Gender Differences in Student Engagement among Polytechnic Students

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Abstract

Student engagement is widely recognised as a critical determinant of academic achievement, persistence, and learning outcomes, particularly within Technical and Vocational Education and Training (TVET) institutions where active participation is essential for both theoretical and practical learning. This study examined gender differences in student engagement among first-semester diploma students in a Malaysian polytechnic. A quantitative cross-sectional survey design was employed involving 106 students from various diploma programmes. Data were collected using an adapted version of the Student Engagement Instrument developed by Appleton et al. (2006), encompassing six dimensions: lecturer–student relationship, control and relevance of schoolwork, peer support for learning, aspirations and goals, family support for learning, and extrinsic motivation. Descriptive statistics and independent samples t-tests were utilised for data analysis. The findings revealed that students generally demonstrated high levels of engagement, with the highest mean scores recorded for aspirations and goals, family support for learning, and lecturer–student relationship. In contrast, extrinsic motivation recorded the lowest mean score, indicating that students were primarily driven by intrinsic and relational factors rather than external rewards. Independent-samples t-test results showed no statistically significant gender differences in lecturer–student relationship, control and relevance of schoolwork, peer support for learning, family support for learning, and extrinsic motivation. However, a significant gender difference was identified in the aspirations and goals dimension, with male students reporting higher levels of aspirations and goals than female students. The findings suggest that gender has limited influence on most aspects of student engagement within the polytechnic context, although differences may exist in students' future educational aspirations and goal orientation. The study contributes to the growing body of literature on student engagement in TVET and provides evidence to support the implementation of inclusive engagement strategies that foster positive learning experiences and academic success for all students.

Keywords: Diploma students; Gender differences; Polytechnic students; Student engagement; TVET.

1.0 Introduction

Student engagement is widely recognised as a critical determinant of learning quality, academic achievement, persistence, and retention in higher education. In Technical and Vocational Education and Training (TVET) institutions such as polytechnics, student engagement is particularly important because learning extends beyond theoretical knowledge to include

practical, hands-on experiences that require active participation and sustained involvement. Engaged students are more likely to demonstrate positive learning behaviours, stronger academic commitment, and greater success in developing industry-relevant competencies.

In Malaysia, polytechnics play a significant role in producing skilled graduates who meet the demands of the national workforce. However, challenges related to student participation, motivation, and academic persistence continue to be reported across higher education institutions. As a result, enhancing student engagement has become an important priority for educators and policymakers seeking to improve student learning outcomes and graduate employability. Understanding factors that may influence engagement is therefore essential for ensuring the effectiveness of teaching and learning practices within the polytechnic environment.

Among the factors frequently examined in the student engagement literature is gender. Previous studies have reported mixed findings regarding the relationship between gender and student engagement. Some researchers found that female students tend to demonstrate higher levels of academic engagement, motivation, and participation than male students, often attributing these differences to stronger self-regulation, learning commitment, and academic attitudes. Conversely, other studies reported minimal or no significant gender differences, suggesting that engagement may be influenced more strongly by contextual, institutional, and instructional factors than by gender alone. These inconsistent findings indicate that the role of gender in shaping student engagement remains inconclusive.

Furthermore, much of the existing literature has been conducted in general higher education settings, with relatively limited attention given to TVET and polytechnic institutions. Given the distinctive characteristics of polytechnic education, including practice-oriented learning, industry-based training, and competency-focused curricula, findings from traditional university settings may not be directly applicable to polytechnic students. Therefore, further investigation is required to determine whether gender differences in student engagement exist within the Malaysian polytechnic context.
Against this backdrop, the present study examines gender differences in student engagement among first-semester diploma students in a Malaysian polytechnic. By providing empirical evidence from the TVET context, the study contributes to a better understanding of student engagement and supports the development of inclusive educational practices that promote positive learning experiences for all students.

Student engagement remains a key concern in educational research because it is closely associated with academic achievement, persistence, and overall learning success. Students who are actively engaged in their learning are more likely to participate in classroom activities, develop meaningful relationships with lecturers and peers, and achieve positive educational outcomes. Consequently, understanding factors that influence engagement has become increasingly important, particularly within TVET institutions where active participation is essential for acquiring both theoretical knowledge and practical competencies.

