

Enhancing Technology and Livelihood Education Through Cooperative Learning: Insights from Secondary Schools in Tandag City Division

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ABSTRACT

This study investigated the implementation of the cooperative learning approach in Technology and Livelihood Education (TLE) among Grade 9 students and teachers in the Tandag City Division. Utilizing a descriptive-correlational design, the research analyzed the demographic profiles, the extent of implementation across four domains; Curriculum, Learning Environment, Diversity of Learners, and Social Regard for Learning and the significant relationships between these variables.

Findings revealed a "High Implementation" of cooperative learning, with an overall grand mean of 4.670. While both respondents aligned on most domains, a highly significant difference was found in Social Regard for Learning ($t = -5.45$, $p = 0.000$), where teachers perceived their role as social facilitators more positively than students. Correlation analysis for students showed that Sex significantly influenced perceptions of the Curriculum ($p=0.044$), Diversity ($p=0.046$), and Social Regard ($p=0.036$), indicating that female students generally perceived a more effective implementation. For teachers, Educational Attainment was significantly linked to Curriculum delivery ($r=0.676$, $p=0.045$), and Age showed a very strong correlation with Social Regard ($r=0.816$, $p=0.007$).

The study concludes that while the mechanical implementation is consistent, a perception gap exists regarding the social atmosphere of learning. The results emphasize that professional maturity and academic advancement are critical drivers for teachers, while gender-sensitive dynamics play a vital role in student engagement. These findings serve as the empirical basis for a targeted intervention program to enhance pedagogical and technical instruction in the TLE framework.

Keywords: Cooperative Learning, Technology and Livelihood Education (TLE). Social Interdependence, Social Regard for Learning, Philippine Secondary Schools, Grade 9 Learners

INTRODUCTION

Teaching Technology and Livelihood Education (TLE) in Philippine secondary schools presents persistent challenges, particularly in balancing technical skill development with learner engagement. In the Tandag City Division, students often struggle to comprehend textbook-driven lessons and extract meaning from complex content, while teachers face pressure to deliver extensive instruction within limited timeframes. This imbalance reduces learner motivation, limits active participation, and hinders the development of practical competencies (Armayan, 2022).

Globally, cooperative learning has been recognized as a powerful instructional approach that enhances academic achievement, self-efficacy, and critical thinking while fostering interpersonal relationships and

learner autonomy (Cole, 2019). It prepares students for real-world contexts where teamwork, communication, leadership, and decision-making are essential (Smith, 2020). Locally, cooperative learning has been shown to improve classroom dynamics by reducing teacher-centered instruction and promoting student collaboration, thereby aligning with the goals of the K to 12 Curriculum.

This study therefore investigates the implementation of cooperative learning in teaching TLE among Grade 9 learners in Tandag City Division. Specifically, it examines the demographic profiles of students and teachers, the extent of cooperative learning implementation across curriculum, learning environment, diversity, and social regard for learning, and the differences and relationships between respondent groups. The study is guided by the following hypotheses: *Ho1*: There is no significant difference in the extent of cooperative learning implementation as perceived by students and teachers. *Ho2*: There is no significant relationship between the profile of respondents and the extent of cooperative learning implementation.

Ultimately, the findings aim to contribute to the refinement of teaching practices and inform policy and program development. A key outcome is the design of Project T-CEF (Tandag City TLE Cooperative Excellence Framework), an intervention program intended to strengthen cooperative learning strategies among TLE educators.

LITERATURE REVIEW

Research on cooperative learning consistently highlights its role as a learner-centered approach that fosters collaboration, authentic assessment, and real-world application. Foreign studies emphasize its benefits for academic achievement, critical thinking, and workplace readiness, grounded in sociocultural theory and social interdependence (Rafoth, 2018; Schmoker, 2018; Johnson & Johnson, 2021). Cooperative learning is shown to prepare students for teamwork, communication, and leadership, while also aligning with global educational reforms (Altun & Korkmaz, 2018; Sears & Hersh, 2020).

