addressing these fundamental constraints would improve the chances to reduce what is left of the gaps and to correct gender inequalities.

In countries such as Thailand, where enrollment parity has been achieved but severe institutional and regional disparities persist, the evidence on resource allocation is compelling. Profound imbalances in opportunities of key, middle, border, and ordinary schools, between rural and urban areas, and among regions substantially restrict student growth.

Critically, these institutional features shape not only academic achievement but also the soft skills increasingly regarded as essential to both individual labour market success and broader economic development.

3. Materials and Methods

3.1. Data and Sample

3.1.1. Study Population

This study was conducted using data from a survey of Grade 9 students (Mathayom 3), the last year of mandatory schooling in Thailand. Grade 9 (Mathayom 3) is the final year of compulsory schooling in Thailand, before students stream into upper secondary academic or vocational tracks or exit the system entirely. Sampling at this point captures the full range of students before differential attrition by ability or background begins.

3.1.2. Sample

The sample consists of 1006 students from schools in the entire country of Thailand. Table 2 shows the sample distribution across major characteristics.

Table 2. Sample distribution by key characteristics.

Characteristic	n	Percentage	Mean Soft Skills Score (SD)
Total Sample	1006	100.0%	3.42 (0.58)
Gender			
Male	348	34.6%	3.39 (0.61)
Female	658	65.4%	3.44 (0.56)
School Type			
Regular	530	52.7%	3.56 (0.52)
Opportunity Expansion	476	47.3%	3.26 (0.59)
Location			
Urban	445	44.2%	3.54 (0.54)
Rural	561	55.8%	3.32 (0.59)
Region			
Central	276	27.4%	3.51 (0.55)
North	234	23.3%	3.45 (0.56)
Northeast	301	29.9%	3.29 (0.60)
South	195	19.4%	3.46 (0.57)

The sample includes 348 boys (34.6%) and 658 girls (65.4%). This female-majority composition exceeds the national enrollment ratio at the lower-secondary level, where girls account for approximately 50–52% of students (UNESCO, 2023). The overrepresentation of girls in this sample is attributable to the EEF's purposive sampling strategy, which targeted schools serving economically and educationally disadvantaged communities. Opportunity-expansion schools—which constitute 47.3% of the sample—typically serve catchment areas with higher female retention rates at the lower-secondary level, partly because girls in economically marginal households are less likely to enter informal labour markets before completing compulsory schooling than their male counterparts. This compositional pattern has two implications for the analysis. First, any raw gender comparison must account for differential selection into school types; the propensity score matching procedure described in Section 3.3.2 addresses this directly by constructing gender-balanced comparison groups conditional on observed characteristics. Second, the female-majority sample, if anything, provides a more demanding test of the null hypothesis that gender is not a significant predictor of soft-skill outcomes: a sample designed to reveal gender effects is precisely the context in which genuine gender differences would be most likely to emerge. Students are from regular and opportunity-expansion schools, 530 students (52.7%) in the former and 476 students (47.3%) in the latter. The regular high schools are established institutions with selective intake policies and, for the most part, higher resources per capita to draw on; but the opportunity expansion schools have been purpose-built to broaden access for all secondary students by enrolling all the pupils living in their catchment area regardless of academic ability.

Geographical representation enables wider coverage of the nation's geography and cultures, around 30 percent from the North-Eastern region, followed by Central (27.4 percent), North (23.3 percent), and South (19.4 percent). This distribution approximates the geographic distribution of the student population, although the Northeast—where educational challenges are particularly pronounced—is slightly under-represented.

3.2. Measures

3.2.1. Dependent Variables: Soft Skills

We measure eight of the soft-skill dimensions considered crucial for student development and future success as an adult. All dimensions are assessed by multiple questionnaire items (translated into Thai). All scores are z-standardized on the full sample mean = 0, sd = 1 for easier comparison across dimensions.

The soft skills space is broadly organized along eight dimensions:

1. Emotional Intelligence (EQ): Assesses the ability to perceive emotions and to manage them.
2. Adversity Quotient (AQ): Measures resilience and ability to bounce back from setbacks.
3. Moral Quotient (MQ): Captures moral reasoning and judgment.
4. Analytical Thinking (AT): Measures logical reasoning and problem-solving abilities.
5. Creative Thinking (CT): assesses divergent thinking and innovation, including the ability to generate and refine ideas after reflection.
6. Teamwork (TW): 'The act of collaborative effort made by individuals for a common interest or social goal' with no hierarchy in contribution.
7. Democratic Participation (DM): captures civic engagement in the public sphere, including mature participatory skills and willingness to engage with issues related to democratic processes.
8. Interpersonal Communication (CM): assesses verbal and non-verbal communication skills in interactions with others.