One factor frequently examined in the literature is gender. Previous studies have reported differing findings regarding the influence of gender on student engagement. Several studies found that female students generally exhibit higher levels of academic motivation, engagement, and learning commitment compared to male students. These studies suggest that female students tend to demonstrate stronger academic behaviours, greater self-discipline, and higher levels of participation in educational activities. However, other studies reported no significant differences between male and female students, indicating that engagement may be shaped more by institutional environments, teaching practices, and social support systems than by gender itself.

The inconsistency of these findings creates uncertainty regarding the extent to which gender influences student engagement. Moreover, much of the existing evidence has been derived from general higher education settings, while empirical research focusing specifically on TVET and polytechnic students remains limited. The unique characteristics of polytechnic education, including practical training, competency-based learning, and strong industry orientation, may produce engagement patterns that differ from those observed in conventional university environments.

In the Malaysian polytechnic context, limited empirical evidence is available regarding whether male and female students differ significantly across various dimensions of student engagement. Without such evidence, educators and administrators may find it difficult to determine whether engagement interventions should be tailored according to gender or implemented universally across the student population. Therefore, this study is necessary to examine whether significant gender differences exist in student engagement among diploma students in a Malaysian polytechnic. The findings are expected to contribute to the student engagement literature while providing practical insights for the development of inclusive and effective teaching and learning strategies within TVET institutions.

Student engagement is widely recognised as a multidimensional construct that plays a crucial role in shaping students' learning experiences, academic achievement, and educational success. Although scholars have conceptualised student engagement from different perspectives, there is broad agreement that engagement reflects the degree of effort, participation, commitment, and involvement students invest in their learning activities. For example, Zepke (2017) emphasises positive learning behaviours as indicators of engagement, while Lee, Song, and Hong (2019) focus on students' dedication and interaction in the learning process. Similarly, Wong and Liem (2021) highlight students' initiative, interest, and motivation, whereas Martin and Bolliger (2018) view engagement as an investment of cognitive, psychological, and practical resources. Despite these varying perspectives, the literature consistently suggests that student engagement is a key factor contributing to academic success, skill development, and positive learning outcomes.

Fredricks, Blumenfeld, and Paris (2004) proposed one of the most influential frameworks of student engagement, conceptualising engagement as comprising behavioural, emotional, and cognitive dimensions. Behavioural engagement refers to participation in academic and extracurricular activities, emotional engagement reflects students' feelings of belonging and attachment toward their educational environment, while cognitive engagement concerns the psychological investment and strategic effort students devote to learning. This multidimensional framework has been widely adopted in educational research and provides a useful basis for understanding how students interact with their learning environment.

Despite extensive research on student engagement, the influence of gender remains inconclusive. Several studies have reported that female students tend to demonstrate higher levels of behavioural and emotional engagement than male students, often attributing these differences to stronger academic motivation, self-regulation, and learning commitment (Lei et al., 2018). These findings suggest that gender may play a role in shaping students' experiences of engagement and educational behaviours. However, other studies have reported little or no significant gender differences, indicating that engagement may be influenced more strongly by contextual factors than by gender itself. Factors such as teaching practices, institutional culture, peer relationships, curriculum structure, and learning environments have been identified as important determinants of student engagement across different educational settings.

Contextual differences among study settings may explain the inconsistency of previous findings. Much of the existing evidence has been generated from general higher education institutions, particularly universities, where learning experiences, student characteristics, and educational expectations differ considerably from those found in Technical and Vocational Education and Training (TVET) institutions. Polytechnic education is characterised by practice-oriented learning, industry-based training, and competency-focused curricula, which may create unique engagement patterns among students. Consequently, findings derived from university settings may not be directly applicable to polytechnic students.