Local literature affirms similar outcomes, noting improvements in social skills, classroom interaction, and learner motivation (Cabansag, 2019; De Dios, 2018). However, challenges such as competition undermining cooperation (Ocampo, 2018) and the complexity of implementation requiring teacher training and resources (Gil & Jurado, 2021) are evident. Philippine studies also situate cooperative learning within globalization, stressing the need for professional readiness and curriculum coherence (Tullao, 2018; Magno, 2018).

Theoretical anchors include Vygotsky's Social Development Theory, which emphasizes learning through guided interaction; Piaget's cognitive conflict model, which highlights peer engagement in resolving misconceptions; and Social Interdependence Theory, which explains how positive interdependence fosters promotive interaction and trust.

Despite extensive global and local evidence, a gap remains in the Philippine secondary school context, particularly in Technology and Livelihood Education (TLE). Few studies have systematically examined cooperative learning's structured implementation in TLE under the K to 12 curriculum. This study addresses that gap by analyzing cooperative learning practices among Grade 9 learners in Tandag City Division and proposing Project T-CEF (TLE Cooperative Excellence Framework) as a localized intervention.

METHODOLOGY

This study adopted a quantitative design, combining descriptive, comparative, and correlational methods to assess the implementation of cooperative learning in Technology and Livelihood Education (TLE). The descriptive component profiled respondents and measured implementation levels, the comparative tested differences between teacher and student perceptions, and the correlational examined relationships between demographic variables and implementation outcomes. The research was conducted in four public secondary schools in Tandag City Division—Jacinto P. Elpa National High School, Buenavista National High School, Vicente L. Pimentel National High School, and Tandag National Science High School—selected for their established TLE programs. Respondents included nine purposively selected TLE teachers with at least two years of teaching experience and 115 Grade 9 students chosen through random sampling, yielding a total of

124 participants. Data were gathered using an adapted NCPTS-based questionnaire, consisting of demographic profiles and a Likert-scale assessment of cooperative learning implementation across four domains: curriculum, learning environment, diversity of learners, and social regard for learning. Surveys were administered during the 2025–2026 academic year with formal approval from education authorities. Responses were processed electronically, and results informed the design of Project T-CEF (TLE Cooperative Excellence Framework). Statistical tools included frequency and percentage for demographics, weighted mean for implementation levels, t-tests for differences, and correlation analysis for relationships. Ethical protocols were observed, with participants assured of confidentiality under the Data Privacy Act of 2012.

RESULTS AND DISCUSSION

Table 1. Students Demographic Profile

Variable	Category	Frequency	Percentage
Age	13-14 years old	44	38
	15-16 years old	70	61
	17 years old or more	1	1
Sex	Male	44	38
	Female	71	62
Number of Years in School	3 Years	104	90
	4 Years	11	10

Age Distribution

A majority of students (61%) were in the 15–16 age bracket, corresponding to middle adolescence. This developmental stage is characterized by heightened sensitivity to peer feedback and social rewards (Steinberg, 2014). In line with Vygotsky’s Social Development Theory (1978), students at this age are optimally positioned to benefit from peer-assisted learning within the Zone of Proximal Development (ZPD). Literature affirms that pedagogical practices such as small-group learning transform peer interaction into a cognitive driver of resilience and achievement (Meza et al., 2025).

Gender Distribution

Female students comprised 62% of the sample, a factor that significantly influenced cooperative learning dynamics. International assessments, such as the OECD PISA (2017), consistently report that female learners outperform males in collaborative problem-solving, demonstrating higher social sensitivity and conflict management skills. Roseth, Johnson, and Johnson (2008) further emphasize that female-dominated groups exhibit stronger relational focus and pro-social behavior, essential for trust-building and effective group interaction. This gender profile provided a strong baseline for successful cooperative learning implementation in the Tandag City Division.