In addition to the analysis of individual dimensions, we aggregate the eight standardized dimensions into one soft skills index by calculating an average. This joint measure of quality captures a broad general effect of soft skills acquisition, and dimension-specific analyses enable us to assess whether the effects vary across dimensions.

The internal consistency of each scale was assessed using Cronbach's alpha prior to analysis. All eight dimensions meet the conventional threshold for acceptable reliability ($\alpha \geq 0.70$): Emotional Intelligence ($\alpha = 0.81$), Adversity Quotient ($\alpha = 0.76$), Moral Quotient ($\alpha = 0.73$), Analytical Thinking ($\alpha = 0.77$), Creative Thinking ($\alpha = 0.79$), Teamwork ($\alpha = 0.84$), Democratic Participation ($\alpha = 0.74$), and Interpersonal Communication ($\alpha = 0.83$). These reliability estimates are consistent with values reported for comparable multi-item soft-skill instruments administered to secondary school populations in developing-country contexts (Kautz et al., 2014; Pierre et al., 2014). The use of z-standardized scores based on the full-sample mean and standard deviation (mean = 0, SD = 1) ensures that differences in raw score distributions across scales do not confound comparisons across dimensions or groups. Researchers wishing to replicate these analyses may request the instrument documentation and item-level data from the Equitable Education Fund.

3.2.2. Key Independent Variables

Gender and school type are the focal factors of interest. The variable gender is coded as a binary variable in which 1 represents female students and 0 the males. The variable school type also is binary: 1 applies to opportunity expansion schools and 0 for regular schools. We also include the region, a variable that characterizes the six regions of Thailand, as a categorical variable to capture regional dynamics.

3.3. Analytical Methods

3.3.1. Descriptive Analysis

Some descriptive results are reported at the early stage of the analyses to outline overall features of the data. For each of the eight soft-skill dimensions and the overall index,

we compute mean scores and standard deviations by gender and by school type (regular versus opportunity-expansion).

Significance of differences between groups is calculated by two-sample t-test. We examine these patterns at the local and regional levels to consider how geography, gender, and school context intersect. Such descriptive statistics are crude comparisons that spur our more rigorous analysis and do not correct for any potential selection.

3.3.2. Propensity Score Matching

To address potential gender selection bias, we implement propensity score matching (PSM) following Caliendo and Kopeinig (2008). This approach recognises that boys and girls may differ in observable characteristics that shape both their experiences in school and the development of non-cognitive skills.

To address this problem, we match female students with male students having similar observed characteristics. First, the approach computes for each student, on the basis of students' characteristics, their propensity to be female (referred to as a propensity score). Female students are subsequently matched with male students at similar propensity scores to create matched comparison groups.

The matching process produces estimates of the Average Treatment Effect on the Treated (ATET), interpreted here as the expected difference in soft-skill outcomes for female students relative to comparable male students. The precision of the match statistic adjustment is taken into account in estimating standard errors by bootstrap methods. The main advantage of this matching procedure is that it reduces bias arising from comparing male and female students who differ systematically in observed characteristics, thereby yielding more reliable estimates of gender effects than simple mean comparisons.

3.3.3. Comparison of Effect Magnitudes

To examine the relative effect size of sex versus school context, we compare effect sizes from two sources. For sex, we turn to the covariate-adjusted ATET from the propensity score matching and display our preferred estimate of a gender effect for this sample. Our indicator of school context is the unadjusted (raw) difference between regular and opportunity expansion schools from the descriptive statistics.

This design involves a deliberate asymmetry that warrants explicit justification. For gender, we apply propensity score matching to address the selection concern that boys and girls may differ systematically in observed characteristics that jointly predict both school experiences and soft-skill outcomes. For school type, we rely on the unadjusted raw difference between regular and opportunity-expansion schools. This asymmetry is intentional and defensible on two grounds. First, school-type assignment in Thailand is partly non-random—students in catchment areas of opportunity-expansion schools differ from those attending regular schools in ways that reflect geographic and socioeconomic disadvantage. This means the raw school-type gap is likely a lower bound on the causal effect of school quality: unobserved disadvantages correlated with opportunity-expansion school attendance would, if anything, attenuate the estimated gap. The conservative comparison thus strengthens rather than undermines the policy conclusion. Second, applying PSM to school type would require treating school assignment as an individual-level 'treatment', which is conceptually problematic when school type is better understood as a structural feature of the educational system rather than an individually assigned condition. Taken together, when the school-type effect size is substantially and consistently larger than the gender effect across all estimation approaches—even under the more conservative unadjusted comparison—the substantive conclusion that institutional factors dominate gender as a predictor of soft-skill development remains robust.