Furthermore, empirical studies examining gender differences in student engagement within Malaysian polytechnic and TVET institutions remain limited. Given the contradictory findings reported in previous studies and the distinctive characteristics of the polytechnic learning environment, further investigation is warranted. Therefore, this study seeks to examine whether significant gender differences exist in student engagement among diploma students in a Malaysian polytechnic. By providing empirical evidence from the local TVET context, the study contributes to a more nuanced understanding of student engagement and informs the development of inclusive educational practices that support all learners.

2.0 Methodology

The target population comprised all first-semester diploma students enrolled in a local polytechnic during the study period, with a total population of 155 students. A census approach was adopted, whereby all eligible students were invited to participate in the study. Participation was voluntary, and students were informed that their responses would be used solely for research purposes. This approach was employed to obtain a comprehensive representation of the target population and minimise sampling bias.

Although a census approach was adopted, participation in the study was voluntary. Of the 155 eligible first-semester diploma students invited to participate, 110 questionnaires were returned. Following data screening, four questionnaires were excluded due to incomplete responses and missing data, resulting in a final sample of 106 respondents. The final sample represented 68.4% of the target population and was considered adequate for statistical analysis due to its substantial population coverage and suitability for the statistical procedures employed. Before data collection, informed consent was obtained from all participants. Respondents were assured that their identities would remain anonymous and that all information provided would be treated confidentially and used solely for research purposes.

3.0 Results and Discussion.

3.1 Descriptive Finding on Student Engagement

The analysis of 106 respondents indicates generally high levels of engagement across most dimensions. As shown in Table 1, the lecturer–student relationship dimension recorded a strong mean score of 5.02 (SD = .6778), with students reporting positive, supportive interactions with their lecturers. The highest-rated item (LSR6) reflects students' perception of lecturers as open and honest (M = 5.26, SD = .7597), followed closely by comfort in communicating with lecturers and receiving support when needed. Similarly, the dimension on control and relevance of schoolwork obtained a mean of 5.10 (SD = .6504), with more than half of the respondents strongly agreeing that the content learned in class is important for their future (LSR13: M = 5.41, SD = .7274). Students also demonstrated responsibility in verifying their work and ensuring comprehension, indicating serious attitudes toward academic performance. Peer support for learning yielded a slightly lower mean of 4.82 (SD = .9062), though still above average, with over half of the respondents affirming that they have supportive friends at the polytechnic. These findings suggest that positive social interactions and collaborative learning environments continue to play an essential role in students' academic experiences.

The highest overall mean score was observed in the aspirations and goals dimension (M = 5.25, SD = .7096), underscoring students' strong academic motivation and forward-looking attitudes. More than half strongly believed that education creates opportunities (LSR28: M = 5.39, SD = .7755), and nearly all respondents expressed a desire to pursue further studies at the university level. Family support for learning also emerged as a key factor, with a mean of 5.18 (SD = .8009), and over 90 percent of respondents reported that

they seek guidance from their families when facing academic challenges. In contrast, extrinsic motivation showed the lowest mean score (M = 2.80, SD = 1.537), suggesting that most students do not rely on external rewards from lecturers or family members to stay motivated. This indicates that polytechnic students' engagement is predominantly driven by intrinsic and relational factors rather than by external incentives.

3.2 Inferential Finding on Differences between Student Engagement and Gender

The findings of the independent samples t-test revealed that gender differences were generally not evident across most dimensions of student engagement. No statistically significant differences were found between male and female students in lecturer–student relationship, control and relevance of schoolwork, peer support for learning, family support for learning, and extrinsic motivation ($p > .05$). However, a statistically significant gender difference was observed in the aspirations and goals dimension, where male students reported higher levels of aspirations and goals than female students, $t(104) = 2.730$, $p = .007$. These findings suggest that gender has a limited influence on most aspects of student engagement among polytechnic students, although it may play a role in shaping students' future educational aspirations and goal orientation.

