GENDER DYNAMICS: TRADITIONAL VERSUS TEAM-BASED LEARNING IN TEACHING HEALTH TERMINOLOGY TO NON-CLINICAL STUDENT

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Abstract. Gender shapes learning transition from passive to active learning framework. This study examines gender with pedagogical shifts in teaching Health Terminology subject to non-clinical students and this is critical for inclusive curriculum design in university. Health Terminology is commonly taught to science-based students, while management student in health-related program struggles due to complexity of component like word-roots, prefixes, and suffixes. This study draws evidence from non-clinical Health Administration students from Faculty of Business and Management, UiTM Puncak Alam (N=114; Female n=97, Male n=17) to examine gender-based variations in student satisfaction and perceived skill gain during the transition from Traditional Lecture to Team-Based Learning (TBL). Grounded in Social Interdependence Theory, study measures learning; conceptual clarity, clinical problem-solving, group interaction, study consistency, and problem-solving skills. Analysis reveals female demonstrate greater satisfaction with teamwork and communication, scoring higher than male in dialogue (Female M=4.49, SD=0.59; Male M=4.18, SD=0.76). In TBL, female (M=4.56, SD=0.59) and male (M=4.53, SD=0.69) reported a similar rising trend in study consistency under peer-accountability frameworks. Conversely, male showed weaker outcomes in problem-solving skills during highly interactive spaces. Study concludes gender dynamics matters when transitioning from traditional lecture to team-based learning in teaching health terminology to non-clinical students.
Keywords: *gender, team-based learning, traditional learning, active learning, health terminology*

Introduction

Anatomy and clinical physiology are the basis foundation for undergraduate health science and health management programs. Historically, these disciplines were taught through lectures, a model where the instructor deliver the information and students listened passively. While traditional lectures are good at covering a large amount of anatomical content, but there are also educational expert who argue they do not help students build deep understanding or apply clinical knowledge (Burgess et al., 2020). To address this, universities have introduced active learning methods such as Team-Based Learning (TBL). In TBL, students have to prepare by pre-reading before class, and during in-class contact hours they have to collaborate, engage in problem-solving and give immediate feedback (Hettler, 2015). However, changes in teaching method do not affect all students equally. As classrooms shift from quiet, independent listening stations to highly collaborative environments, the gender differences in communication, peer accountability, and confidence become more visible. Past study suggests that male and female students process collaborative learning differently, with some some prefer group activities and others prefer individual tasks (Eddy et al., 2014; Theobald et al., 2020). However, there are still gap in knowledge concerning how these gender

differences shape specific cognitive and behavioral skills when student suddenly shift from traditional lectures to TBL in health related subjects.

The work undertaken here tackles this gap by analyzing data from 114 students enrolled in the Health Terminology (HSM545) course code offered to undergradate students of Bachelor Degree in Business Administration (Health Administration) program at UiTM Puncak Alam. It investigates gender based differences between male and female students across two pedagogical approaches: Traditional Lectures and Team-Based Learning. Specifically, it seeks to answer the following objectives: 1. How do perceptions of interactive group dialogue vary by gender across instructional methods? 2. Does the accountability structure of TBL eliminate or exacerbate gender-based differences in study habits and application skills?

Underlying theories

To explore gendered responses to teaching changes, this study draws upon Social Interdependence Theory (Johnson and Johnson, 2009; Deutsch, 1949) and Collaborative Learning Theory (Vygotsky, 1978). Togehter, both theories explain how male and female students adapt when moving from traditional lectures to TBL in Health Terminology course for non-clinical students. Social Interdependence Theory explains how a group goals are set within an environment determines how people work together, which subsequently affects psychological and behavioral outcomes. Social interdependence can take two forms: Positive Interdependence, where individual success is tied directly to group success, and No Interdependence, where each person works individually. In traditional lectures where there is no interdependence as students sit side-by-side but navigate the learning process individually. Contrarily, TBL create positive interdependence through peer accountability towards team assignments and shared grading and this force students to prepare before class because their group relies on them. This theoretical lens clarifies why both male and female students showed similar improvements in study consistency under TBL, since group accountability encouraged regular effort and discipline. Meanwhile, Collaborative Learning Theories emphasizes that knowledge is constructed through dialogue, teamwork, and shared problem-solving. Female students often show a stronger preference for connected, relational learning spaces where understanding is co-constructed through dialogue, questioning, and linguistic validation (Elamin et al., 2024). While male students, by contrast, often demonstrate individualistic task preference or competitive behaviors within academic environments (Eddy et al., 2015). By combining these theories, this study analyze whether the shift in TBL move into positive interdependence accommodates or challenges student preferences of male and female students.

Materials and Methods

This study utilize a quantitative, descriptive cross-sectional research design to analyze student evaluations of course delivery in the Health Terminology (HSM545) course code.