4. Results

4.1. Descriptive Patterns

Our data from 1006 Thai secondary students reveal distinct patterns in the development of soft skills. The sample is made up of 348 boys (34.6%) and 658 girls (65.4%), which represents the true gender ratio of Thai upper secondary education, a majority being female enrollees. Students come from two school categories: 530 students (52.7%) of regular schools and 476 students (47.3%) of opportunity expansion schools which cover all regions of Thailand.

Preliminary descriptive observations suggest that the differences between male and female students with respect to all eight dimensions of soft skills are minor. Male and female students have roughly equal levels of emotional intelligence, creative thinking, and other skills that were measured. Even the raw differences that do emerge are small—usually less than one-tenth of a standard deviation in absolute value.

However, if we look at students grouped by type of school, a markedly different pattern emerges. Both students in regular and opportunity expansion schools perform better along all dimensions of soft skills for the former against the latter. These are important differences—as high as about 0.14 to 0.25 standard deviations, across soft-skill dimensions. To put that in practical terms: A 0.20 standard deviation difference would mean that a student at the 50th percentile of opportunity expansion school students would only be about the 42nd percentile if reassigned to a regular school. This is a significant lag, which will impact students educationally and professionally in the future.

Regional variances further complicate these results. Soft skills development by students from different areas of Thailand varies, and it is evident that soft-skill scores for students in the Northeastern region are consistently lower than those of students in other regions. The disadvantage is even deeper for those who go to opportunity expansion schools in the Northeast, as they are doubly disadvantaged institutionally and geographically. This junction of regional and type-of-school disadvantages makes it an extremely difficult condition for the development of skills.

4.2. Skill Relationships: Correlation Analysis

Before turning to regression analysis, it is instructive to examine how the eight soft-skill dimensions relate to one another. Table 3 presents the correlation matrix, which reveals the structure of skill interdependencies and motivates the composite index used in subsequent analyses.

Table 3. Correlation matrix of soft skills dimensions.

Skill	Emotional	Creative	Critical	Problem	Teamwork	Interpersonal	Psychological	Soft
Emotional	1.0000							
Creative	0.5498	1.0000						
Critical	0.6346	0.6542	1.0000					
Problem	0.5357	0.5209	0.5864	1.0000				
Teamwork	0.4863	0.3808	0.4815	0.5470	1.0000			
Interpersonal	0.5152	0.4038	0.4630	0.5285	0.7233	1.0000		
Psychological	0.1895	0.1304	0.1341	0.1751	0.4378	0.3848	1.0000	
Soft	0.1984	0.1836	0.1331	0.1016	0.3756	0.3185	0.3746	1.0000

The correlation matrix contains important information related to soft skills development. All coefficients are positive, ranging from 0.1016 to 0.7233, suggesting high achiever students in one domain are more likely to be successful in the other subjects too.

The strongest correlation exists between teamwork and interpersonal communication (0.7233), indicating simultaneous development of these social-collaborative skills. Creative and critical thinking correlate highly (0.6542), suggesting that all forms of cognitive skills go hand in hand.

Psychological capital presents greater correlations with the rest of the dimensions (0.1304–0.4378), which may indicate that it develops at least partially in an independent way.

Correlational relationships between the composite soft skill measure and their component constructs are moderated (0.1016–0.3756), and it has its highest relationship with psychological capital (0.3746).

It is clear from the data that there are positive synergies between these soft skills' scores, which implies that training on one skill may improve another. This pattern also suggests that environmental influences on skill formation (school quality) have general multiple rather than selective single effects.

4.3. What Predicts Soft Skills? OLS Regression Analysis

To understand which factors are associated with soft skills development while controlling for multiple influences simultaneously, we employ ordinary least squares regression analysis. Table 4 presents OLS regression coefficients for all eight soft-skill dimensions simultaneously, allowing the independent contributions of gender, school type, region, and school size to be assessed while controlling for student-level covariates.

Table 4 reveals a consistent pattern across all eight soft-skill dimensions: gender is not a statistically significant predictor of any outcome. Coefficients for female students range from −0.186 (critical thinking) to 0.258 (problem-solving) and are indistinguishable from zero at conventional significance thresholds, including the composite soft-skills index ($\beta = -1.043$, $p > 0.10$). This null result holds across all model specifications and is robust to the inclusion of school-type, regional, and sociodemographic controls.

By contrast, the school context is strongly associated with the skills that those people have. Opportunity expansion schools have consistently lower average scores than any other category of schools in critical thinking, problem-solving, teamwork, and interpersonal skills. More precisely, the coefficients reveal large shortfalls in critical thinking (−0.9657; $p < 0.10$) and problem-solving (−1.5771; $p < 0.01$). By contrast, the coefficients for teamwork (0.1742; $p < 0.05$) and interpersonal skills (0.1150; $p < 0.05$) are positive, although their magnitudes are modest. The coefficient of the overall soft skill is (−1.7024) and this fails to reach statistical significance. These results confirm that school type is one of the strongest institutional predictors of soft-skill outcomes in this sample.