School Cohort Stability

Approximately 90% of respondents had studied in the same school for three consecutive years (Grades 7–9), indicating institutional stability and adaptation to established social norms. Wentzel (2017) notes that long-term cohort membership fosters social capital, including shared expectations and peer behaviors. This stability suggests that students had already progressed beyond early stages of social adjustment, enabling them to focus on technical competencies and accountability within cooperative tasks rather than negotiating new social environments.

Together, these demographic factors—developmental age alignment, gender distribution favoring social sensitivity, and cohort stability—created an environment highly conducive to cooperative learning. The findings justify the adoption of cooperative strategies in TLE, as respondents possessed the developmental readiness, relational skills, and institutional stability necessary for effective implementation.

Table 2. Demographic Profile of Teachers Respondents

Variable	Category	Frequency	Percentage
Age	26-30	2	22
	36-40	2	22
	41 or more	5	56
Sex	Male	1	11
	Female	8	89
Educational Attainment	BSE Graduate	5	56
	Second Courser	1	11
	Masteral Graduate	3	33
Length of Service	5-10 Years	4	44
	11-15 Years	1	11
	21 or more	4	44
Relevant Training Attended	School Level	3	33
	Division Level	4	44
	Regional Level	2	22

Age and Teaching Tenure

More than half of the teachers (56%) were over 41 years old, and 44% had served for more than 21 years. This distribution indicates a high level of pedagogical maturity and institutional resilience. Research confirms that teacher effectiveness increases with experience, particularly in classroom management and adaptability to curriculum reforms (Kini & Podolsky, 2016). In the Philippine context, long-tenured teachers often serve as informal mentors or “More Knowledgeable Others” (MKOs) in the Vygotskian sense, supporting younger faculty in collaborative tasks and curriculum transitions such as the MATATAG reform.

Gender Distribution

The predominance of female teachers (86%) reflects the broader feminization of the teaching profession in the Philippines (Maligalig et al., 2020). This trend is particularly evident in strands such as Home Economics, traditionally female-dominated, though the TLE curriculum now emphasizes gender-neutral technical skills. Female educators bring strengths in communication, social sensitivity, and conflict resolution, aligning with the relational demands of cooperative learning.

Educational Attainment

While 33% of teachers held Master’s degrees, the majority (56%) were Bachelor of Secondary Education (BSE) graduates. This distribution underscores the foundational competence of the workforce but highlights the need for continuous professional upskilling to meet evolving demands in technology-driven vocational education. Graduate-level training often emphasizes Constructivist and Social Interdependence theories, equipping teachers with advanced strategies for student-centered learning (Darling-Hammond et al., 2017).

Professional Development and Training

Relevant training attendance was a critical indicator of preparedness. Notably, 44% of teachers had participated in division-level training focused on pedagogy, classroom management, and TLE-specific skills. Structured professional development is essential for effective cooperative learning, as it equips teachers with the tools to facilitate positive interdependence and accountability (Desimone, 2009). Division-level initiatives in Tandag City represent proactive efforts to address technical skill gaps (Armayan, 2022) and align teaching practices with curriculum standards.

The instructor profile demonstrates a workforce characterized by experience, gendered strengths, foundational competence, and ongoing professional development. Veteran teachers provide institutional memory and

resilience, female educators contribute relational and communicative strengths, and training initiatives enhance technical and pedagogical capacity. Together, these factors create favorable conditions for the successful implementation of cooperative learning in TLE, ensuring that both curriculum fidelity and classroom dynamics are effectively managed.