Table 1: Descriptive findings on student engagement (N=106)

Item		Likert Scale						Mean	S.D.	Level
		1	2	3	4	5	6			
Dimension: Lecturer-Student Relationship								5.02	.6778	AA
LSR1	Overall, lecturers at my polytechnic treat students fairly.	1 .9	2 1.9	0 .0	15 14.2	47 44.3	41 38.7	5.17	.8560	High
LSR2	Lecturers at my polytechnic listen to the students.	1 .9	1 .9	0 .0	22 20.8	42 39.6	40 37.7	5.11	.8764	High
LSR3	At my polytechnic, lecturers care about students.	0 .0	2 1.9	0 .0	18 17.0	37 34.9	49 46.2	5.25	.8055	High
LSR4	My lecturers are there for me when I need them.	0 .0	1 .9	1 .9	17 16.0	41 38.7	46 43.4	5.23	.8198	High
LSR5	The polytechnic rules are fair.	1 .9	6 5.7	0 .0	30 28.3	34 32.1	35 33.0	4.90	.9946	AA
LSR6	Overall, my lecturers are open and honest with me.	0 .0	1 .9	0 .0	17 16.0	41 38.7	47 44.3	5.26	.7597	High
LSR7	I enjoy talking to the lecturers here.	0 .0	2 1.9	0 .0	20 18.9	38 35.8	46 43.4	5.21	.8132	High
LSR8	I feel safe at Polytechnic.	0 .0	5 4.7	2 1.9	26 24.5	32 30.2	41 38.7	4.99	1.0	AA
LSR9	Most lecturers at my polytechnic are interested in me as a person, not just as a student.	8 7.5	14 13.2	7 6.6	33 31.1	27 25.5	17 16.0	4.08	1.4083	Low
Dimension: Control and Relevance of School Work								5.10	.6504	
CRS1	The tests in my classes do a good job of measuring what I can do.	0 .0	1 .9	0 .0	22 20.8	50 47.2	33 31.1	5.08	.7447	High
CRS2	Most of what is important to know, you learn in a polytechnic.	0 .0	2 1.9	0 .0	26 24.5	46 43.4	32 30.2	5.02	.7926	AA
CRS3	The grades in my classes do a good job of measuring what I can do.	0 .0	2 1.9	0 .0	25 23.6	45 42.5	34 32.1	5.05	.7974	AA
CRS4	What I'm learning in my classes will be important in my future.	0 .0	1 .9	0 .0	12 11.3	36 34.0	57 53.8	5.41	.7274	High
CRS5	After finishing my schoolwork, I check it over to see if it's correct.	0 .0	2 1.9	4 3.8	16 15.1	41 38.7	43 40.6	5.10	.9849	High
CRS6	When I do my schoolwork, I check to see whether I understand what I'm doing.	1 .9	2 1.9	0 .0	11 10.4	47 44.3	45 42.5	5.25	.8374	High

CRS7	Learning is fun because I get better at something.	0 .0	4 3.8	0 .0	15 14.2	40 37.7	47 44.3	5.23	.8313	High
CRS8	When I do well in polytechnic, it's because I work hard.	0 .0	4 3.8	0 .0	15 17.9	45 42.5	42 39.6	5.18	.8141	High
CRS9	I have a say about what happens to me at the polytechnic.	1 .9	13 12. 3	3 2.8	30 28.3	31 29.2	28 26.4	4.61	1.1429	BA
Dimension: Peer Support for Learning								4.82	.9062	
PSL1	Other students at the polytechnic care about me.	2 1.9	12 11. 3	0 .0	33 31.1	34 32.1	25 23.6	4.62	1.0819	BA
PSL2	Students at my polytechnic are there for me when I need them.	2 1.9	8 7.5	0 .0	31 29.2	35 33.0	30 28.3	4.76	1.0651	AA
PSL3	Other students here like me the way I am.	3 2.8	12 11. 3	0 .0	28 26.4	41 38.7	22 20.8	4.60	1.110	BA
PSL4	I enjoy talking to the students here.	1 .9	4 3.8	1 .9	28 26.4	41 38.7	31 29.2	4.89	.9693	AA
PSL5	Students here respect what I have to say.	1 .9	10 9.4	2 1.9	26 24.5	44 41.5	23 21.7	4.69	1.0361	BA
PSL6	I have some friends at the polytechnic.	0 .0	2 1.9	1 .9	17 16.0	27 25.5	59 55.7	5.33	.8807	High
Dimension: Aspirations and Goals								5.25	.7096	
AG1	I plan to continue my education at a polytechnic.	0 .0	4 3.8	0 .0	25 23.6	40 37.7	37 34.9	5.04	.8807	AA
AG2	Going to university after the polytechnic is important.	1 .9	2 1.9	1 .9	21 19.8	30 28.3	51 48.1	5.18	.9837	High
AG3	Polytechnic is important for achieving my future goals.	0 .0	0 .0	0 .0	19 17.9	36 34.0	51 48.1	5.30	.7581	High
AG4	My education will create many future opportunities for me.	0 .0	2 1.9	0 .0	13 12.3	33 31.1	58 54.7	5.39	.7755	High
AG5	I am hopeful about my future.	0 .0	5 4.7	0 .0	14 13.2	27 25.5	60 56.6	5.34	.8825	High