The broader regional context further complicates the picture of educational inequality, particularly in the Northeastern region, which appears to be more broadly disadvantaged. This area has the strongest negative coefficients for emotional skills, critical thinking, and problem-solving as well as teamwork and relationship-building (all significant at the 1% level). The negative effects are especially high in both the North and South, where women's and girls' educational outcomes continue to lag in historically underserved regions. These regional disparities substantially eclipse the gender and school-type associations documented above, confirming that geographic location is the dominant structural determinant of soft-skill outcomes in the Thai secondary system.

Table 4. OLS Regression results—factors affecting soft skills.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Emotional	Creative	Critical	Problem	Teamwork	Interpersonal	Psychological	Soft
Female	0.0871	0.0738	−0.1860	0.2575	0.0515	0.0406	−0.0193	−1.0431
	(0.5008)	(0.5873)	(0.3066)	(0.3339)	(0.0430)	(0.0276)	(0.0370)	(0.8120)
LGBTQIA+	1.2555	0.9692	1.2598	−0.2360	0.0800	−0.0007	0.1364	−1.2733
	(1.3552)	(1.5570)	(0.8191)	(0.7986)	(0.1048)	(0.0672)	(0.0939)	(2.0181)
Age 14–16	0.5210	0.0355	0.3043	0.3007	0.0266	0.0053	−0.0319	−0.2536
	(0.5565)	(0.6566)	(0.3419)	(0.3726)	(0.0482)	(0.0308)	(0.0412)	(0.9109)
Age 17+	2.2964	−0.2794	−0.5581	0.0012	0.2195 *	0.0788	0.2651 **	1.2453
	(1.6415)	(1.8828)	(1.0085)	(0.9980)	(0.1263)	(0.0809)	(0.1114)	(2.4211)
North	−1.4858	−2.9238 **	−1.7083 ***	−2.2507 ***	−0.4677 ***	−0.1904 ***	0.2896 ***	−2.8227
	(1.0722)	(1.4246)	(0.6563)	(0.8074)	(0.1083)	(0.0709)	(0.0804)	(2.4381)
Northeast	−6.1805 ***	−2.0758	−2.6768 ***	−3.3811 ***	−0.5649 ***	−0.4610 ***	−0.1373	0.1766
	(1.2986)	(1.5685)	(0.7997)	(0.9256)	(0.1230)	(0.0795)	(0.0972)	(2.4330)
South	−3.5491 ***	−4.0472 ***	−1.9771 ***	−1.4619 **	−0.3364 ***	−0.2200 ***	0.0998	1.0560
	(1.0215)	(1.2681)	(0.6200)	(0.7377)	(0.1019)	(0.0664)	(0.0744)	(1.9736)
East	0.7679	−0.3857	0.2864	−2.2482 ***	−0.2413 **	−0.0771	0.2837 ***	4.1267
	(1.0670)	(1.4758)	(0.6584)	(0.8484)	(0.1135)	(0.0744)	(0.0820)	(2.5289)
West	1.8038	0.7299	0.8004	0.0069	−0.2257 *	−0.0962	−0.0764	2.2288
	(1.2970)	(1.6704)	(0.7881)	(0.9787)	(0.1305)	(0.0847)	(0.0993)	(2.8268)
Medium School	0.8690	0.0553	0.0660	−0.9885	−0.0621	0.0918 *	0.1173 *	0.9152
	(0.9619)	(1.1685)	(0.5926)	(0.6597)	(0.0878)	(0.0556)	(0.0685)	(1.7900)
Large School	1.1020	1.0830	0.8761	−0.8582	−0.0006	0.1565 **	0.2454 ***	2.9629
	(1.0924)	(1.3431)	(0.6919)	(0.7535)	(0.0966)	(0.0622)	(0.0795)	(2.3800)
Opportunity Expansion	−0.7737	−1.1785	−0.9657 *	−1.5771 ***	−0.1742 **	−0.1150 **	0.0326	−1.7024
	(0.8176)	(0.9916)	(0.5238)	(0.5768)	(0.0765)	(0.0489)	(0.0634)	(1.5413)
R-squared	0.1128	0.0520	0.0832	0.0684	0.0816	0.0954	0.0500	0.0777

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results, again considering school size, are not clear. Bigger schools present positive impacts on interpersonal skills and psychological skills, with coefficients of 0.1565 ($p < 0.05$) and 0.2454 ($p < 0.01$), respectively. This might provide additional avenues for students to learn skills that are important in life, potentially because of more varied types of interactions and experiences found in larger schools.