Extent of Implementation of Cooperative Learning in Grade 9 TLE

Table 3. Implementation of Cooperative Learning Approach

Indicator Domain	Mean (Students)	Mean (Teachers)	Grand Mean	Overall Adjectival Rating
Curriculum	4.484	4.787	4.635	High Implementation
Learning Environment	4.584	4.759	4.672	High Implementation
Diversity of Learners	4.487	4.681	4.584	High Implementation
Social Regard for Learning	4.687	4.890	4.789	High Implementation
Over-all Mean	4.560	4.779	4.670	High Implementation

Legend: 4.51—5:00 Highly Implemented

1.76 – 2.50 Poorly Implemented

3.26 – 4.50 Fairly Implemented

1.00 – 1.75 Not Implemented

2.51 – 3.25 Slightly Implemented

Curriculum

Cooperative learning was integrated into lesson delivery with moderate to high fidelity. Teachers reported structuring tasks to promote positive interdependence and accountability, aligning with the National Competency-Based Teacher Standards (NCBTS). This reflects a shift from teacher-centered instruction toward collaborative, student-centered pedagogy.

Learning Environment

Findings indicated that cooperative learning fostered a supportive classroom climate. Students valued peer-led activities that encouraged dialogue, trust, and shared responsibility. This aligns with Vygotsky’s (1978) Social Development Theory, which emphasizes the role of social interaction in cognitive growth.

Diversity of Learners

Implementation was effective in accommodating varied learner profiles. Cooperative structures allowed students of differing abilities to contribute meaningfully, consistent with Piaget’s cognitive conflict model, which highlights the benefits of peer interaction in resolving misconceptions and deepening understanding.

Social Regard for Learning

Respondents reported high levels of respect for collaborative tasks, with students demonstrating pro-social behaviors such as active listening, conflict resolution, and valuing peer contributions. This supports Johnson & Johnson’s Social Interdependence Theory, which posits that positive interdependence fosters promotive interaction and group cohesion.

Overall, the extent of cooperative learning implementation was rated moderate to high across all domains. The findings suggest that Grade 9 learners in Tandag City Division are developmentally and socially prepared to benefit from cooperative learning structures. The results justify the adoption of cooperative strategies in TLE, as they enhance curriculum delivery, classroom climate, inclusivity, and respect for learning. These outcomes provided the empirical basis for the proposed intervention program, Project T-CEF (TLE Cooperative Excellence Framework).

Significant Difference in the Extent of Implementation

Table 4. Significant Difference on Cooperative Learning Approach as Perceived by the two groups

Sources of Variation	Computed t	P-value	Decision	Interpretation
Curriculum	-1.53	0.165	Failed to reject Ho	Not Significant
Learning Environment	0.41	0.683	Failed to reject Ho	Not Significant
Diversity of Learners	-0.62	0.551	Failed to reject Ho	Not Significant
Social Regard for Learning	-5.45	0.000	Reject Ho	Highly Significant

Level of Significance $p > 0.05$

The analysis revealed no significant differences ($p > 0.05$) in the domains of Curriculum, Learning Environment, and Diversity of Learners, indicating strong alignment between teacher and student perceptions. Both groups recognized that cooperative learning was consistently implemented through structured group tasks, inclusive laboratory environments, and strategies accommodating diverse skill levels. This procedural alignment suggests that the mechanical aspects of cooperative learning—such as seating arrangements, grouping strategies, and the use of “expert peers”—were visible and uniformly applied across schools.

However, a highly significant difference was observed in the domain of Social Regard for Learning ($t = -5.45$, $p = 0.000$). Teachers perceived their role-modeling and social interactions more positively than students did. Several explanatory lenses contextualize this divergence: Professional Self-Perception vs. External Observation: Teachers, as front-liners in education, may overestimate their impact as role models due to social desirability or intentionality, while students are more attuned to the affective atmosphere of the classroom. Implicit vs. Explicit Attitudes: Teachers explicitly value social regard, but implicit behaviors under curriculum pressures may be perceived by students as less supportive. Developmental Gaps: The age difference between mature teachers (41+) and adolescent students (15–16) may contribute to divergent perceptions, as teenagers often undervalue adult-led instruction or its relevance to their lived experience. Inclusivity Dynamics: As Slee (2019) notes, educators may view their practices as inclusive, yet students can feel overwhelmed or isolated if reciprocity in group learning is imbalanced. When group roles are unevenly distributed, students may perceive cooperative tasks as hierarchical rather than collaborative.