Dimension: Family Support for Learning								5.18	.8009	
FSL1	My family/guardian (s) are there for me when I need them.	0 .0	3 2.8	0 .0	18 17.0	31 29.2	54 50.9	5.28	.8480	High
FSL2	When I have problems at the polytechnic, my family/guardian (s) are willing to help me.	0 .0	7 6.6	0 .0	19 17.9	29 27.4	51 48.1	5.17	.9509	High
FSL3	When something good happens at the polytechnic, my family/guardian (s) want to know about it.	0 .0	8 7.5	0 .0	21 19.8	33 31.1	44 41.5	5.07	.9589	AA
FSL4	My family/guardian (s) want me to keep trying when things are tough at the polytechnic.	0 .0	5 4.7	0 .0	20 18.9	30 28.3	51 48.1	5.20	.9094	High
Dimension: Extrinsic Motivation								2.80	1.537	
EM1	I'll learn, but only if my family/guardian (s) reward me. (R)	31 29.2	19 17.9	20 18.9	15 14.2	15 14.2	6 5.7	2.82	1.6024	Low
EM2	I'll learn, but only if the lecturer rewards me. (R)	33 31.1	21 19.8	18 17.0	17 16.0	8 7.5	9 8.5	2.77	1.6170	Low

Note:
S.D.: Standard deviation
Likert Scale: 1-Strongly Disagree, 2-Likely Disagree, 3-Disagree, 4- Likely Agree, 5- Agree, 6-Strongly Agree
Level: 1.00-4.33 Low, 4.34-4.69 Below Average (BA), 4.70-5.07 Above Average (AA), 5.08-6.00 High

The present findings are consistent with studies by Reza, Mohammad, and Hessam (2014) and Annetta, Holmes, Collazo, and Cheng (2009), who similarly reported no significant gender differences in student engagement. These studies suggested that engagement may be influenced more strongly by learning environments, institutional experiences, and interpersonal relationships than by gender alone. The consistency of these findings across different educational settings suggests that male and female students may experience comparable opportunities and support systems that contribute to similar engagement levels.

However, the findings differ from those reported by Kinzie et al. (2007), who identified significant gender differences in first-year student engagement, and Tison, Bateman, and Culver (2011), who found that gender influenced several aspects of engagement among university students. One possible explanation for these contrasting findings may be differences in educational settings, programme structures, cultural contexts, and measurement approaches. While those studies were conducted primarily in university environments, the present study focused on diploma students in a polytechnic context, where learning is often competency-based, practical, and industry-oriented.

Similarly, Bru, Virtanen, Kjetilstad, and Niemiee (2019) reported that female students demonstrated stronger behavioural and emotional engagement than male students. In contrast, the current study found no statistically significant gender differences across five dimensions of student engagement. However, a significant gender difference was observed in the aspirations and goals dimension, with male students reporting higher aspirations and goals than female students. This finding suggests that gender may influence certain aspects of student engagement while having limited impact on others.