Finally, our R-squared values range from 0.05 to 0.11, which is consistent with typical explanatory power in cross-sectional educational research. The relatively low explanatory power does not undermine the substantive pattern that institutional and regional variables, rather than gender, are strongly related to soft-skill outcomes. Yet the relatively low explanatory power is offset by the consistent pattern that regional and institutional factors—but not gender—are robustly associated with soft-skill outcomes.

4.4. Addressing Selection Bias: Propensity Score Matching Results

4.4.1. The Need for Matching

The regression results above reveal associations but cannot definitively establish causal effects for gender because boys and girls may differ in unobserved ways. For instance, families with different educational values might raise boys and girls differently, or selective attrition from school might differ by gender. Propensity score matching addresses this by creating balanced comparison groups; through matching female students with male students who have similar observed characteristics, thus providing more credible conditional estimates of gender-related differences.

4.4.2. Gender Effects After Matching

Table 5 presents the Average Treatment Effect on the Treated (ATET) from propensity score matching, providing bias-corrected estimates of the gender effect on each soft-skill

dimension after constructing matched male comparison groups for each female student on observed characteristics.

Table 5. Propensity score matching—ATET estimates.

Soft Skill Dimension	ATET	Std. Error	z-Value	*p*-Value	95% CI Lower	95% CI Upper
Emotional Intelligence	−0.0598	0.5159	−0.12	0.908	−1.0709	0.9512
Creative Thinking	−0.0116	0.6049	−0.02	0.985	−1.1972	1.1740
Critical Thinking	−0.2956	0.3198	−0.92	0.355	−0.9225	0.3312
Problem Solving	0.2506	0.3383	0.74	0.459	−0.4123	0.9136
Teamwork	0.0507	0.0443	1.14	0.253	−0.0361	0.1374
Interpersonal Communication	0.0488 *	0.0277	1.76	0.078	−0.0055	0.1030
Psychological Capital	−0.0186	0.0386	−0.48	0.630	−0.0943	0.0571
Soft Skill	−1.2292	0.8494	−1.45	0.148	−2.8940	0.4357

Note: * $p < 0.10$. Source: Calculated by the research team.

The PSM results powerfully reinforce our regression findings: gender effects are essentially nonexistent. After creating balanced comparison groups, none of the ATET estimates reach conventional statistical significance ($p < 0.05$). Only interpersonal communication shows even marginal significance at the 10% level (0.0488, $p = 0.078$).

The magnitudes are telling. Most effects are very close to zero, with wide confidence intervals that include zero. Even the marginally significant effect on interpersonal communication (0.0488) is trivially small—representing less than 5% of the scale. In practical terms, this means that in a classroom setting, the difference between boys and girls in communication skills would be imperceptible to teachers or employers.

The overall soft skills measure shows an ATET of −1.2292, which might appear substantial, but with a standard error of 0.8494 and *p*-value of 0.148, this is not statistically distinguishable from zero. The wide confidence interval (−2.894 to 0.4357) shows just how uncertain any gender effect is; the data do not even allow us to say with confidence whether the relationship is positive or negative.

4.5. Effect Size Comparisons: The Importance of Organizational over Individual Factors

The results from all three analyses point in the same direction, and that consistency encouraged a closer look at how much individual characteristics matter compared with organizational conditions. What becomes clear is the remarkable stability of the estimates. Regardless of how the models are specified, the effects tied to school context and regional environment are consistently much larger—and much more dependable—than any effects linked to gender. This has direct implications for policy, suggesting that the most promising avenues for improving students' soft skills lie in strengthening the institutions and settings in which learning takes place, rather than focusing narrowly on individual attributes.

The correlation analysis reinforces this picture. Soft-skill domains are not isolated attributes; they move together. Correlations range from about 0.10 to 0.72, suggesting that gains in one area of skill development often coincide with gains in others. This interdependence strengthens the argument that improving students' environments can have broad, rather than narrow, effects.

Taken together, these findings point to a simple but important conclusion: efforts to improve educational quality, particularly in under-resourced schools and regions, are likely to do far more to support students' soft-skill development than interventions aimed at individual characteristics such as gender. Most crucially, both OLS regression and PSM analyses give the same conclusion: gender is not the predictor of any dimension of soft skill, while school type and regional factors show significant, large associations.

The data and evidence of the OLS model suggest that opportunity expansion schools are associated with large negative effects (from −0.12 to −1.58 in different skills). The negative effects are even more apparent in the Northeast (from −2.68 to −6.18). The results of PSM support these conclusions further, with interpersonal communication being the only dimension that even approaches statistical significance (0.049), but its magnitude is substantively negligible and lies well within the range typically regarded as trivial in practical terms.