The lack of significant differences in technical and environmental domains underscores procedural consistency in cooperative learning implementation. Yet, the divergence in Social Regard for Learning highlights a critical affective gap: while teachers believe they foster inclusive and supportive environments, students may experience cooperative learning as uneven or less affirming. Addressing this gap requires professional development focused on relational pedagogy, ensuring that cooperative learning not only meets procedural standards but also resonates with students’ social and emotional needs.

Relationship Between Respondent Profiles and Cooperative Learning Implementation

Based on the data provided in the tables for SOP 4, the study explored the relationship between the respondents' demographic profiles and their perceptions of the cooperative learning implementation. The analysis reveals that while many demographic factors are independent of the instructional approach, specific variables particularly Sex for students and Education and Age for teachers play a significant role

The data utilizes Pearson’s “r” Correlation to determine the relationship between student profiles and their perception of the implementation of various educational domains. The data indicates a significant relationship between the Sex of the student respondents and three specific domains: Curriculum $r=0.188$, $p=0.044$, Diversity of Learners $r=0.186$, $p=0.046$, and Social Regard for Learning $r=0.195$, $p=0.036$. All other variables (Age and Years in School) showed no significant relationship where $p > 0.05$.

Table 5. Significant Relationship between the Profile and the Extent of Implementation (Students)

Variables Tested		Computed r	P-value	Decision	Interpretation
Curriculum	Age	0.116	0.218	Failed to reject Ho	Not Significant
	Sex	0.188	0.044	Reject Ho	Significant
	Years in School	0.001	0.991	Failed to reject Ho	Not Significant
Learning Environment	Age	0.138	0.141	Failed to reject Ho	Not Significant
	Sex	0.119	0.206	Failed to reject Ho	Not Significant
	Years in School	0.136	0.147	Failed to reject Ho	Not Significant
Diversity of Learners	Age	0.135	0.152	Failed to reject Ho	Not Significant
	Sex	0.186	0.046	Reject Ho	Significant
	Years in School	0.034	0.715	Failed to reject Ho	Not Significant
Social Regard	Age	0.121	0.199	Failed to reject Ho	Not Significant
	Sex	0.195	0.036	Reject Ho	Significant
	Years in School	0.104	0.268	Failed to reject Ho	Not Significant

Level of Significance $p > 0.05$

For student respondents, sex was the only variable with a statistically significant relationship ($p < 0.05$), though correlations were weak ($r = 0.186-0.195$). Female students consistently perceived higher implementation levels, particularly in Social Regard for Learning, reflecting their greater social sensitivity and collaborative competence (OECD, 2017; Roseth, Johnson, & Johnson, 2008). In contrast, age and years in school showed no significant effects, indicating that maturity and institutional tenure did not alter perceptions of cooperative learning.

For teacher respondents, two significant relationships emerged: Education vs. Curriculum ($r = 0.676$, $p = 0.045$) and Age vs. Social Regard for Learning ($r = 0.816$, $p = 0.007$). Teachers with advanced degrees were more likely to rate curriculum implementation highly, while older teachers perceived stronger social regard, consistent with their mentoring role and experiential knowledge.

Overall, sex influenced student perceptions of cooperative learning, while education and age shaped teacher assessments. These findings highlight the importance of gender-sensitive strategies for students and continuous professional development for teachers to strengthen cooperative learning outcomes.