Overall, the findings contribute to the growing body of literature suggesting that gender may not consistently predict student engagement across educational settings. Rather than indicating that existing teaching practices are effective, the findings suggest that male and female students at this polytechnic experience similar levels of engagement and support in the learning environment. Therefore, future efforts to enhance student engagement may be directed towards factors such as learning experiences, social support, motivation, and instructional practices, which may exert a greater influence on engagement than gender alone.

Table 2: Independent-samples t-test results according to gender

Dimension	Male Mean (SD)	Female Mean (SD)	*t*(df)	*p*
Lecturer–Student Relationship	5.12 (.626)	4.92 (.718)	1.506 (104)	.135
Control and Relevance of Schoolwork	5.10 (.637)	5.11 (.670)	-0.066(104)	.947
Aspirations and Goals	5.23 (.746)	4.71 (.678)	2.730 (104)	.007
Peer Support for Learning	4.92 (.742)	4.71 (.678)	1.199 (104)	.233
Family Support for Learning	5.25 (.678)	5.10 (.868)	0.970 (104)	.334
Extrinsic Motivation	2.91(1.620)	2.69 (1.455)	0.725 (104)	.470

The results of the independent-samples t-test revealed no statistically significant gender differences in lecturer–student relationship, control and relevance of schoolwork, peer support for learning, family support for learning, and extrinsic motivation ($p > .05$). However, a statistically significant gender difference was observed in the aspirations and goals dimension, with male students reporting higher levels of aspirations and goals than female students, $t(104) = 2.73$, $p = .007$. These findings suggest that while gender does not appear to influence most dimensions of student engagement, it may play a role in shaping students' future educational aspirations and goal orientation.

For the lecturer–student relationship, male students reported a slightly higher mean score (M=5.12, SD=.626) than female students (M=4.92, SD=.718); however, the difference was not statistically significant, $t(104)=1.506$, $p=.135$. Similarly, no significant gender difference was observed for control and relevance of schoolwork, where male students (M=5.10, SD=.637) and female students (M=5.11, SD=.670) reported almost identical perceptions, $t(104)=-0.066$, $p=.947$.

With respect to aspirations and goals, male students reported a significantly higher mean score (M=5.23, SD=.746) than female students (M=4.71, SD=.678), and the difference was statistically significant, $t(104)=2.73$, p=.007. This finding suggests that male students demonstrated stronger aspirations and future-oriented educational goals than their female counterparts within the present sample. Likewise, male students reported slightly higher levels of peer support for learning (M=4.92, SD=.742) than female students (M=4.71, SD=.678); however, the difference was not statistically significant, $t(104)=1.199$, $p=.233$. No significant gender difference was found in family support for learning, with male students (M=5.25, SD=.678) reporting slightly higher scores than female students (M=5.10, SD=.868), $t(104) = 0.970$, $p=.334$. Similarly, male students reported marginally higher levels of extrinsic motivation (M=2.91, SD=1.620) than female students (M=2.69, SD=1.455), although the difference was not statistically significant, $t(104)=0.725$, $p=.470$.

Overall, the findings indicate that gender was not a significant differentiating factor across most dimensions of student engagement. However, a statistically significant difference was observed in the aspirations and goals dimension, with male students reporting higher aspirations and goals than female students. While gender appears to have limited influence on lecturer–student relationships, schoolwork relevance, peer support, family support, and extrinsic motivation, it may play a role in shaping students' future educational aspirations and goal orientation within the polytechnic context.

The findings of this study offer several important implications for educators, administrators, and policymakers within the polytechnic context. While no significant gender differences were observed across most dimensions of student engagement, a significant difference was identified in the aspirations and goals dimension. This finding suggests that male and female students generally experience comparable levels of engagement and support within the

institution; however, differences may exist in their future educational aspirations and goal orientation. Therefore, educators and student support services may consider implementing initiatives that encourage long-term educational planning and career development among all students while ensuring that engagement opportunities remain inclusive and accessible. However, further research is required to identify the specific institutional and instructional factors that contribute to these engagement patterns. This indicates that engagement may be influenced more strongly by the learning environment, instructional strategies, and support structures than by demographic characteristics such as gender.