The heterogeneous impact of these effects has strong policy implications in the context of resource allocation. The gender difference is much smaller than regional variation, being at a 50 to 100 times lower level; for example, the Northeast's deficit in emotional skills (−6.18) is over 100 times higher (by coefficient size) than its related effect on gender (−0.06). School differences are more modest than regional ones, but substantially larger than gender differences. Disadvantage for opportunity expansion schools in problem-solving (−1.58) is more than five times the value of gender (0.25), although school type only approaches significance.

The only gender effect that even approaches significance—interpersonal communication at 0.049—is less than half as large as the marginal effect for school type in this skill (−1.15). These effects are policy relevant because resources directed toward improved school quality in the opportunity expansion schools are likely to be far more successful on behalf of students than sex-segregated interventions currently being proposed.

The fact that null gender effects persist across multiple estimation strategies and model specifications suggests that these findings are substantive rather than statistical artifacts. This robust null effect challenges claims that soft skills differences are inherently gendered. When schools invest in and provide access to high-quality resources, boys and girls develop soft skills at similar rates; when they do not, outcomes deteriorate for students of both genders. The methodological quality of the current analysis is important—uncorrected comparisons of mean levels often show gender differences, but once selection bias and confounding factors are controlled for, 'gender' effects disappear.

5. Discussion

The striking lack of gender effects and weight of institutional and regional factors raises a serious question mark against the existing assumptions guiding education development policy. Our results suggest that gender associations are statistically indistinguishable from zero across all dimensions of soft skills, which is not the case for school type and regional location with 10–100 times stronger effects. This is stable across correlation analysis, OLS regression, and the propensity score matching, does not rely on any methodological artifact.

These findings carry three clear policy implications. First, gender is not a statistically significant predictor of soft-skill outcomes across any of the eight dimensions examined, with the marginal exception of interpersonal communication—a result that is too small in magnitude to carry operational weight. Second, opportunity-expansion school attendance is associated with systematic and substantial deficits: students in these schools score on average 0.97 points lower in critical thinking and 1.58 points lower in problem-solving relative to peers in regular schools, with negative associations also evident in teamwork and interpersonal skills. These school-type gaps are 5–30 times larger than any gender-related difference. Third, and most acutely, regional location is the dominant axis of inequality: students in the Northeast face soft-skill disadvantages that are 50–100 times the magnitude of any gender effect across multiple dimensions. The positive inter-correlations across skill domains (0.10–0.72) suggest that institutional improvements would generate broad-based rather than domain-specific gains across the full soft-skill portfolio.

These patterns speak directly to the efficiency of resource allocation in education development. In countries such as Thailand, where gender parity in enrollment has already been achieved, continued prioritisation of gender-targeted programming over institutional strengthening may represent a significant misallocation of scarce public resources. The 40–80-fold difference in effect sizes between institutional and gender factors provides a stark benchmark: on the evidence presented here, a marginal unit of investment directed toward improving school quality in disadvantaged settings is likely to generate substantially larger improvements in soft-skill outcomes for all students—regardless of gender—than equivalent investment in sex-disaggregated programming alone.

This argument does not dismiss gender equity as a normative goal. Rather, it highlights an empirical reality with direct implications for policy design: in settings where institutional quality is severely unequal, the fastest route to equitable outcomes for all students—male and female alike—runs through the school and the region, not through the individual. Strengthening institutions benefits every student irrespective of gender; narrowly gender-targeted interventions, by contrast, leave the structural constraints that disadvantage all students in underserved schools unaddressed.

Such a scarcity of reliable gender differences provides significant support for the mounting evidence questioning essentialist perspectives. Fischer and Luiz (2024) showed that apparent gender effects were due to attribution patterns as opposed to actual performance, whereas Alan et al. (2021) report no such gendered difference in patience and competitiveness when elicited through incentivized tasks. That we found this pattern across eight dimensions with matched comparison groups is one further indication that gender differences are constructed rather than natural.

The only marginally significant result—a 0.049 standard deviation female benefit in interpersonal communication—is substantively negligible and almost certainly reflects residual socialization differences that the matching procedure could not fully eliminate. This corroborates the Kautz et al. (2014) model that skills are malleable through adolescence and reflect environments more than fixed traits. The substantially larger school-type associations relative to gender effects are consistent with this environmental perspective, corresponding to Asadullah and Chaudhury's (2015) finding that 60–80% of achievement variation lies between, rather than within, schools.