Study design and setting

The intervention combined traditional lectures and TBL, were implemented from October 2025 to February 2026 on the Health Terminology course (HSM545), in the

Bachelor Degree in Business Administration (Health Administration) program at Faculty of Business and Management, UiTM Puncak Alam. Ethical approval was obtained from the Ethics Committee of the Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Selangor. The Health Terminology course is designed to introduces the construction and interpretation of medical terms based on word root, combining forms prefix and suffix, with applications across all major body systems. The learning outcomes include: (1) demonstrating knowledge of anatomy and physiology, (2) applying health terminology to related diseases and medical procedures, and (3) using digital tools to present health terminology effectively. Classes were conducted twice a week (four hours total) throughtout 14 weeks period. Notably, as students are non-clinical students, the course did not include a laboratory component. The midterm exam assessed the first five topics, while the final exam assessed the remaining of the syllabus.

Participants and context

The sample consisted of 114 undergraduate students enrolled in the Health Terminology (HSM545) course (N = 114). The cohort reflects a demographic profile that is common in any Health Administration program, marked by a strong female predominance. Female students constituted 85.1% (n = 97) of the sample, while male students made up 14.9% (n = 17). The vast majority of participants (86.8%) shared a uniform educational pathway within the Faculty of Business Management (FBM).

Instrument and data gathering

Data were collected through a student feedback survey, at the end of the 14 week semester. The survey captured student perceptions across five pedagogical skill indicators, rated on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). These five indicators were standardized across the traditional lecture and the TBL questions in the survey to allow for direct comparison. The indicators are as in the *Table 1*.

Table 1. *Pedagogical skill indicators.*

Indicator	Questions
Conceptual Understanding	I found that this learning style helped me understand anatomical concepts.
Problem-solving	I found that this style of learning encouraged clinical anatomy problem-solving
Engagement and Interaction	I found that this style of learning encouraged questions, discussions, and interactions.
Accountability and Consistency	I found that this style of learning forced me to study more consistently.
Problem solving Development	I found that this style of learning improved my problem-solving skills.

Data preparation and analysis strategy

Data were analyzed using IBM SPSS Statistics to obtain demographic summaries, to calculate mean satisfaction scores, and compute gender based differences.

Results and Discussion

The data indicate overlapping patterns and clear contrasts when comparing gendered responses to Traditional Lectures and Team-Based Learning, supported by standard deviations and inferential metrics.

Data overview and comparative analysis

Empirical data were obtained from 114 non-clinical Health Administration students of the Faculty of Business and Management, UiTM Puncak Alam Campus (N = 114; Female n = 97, Male n = 17). Descriptive statistics in IBM SPSS Statistics showed that, when scores across the five pedagogical skills indicators were combined, female students demonstrate a higher overall satisfaction (M = 4.40) with the course structure than male students (M = 4.18). The observed difference suggest that a consistent baseline advantage for female student in perceived satisfaction with instructional design. The comparative analysis of mean scores revealed a consistent gender difference in peer interaction across both instructional methodologies. Female students showed greater participation in engagement and interaction (M = 4.49, SD = 0.59 n = 97) compared to male students (M = 4.18, SD = 0.76 n = 17). This difference remained stable across lecture and TBL, with an observed mean gap of 0.31. This reflects a continuing pattern of female student engaging more actively in question and discussion sessions. However, inferential statistics shows that these differences were not statistically significant as p value is greater than ($p > 0.05$).

Further examination of study consistency, female students demonstrated stronger habits under traditional lecture format (M = 4.40, SD = 0.61) relative to males students (M = 4.24, SD = 0.81), producing a mean difference of 0.16. However, with the adoption of TBL, both male and female students demonstrated a marked increase in study consistency, with females scoring M = 4.56 (SD = 0.59) and males M = 4.53 (SD= 0.69). The gender gap narrowed to 0.03, indicating convergence in study behaviour when accountability structures were introduced. But, no statistically significant differences were found which means the observed convergence portrays descriptive trends but not inferential confirmation. Problem-solving skills showed a different trajectory. Under lecture conditions, female students scored M = 4.22 (SD = 0.71) compared to males at M = 4.06 (SD = 0.85). leading to a 0.16 mean differences. With the TBL format, female scores rose to M = 4.36 (SD = 0.65), while male scores increased modestly to M = 4.12 (SD = 0.79), widening the gender difference to 0.24. This suggests that collaborative problem-solving environments may enhance perceived skill development more strongly among female students, but with the effect is indicative rather than conclusive ($p > 0.05$) (*Table 2*).

Table 2. *Comparative metrics analysis.*

Instructional Methodology	Skill Dimension	Satisfaction Mean (SD)	
		Female (n=97)	Male (n=17)
Traditional Lecture	Understanding concepts	4.40 (0.64)	4.29 (0.81)
	Clinical problem-solving	4.33 (0.69)	4.06 (0.84)
	Engagement and interaction	4.49 (0.59)	4.18 (0.76)
	Consistent study habit	4.40 (0.61)	4.24 (0.81)
	Problem solving skills	4.22 (0.71)	4.06 (0.85)
Team Based Learning	Understanding concepts	4.37 (0.61)	4.35 (0.79)
	Clinical problem-solving	4.36 (0.69)	4.18 (0.77)
	Engagement and interaction	4.49 (0.60)	4.18 (0.76)
	Consistent study habit	4.56 (0.59)	4.53 (0.69)
	Problem solving skills	4.36 (0.65)	4.12 (0.79)

The shift from the traditional lectures to Team-Based Learning (TBL) marks major changes in the socio-cognitive environment of the health terminology classroom filled with non-clinical students. When interpreted through Social Interdependence Theory and Collaborative Learning Theory, the results provide insights into how male and female students navigate new structure of an active learning environment embedded in TBL.