As such, polytechnics may benefit from continuing to strengthen universal engagement strategies—such as promoting meaningful lecturer–student interactions, ensuring the relevance of academic tasks, and encouraging peer collaboration—to sustain positive engagement outcomes for all students. Additionally, the strong levels of aspiration, family support, and healthy peer relationships observed in this study further highlight the importance of maintaining a holistic support ecosystem that nurtures students' academic growth and personal development.

Moreover, the low scores in extrinsic motivation imply that students rely more heavily on intrinsic and relational forms of motivation. This finding suggests the need for educators to design learning experiences that cultivate self-driven learning, autonomy, and internal goal setting rather than depending on reward-based reinforcement. Institutions may also consider providing targeted interventions, workshops, or counselling programmes to further foster intrinsic motivation and academic self-efficacy. Overall, the results underscore the value of sustained, inclusive engagement strategies that address both academic and psychosocial dimensions of student development.

4.0 Conclusion

In conclusion, this study examined gender-based differences in student engagement across six dimensions, namely lecturer–student relationship, control and relevance of schoolwork, peer support for learning, aspirations and goals, family support for learning, and extrinsic motivation among 106 diploma students in a local polytechnic. The findings revealed no statistically significant gender differences in lecturer–student relationship, control and relevance of schoolwork, peer support for learning, family support for learning, and extrinsic motivation.

However, a statistically significant gender difference was observed in the aspirations and goals dimension, with male students reporting higher levels of aspirations and goals than female students. These findings suggest that gender has a limited influence on most aspects of student engagement but may be associated with differences in students' future educational aspirations and goal orientation. The findings contribute to the growing body of literature indicating that student engagement is a multifaceted construct that may be influenced more strongly by educational experiences, learning environments, and support systems than by gender alone.

The study also provides practical implications for Technical and Vocational Education and Training (TVET) institutions. Since male and female students demonstrated comparable levels of engagement, educators and administrators may continue to focus on inclusive engagement strategies that benefit all learners regardless of gender. Emphasis should be placed on strengthening lecturer–student relationships, fostering peer support, promoting meaningful learning experiences, and supporting students' aspirations and goals, as these dimensions recorded relatively high levels of engagement among respondents. Such efforts may contribute to improved learning experiences, academic success, and student retention within polytechnic and TVET institutions.

Despite its contributions, this study has several limitations. First, the study was conducted in a single polytechnic, which may limit the generalisability of the findings to other polytechnic or TVET institutions in Malaysia. Second, the study employed a cross-sectional design that captured student engagement at only one point in time, preventing the examination of changes in engagement over different stages of study. Third, the study relied solely on self-reported questionnaire data, which may be influenced by response bias and social desirability effects.

Therefore, future research is recommended to include larger and more diverse samples drawn from multiple polytechnics and TVET institutions across different regions of Malaysia. Future studies may also examine whether gender differences emerge across different academic programmes, semesters of study, or institutional settings within the broader TVET sector. Qualitative or mixed-methods approaches could also be utilised to provide deeper insights into students' experiences of engagement and perceptions.

Overall, the findings of this study provide valuable evidence regarding gender and student engagement within the Malaysian polytechnic context. While no significant gender differences were observed across most dimensions of student engagement, a significant difference was identified in the aspirations and goals dimension. These findings support the implementation of inclusive educational practices while highlighting the need to understand further factors that shape students' educational aspirations and future goals within TVET institutions.These findings reinforce the importance of creating supportive and inclusive learning environments within TVET institutions, where engagement is fostered through meaningful educational experiences rather than demographic characteristics such as gender.

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Y. L. Ling: Conceptualisation, Abstract, Introduction and Discussion, Methodology, Testing, Results, Writing; **L. Z. E. Chung:** Reviewing and **T. S. James:** Editing; **Y. H. Li:** Collaborator.

Conflicts of Interest

The manuscript has not been published elsewhere and is not under consideration by any other journal. All authors have reviewed and approved the manuscript, consent to its submission, and declare that there are no conflicts of interest.

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