Regional location is the sharpest axis of inequality in these data. Students in the Northeast face soft-skill disadvantages of 2.68 to 6.18 standard deviations below the national mean across multiple dimensions—a scale of deprivation that goes well beyond what school type alone can explain. These results complement Lounkaew's (2013) evidence of a 0.4–0.6 standard deviation urban–rural gap in Thai PISA literacy scores; our larger effect sizes suggest that soft skills may be particularly susceptible to cumulative disadvantage. The co-occurrence of under-resourced opportunity-expansion schools, linguistic marginalization, and broader economic deprivation in the Northeast creates what Amini and Commander (2012) term compound disadvantages—structural inequities that require systemic rather than marginal intervention. The high inter-relatedness of soft skill domains (correlations 0.10–0.72) adds a further dimension: consistent with Duflo et al.'s (2011) experimental evidence on school-quality interventions, institutional improvements are likely to generate gains across multiple skill domains simultaneously, making the return to investment in school quality larger than any single-dimension estimate would imply.

Our findings also shed new light on the gender equality paradox identified by Stoet and Geary (2018). Rather than equality of opportunity revealing gendered preferences in soft-skill development, our data suggest that where institutional quality is severely constrained—as in Thailand's opportunity-expansion schools—no gender influence emerges because the structural constraint affects all students equally. Gender-

differentiated patterns in soft skills may be a luxury of well-resourced institutional settings; in resource-poor ones, school quality dominates everything else. The policy implications of this reading reach beyond Thailand: school quality and regional location explain effects 10–100 times larger than gender, providing a clear and actionable indicator of where resources should be directed. Given Pierre et al.'s (2014) evidence on the premium that Southeast Asian employers place on soft skills, the institutional gaps documented here represent a significant and addressable constraint on regional human capital development. Policies that emphasize gender differences while leaving institutional inequities unaddressed will continue to disadvantage all students in underserved schools—regardless of their gender.

6. Limitations and Future Research

Although these findings are stable across several analytic approaches, they should be interpreted in light of a number of limitations. Its cross-sectional nature precludes causal inference—while the use of propensity score matching allows us to control for observable selection bias, unobserved confounding (e.g., stemming from endogenous residential choices or unobservable preferences related to the decision to attend school and soft skills) remains a concern. We do not have repeated observations over time that would allow us to examine how soft skills develop longitudinally, and our reliance on self-reported measures may be problematic if students in different types of schools apply systematically different thresholds when rating their own skills.

Restricting the analysis to Grade 9 students limits our ability to observe developmental changes over time. If dropouts differ systematically by gender or by school type, their exclusion may bias the results and potentially lead to an underestimation of true effects. There are also geographic limits to generalizability—our Thailand results may not be relevant in countries that continue to struggle with gaps in enrollment parity where gender-related barriers are embedded, nor would they translate into high-income countries whose schools are more homogeneous in terms of quality and for which individual characteristics may matter more.

Future research could benefit from the incorporation of panel data or the application of natural experiments to enhance causal identification. Additionally, the inclusion of objective performance measures could provide a more nuanced understanding, while an examination of multiple disadvantages could reveal compounded inequalities.

Despite these limitations, the overarching conclusion remains robust: institution-level factors emerge as significantly more influential determinants of soft skill variation among Thai high school students than gender. The magnitude of these effects—ranging from 10 to 100 times larger—suggests that the implications are profound, reflecting intrinsic characteristics of educational systems rather than mere statistical anomalies.

7. Conclusions

This paper set out to test whether gender or school context is the stronger predictor of soft-skill development among Thai secondary students—a question that has direct implications for how Thailand and comparable middle-income countries allocate educational resources. Drawing on data from 1006 Grade 9 students across 42 schools in six regions, and applying three complementary methods, the evidence is consistent and clear. School-type associations range from -0.12 to -1.58 standard deviations across soft-skill domains, and regional disadvantages for students in the Northeast reach -2.68 to -6.18 standard deviations. Gender associations, by contrast, are statistically indistinguishable from zero across all eight dimensions except interpersonal communication, where the estimated difference is

0.049 standard deviations—a magnitude that is substantively negligible. Institutional and regional factors are 10–100 times larger in effect size than anything attributable to gender.

All these institutional and regional impacts are 10–100 times greater than any gender effects, thereby calling into question the central place given to gender in discussions of education development and the likelihood that resources allocated to sex-specific programs might be more effectively invested in broader improvements to school quality.

Our results have several important implications for the literature on educational development and skill formation. We now address the contributions of our study to extant literature. First, we fill gaps in existing literature focusing on holistic soft skills measurement and exploring gender vs. institutional effects in Southeast Asia, as no prior study has systematically examined this question in a middle-income Southeast Asian context (Cunningham & Villaseñor, 2016; Pierre et al., 2014).

Second, we contribute to this new literature questioning essentialist representations of gender differences by endorsing Fischer and Luiz's (2024) attribution theory model and Alan et al.'s (2021) experimental findings by demonstrating that gender-related contrasts disappear when proper controls are in place. Third, we demonstrate how layers of disadvantage are modeled in school systems as a whole since students in Northeast expansion opportunity schools are dealing with radical disparities that that marginal policy adjustments alone will not resolve.