Significant Relationships Between Teacher Profiles and Cooperative Learning Implementation

Table 6. Significant Relationship between the Profile and the Extent of Implementation

Variables Tested		Computed r	P-value	Decision	Interpretation
Curriculum	Age	0.180	0.642	Failed to reject Ho	Not Significant
	Sex	0.195	0.615	Failed to reject Ho	Not Significant
	Education	0.676	0.045	Failed to reject Ho	Not Significant
	Service	0.086	0.0825	Failed to reject Ho	Not Significant
	Training	0.234	0.544	Failed to reject Ho	Not Significant
Learning Environment	Age	0.567	0.111	Failed to reject Ho	Not Significant
	Sex	0.154	0.693	Failed to reject Ho	Not Significant
	Education	0.646	0.060	Failed to reject Ho	Not Significant
	Service	0.258	0.503	Failed to reject Ho	Not Significant

	Training	0.246	0.524	Failed to reject Ho	Not Significant
Diversity of Learners	Age	0.603	0,086	Failed to reject Ho	Not Significant
	Sex	0.166	0.669	Failed to reject Ho	Not Significant
	Education	0.646	0.060	Failed to reject Ho	Not Significant
	Service	0.288	0.452	Failed to reject Ho	Not Significant
	Training	0.237	0.539	Failed to reject Ho	Not Significant
Social Regard	Age	0.816	0.007	Reject Ho	Significant
	Sex	0.354	0.351	Failed to reject Ho	Not Significant
	Education	0.438	0.239	Failed to reject Ho	Not Significant
	Service	0.547	0.128	Failed to reject Ho	Not Significant
	Training	0.000	1.000	Failed to reject Ho	Not Significant

Level of Significance $p > 0.05$

The study found a strong positive correlation between teachers' educational attainment and curriculum implementation ($r = 0.676$, $p = 0.045$). Teachers with advanced degrees were more effective in integrating cooperative structures into TLE, reflecting the impact of graduate-level training on student-centered instructional design (Darling-Hammond et al., 2017). An even stronger relationship emerged between age and social regard for learning ($r = 0.816$, $p = 0.007$). Veteran teachers placed greater emphasis on trust, leadership, and conflict resolution, consistent with findings that experience enhances social capital and resilience in classroom management (Kini & Podolsky, 2016).

Interestingly, training showed no significant relationship ($p = 1.000$), suggesting that formal workshops alone may be less influential than academic background and lived experience. The results highlight a perception gap: students' experiences are shaped by gendered social dynamics, while teachers' effectiveness is driven by professional maturity and academic advancement. These findings underscore the need for gender-sensitive grouping strategies for students and continuous professional development for teachers to sustain high-quality cooperative learning implementation.

CONCLUSION

The study indicated that the Tandag City Division possesses a stable and mature teaching workforce alongside students who are developmentally primed for cooperative learning. There is strong procedural alignment between teachers and students in the mechanical aspects of cooperative learning, such as group tasks and seating arrangements. However, a significant perception gap persists in the affective domain, particularly in Social Regard for Learning, where teachers perceive their role-modeling more positively than students do. The findings further suggest that teacher maturity and educational attainment are the primary drivers of quality implementation, while student gender influences how social interdependence is valued and perceived. Based on these results, it is concluded that an intervention program is necessary to strengthen cooperative learning practices and address the identified perceptual and pedagogical gaps.

RECOMMENDATION

The study emphasized the need for continuous improvement in cooperative learning practices within the Tandag City Division. Specifically, professional development initiatives should be prioritized to upskill Bachelor of Secondary Education (BSE) graduates, thereby equipping them to meet the evolving technical demands of the Technology and Livelihood Education (TLE) curriculum. Teachers are encouraged to move beyond mechanical grouping strategies and instead foster psychological safety and balanced group dynamics to ensure inclusivity and student voice. Gender-responsive engagement strategies must be developed to address the lower levels of cooperative learning perception among male students. Furthermore, targeted intervention programs should be designed using empirical evidence to address both technical and pedagogical needs. Veteran teachers aged 41 and above should be leveraged as "More Knowledgeable Others" to mentor younger faculty in managing classroom dynamics and modeling social regard for learning. Finally, future researchers are encour-

aged to conduct further studies in this field to explore unexamined issues and expand insights, thereby contributing to the refinement of cooperative learning practices in secondary education.

Conflict of Interest

The authors declare no conflict of interest. The study was conducted independently, with no financial, institutional, or personal relationships that could have influenced the outcomes or interpretations of the research.

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