TBL accountabiltiy mechanisms as a self regulatory equalizer

The dataset points to a noteable finding which is the almost perfect equalization of study consistency under the TBL framework. In contrast to the traditional lecture where study behavior is entirely unconstrained by immediate social consequences, as female students reported higher study consistency (M = 4.40) compared to male counterparts (M = 4.24). The observed baseline differences aligns with prior studies emphasizing that female undergraduates generally achieved higher scores in academic self-regulation, more proactive approaches to time management, and adhere to the structured course timelines (Bavishi et al., 2022; Rajabalee et al., 2021; Manfrin et al., 2019). Following the implementation of TBL, this behavioral gap disappeared with both groups reached near-identical levels of study consistency (Female M = 4.56; Male = 4.53). In TBL framework, goal interdependence is promoted through the Individual Readiness Assurance Test (iRAT) and Team Readiness Assurance Test (tRAT) assessment (Hettler, 2015). Because the tRAT makes individual preparation visible to peers, shifting the cost of arriving unprepared shifts from a individual concern to a shared group liability. Throught this process, accountabilty is reconfigured, making sure that study behaviour become functions s personal discipline but also by expectation imposed by peers. The evidence indicates that the externalized peer accountability framework within TBL serves as a behavioral equalizer. It provides an extrinsic motivational layer, it offsets lower male self regulatory baselines and align them with female students. This interpretation is consistent with Aga (2024), who found that highly structured team check-ins and immediate testing cycles can disproportionately stabilize the study habits of students who otherwise struggle with self directed pacing in traditional lecture.

Social gap in perceived problem solving gains

In contrast to the alignment observed in study habits, the communication metrics highlight a sustained and rigid division. Female students maintained a significantly higher ratings for questions, dialogue, and interaction (M = 4.49) across both traditional lectures and TBL, while male scores remained the same at (M = 4.18). The mean gap of 0.31 underscore a presistence of gender differences in communicative engagement. This systemic disparity provides compelling validation for Collaborative Learning Theories, which argue that female learners tend to rely on relational, conversational frameworks to co-construct meaning and affiirm conceptual knowledge (Sari et al., 2025; Elamin et al., 2024). More recent studies confirm that female students frequently derive profound psychological safety and cognitive clarity from peer interaction, using group dialogue to systematically unpack complex material (Huilaja et al., 2022; Ainsworth, 2021; Theobald et al., 2020). In contract, male students approached these interactive spaces with lower level of enthusiasm. This lack of engagement becomes evident when examining their perceived problem-solving gains under TBL, where male scores dropped to 4.12, while female satisfaction widened to 4.36. This observed divergence can be explained by the intersection of gendered communication patterns and the demographic skew of the cohort. With the classroom comprising 85.1% female, the distribution of verbal participation and social norms within the small teams were naturally dominated by female conversational styles. Research by Eddy et al. (2015) and Alamoudi et al. (2021) demonstrates that in settings heavily dominated by one gender, minority gender student which in this case, male frequently undergo a process of subtle

social withdrawal. When collaborative spaces become sites of unstructured, free-flowing verbal negotiation, male students often perceive the process as inefficient, overly circuitous, or low in direct utility (Sari et al., 2025; Elamin et al., 2024; Eddy et al., 2015). Males students may experience conversational norms established by the dominant group, leading them to disengage from the group's cognitive synthesis. As a result, while male students perform the baseline preparation required by the tRAT, they do not fully internalize the higher order problem solving gains during the group application phases, viewing the collaborative process as an operational hurdle rather than a cognitive accelerator.

Conclusion

This empirical analysis demonstrates that the transition from traditional lectures to TBL is not demograhically neutral. It alters behavioral and cognitive outcomes along gender lines. TBL can shape a good and strong study habit, ensuring positive peer interdependence and leading student to consistently prepare before coming to class. We can observe a similar habit across both genders. However, the interactive group work employed in TBL reveals an enduring preference gap, with female students benefit from collaborative task while male students report lower problem-solving gain when embedded in a female dominated team. How this findings show possible trends only and future research with more balanced male and female participants is needed.

Recommendation for health administration educators in non-clinical setting

Recommendation emphasize three areas. First TBL structure should be retained as the pre class tests and group accountability make all student to force themselves to come prepared to class. Second, to reduce social alienation of male student in a female dominated group, educator must assign clear roles in team so that peer interaction become more inclusive of both male and female. Lastly, the final grades should maintain fairness by balancing both group performance and individual knowledge check so no demographic group feels disadvantaged by the team delivery framework.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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