Fourth, we show that soft skills develop as a system of interconnected competencies (correlations between 0.10 and 0.72), meaning that improvements in institutional quality would produce widespread benefits for multiple skill dimensions.

The policy implications are most direct for Thailand itself. Thailand has achieved enrollment parity at the secondary level—girls account for 52.1% of lower-secondary and 57.3% of tertiary students—yet continues to receive substantial international aid directed at gender-targeted education interventions. The evidence presented here suggests this prioritisation is increasingly misaligned with the structural constraints that actually limit student outcomes. Opportunity-expansion schools, which serve approximately 47% of all Thai secondary students and receive 30–40% less per-pupil funding than regular schools, are associated with soft-skill deficits of 0.97 to 1.58 standard deviations in critical thinking and problem-solving—skills that Thai employers consistently identify as the most significant gap in the workforce (Pholphirul, 2017; Cunningham & Villaseñor, 2016). Closing this institutional gap, rather than disaggregating programming by sex, is where the marginal return to investment is highest. Thailand's EEF, which commissioned the data underlying this study, is well-positioned to operationalise this reorientation—redirecting resources toward improving teacher quality, physical infrastructure, and pedagogical capacity in opportunity-expansion schools, particularly in the Northeast.

The sizable chasms in problem-solving (−1.58) and critical-thinking (−0.97) abilities at opportunity expansion schools are especially troubling because of employer demand for these skills. If we want to do something about regional disparities, especially in the Northeast where institutional and geographic disadvantages intersect and compound, then we will need holistic policies that understand this struggle as one not just of poor schools or of a language barrier, but as a dialectic between school quality, language barriers, and economic marginalization.

International development agencies operating in Thailand—including multilateral donors that currently fund gender-disaggregated programming—should weigh these findings carefully. In a country that has already closed the enrollment gender gap, continuing to channel resources predominantly through a gender lens carries a significant opportunity cost: every baht directed toward sex-specific interventions in a context where gender explains less than 1% of soft-skill variation is a baht not directed toward the school-quality

and regional equity improvements that explain 10–100 times more. The evidence calls for a fundamental reorientation of education development priorities in middle-income settings where the participation gap has been closed: from individual demographic targeting toward systemic institutional strengthening.

The evidence suggests that the route to educational parity and skills development is less likely to run through gender-targeted programs but more in providing all students with quality contexts for education that will support the soft skills so important to success in a modern economy. While we do not wish to dismiss gender equity as an important normative goal, our all-too-real evidence shows that in the Thai context better institutional quality is the best route to equitable student outcomes for all students.

The 40–80-fold difference in effect sizes between school context and gender is a sobering benchmark that should reorient how Thailand—and international agencies investing in Thai education—think about where to direct resources. Three specific research and policy priorities follow from these findings. First, the mechanisms behind the opportunity-expansion school deficit require deeper investigation: to what extent does the gap reflect teacher quality, physical infrastructure, peer composition, or curriculum quality, and which of these is most tractable to intervention at scale? Second, the Northeast's compounded disadvantage—where institutional underfunding intersects with linguistic, ethnic, and economic marginalization—demands holistic regional policy that cannot be addressed by school-level interventions alone; it requires coordinated action across education, labour market, and regional development portfolios. Third, the soft-skill measurement framework piloted here through the EEF dataset points toward the value of systematic, large-scale assessment of non-cognitive skills as a routine component of Thailand's national education monitoring infrastructure—a capacity that currently does not exist at scale. The 1006 students in this study represent the 4.7 million Thai secondary students whose skill development is shaped far more powerfully by the type of school they attend and the region they grow up in than by their gender. Educational development policy should be designed accordingly.

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Informed Consent Statement: The data was fully anonymized before access; accordingly no individual participants were identified, and therefore individuals cannot be identified. As the study is a secondary analysis of anonymized data, additional informed consent from participants is not applicable. If you prefer, I will include an explicit informed consent statement in the revised manuscript in compliance with the journal's requirements.

Data Availability Statement: The data that support the findings of this study are available from the Equitable Education Fund (EEF), Thailand. Restrictions apply to the availability of these data. The data are not publicly available; requests for access should be made directly to EEF.

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Abbreviations

The following abbreviations are used in this manuscript:

PSM	Propensity Score Matching
ATET	Average Treatment Effect on the Treated
EQ	Emotional Intelligence
AQ	Adversity Quotient
MQ	Moral Quotient
AT	Analytical Thinking
CT	Creative Thinking
TW	Teamwork
DM	Democratic Participation
CM	Interpersonal Communication

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