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COGNITIVE SCIENCES AND HUMAN DEVELOPMENT

The effect of idea generation on innovative work behaviour among TVET teachers at vocational colleges in Malaysia

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ABSTRACT

This study examines the effect of idea generation on Innovative Work Behaviour (IWB) among Technical and Vocational Education and Training (TVET) teachers in Malaysian vocational colleges. A quantitative, cross-sectional design was employed, and data were collected from 331 teachers using a validated questionnaire through stratified random sampling to ensure balanced representation across regions. Descriptive analysis demonstrated that both ideas were perceived at high levels. Pearson correlation analysis revealed a strong, positive relationship between idea generation and IWB, indicating that teachers who frequently engage in ideation are also more likely to demonstrate innovative teaching behaviours. A simple linear regression further confirmed that idea generation significantly predicts IWB. These findings highlight the critical role of cognitive creativity in shaping innovative educational practices. The study underscores the need for institutional strategies such as leadership support, collaborative cultures, and professional development to promote idea generation in vocational education. The results contribute to the theoretical understanding of IWB and provide practical insights for educational policymakers. Future research should explore additional organisational and contextual factors that may influence innovation in teaching and learning.

Keywords: idea generation, innovative work behaviour, technical and vocational education and training, vocational education

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1 INTRODUCTION

Innovation has emerged as a cornerstone of educational progress, particularly in Technical and Vocational Education and Training (TVET), where responsiveness to evolving industrial trends is crucial. In Malaysia, the transformation agenda for TVET institutions highlights the importance of educators not only in delivering technical knowledge but also in cultivating creativity and adaptability among students. As industries adopt digitalisation, automation, and advanced technologies, teachers face increasingly complex and innovation-driven responsibilities in preparing graduates (Ministry of Education Malaysia, 2023).

In this context, Innovative Work Behaviour (IWB) has become a key focus in educational research and practice. IWB refers to the intentional creation, promotion, and implementation of new ideas within a work role, group, or organisation to improve performance and outcomes (Janssen, 2000). For vocational educators, IWB may include developing fresh instructional approaches, revising curricula to address emerging skills gaps, or embedding workplace-relevant technologies in the classroom. These behaviours are vital for professional growth, institutional development, and the readiness of graduates to meet industry demands (Zargar et al., 2025).

IWB is generally conceptualised in three interrelated phases: idea generation, idea promotion, and idea realisation. Among these, idea generation forms the foundation of the innovation process. For teachers, this may involve designing engaging learning materials, exploring alternative assessment strategies, or addressing pedagogical challenges creatively. By initiating the innovation sequence, idea generation directly influences the likelihood of successful implementation (Lambert & Newman, 2023).

Despite its significance, the contribution of idea generation to IWB remains underexplored, particularly within Malaysian vocational education. Previous studies have emphasised broader predictors of innovation, such as leadership, professional development, and organisational learning (Zainal & Mohd Matore, 2021), but few have placed idea generation at the centre of investigation. This gap leaves policymakers and institutional leaders with limited evidence on how to stimulate teacher-led innovation beginning at the conceptual stage.

Empirical research from diverse educational settings supports the critical role of idea generation in enhancing innovation. For instance, Fischer and Barabasch (2023) found that vocational educators who engaged in conceptualising and implementing creative teaching approaches demonstrated stronger capacities for innovative practices. Similarly, Qin et al. (2025) demonstrate that heightened collaboration among teachers is linked to greater innovation capacity, mediated through stronger motivation and instructional self-efficacy. These findings imply that idea generation is not merely an individual trait but is also shaped by institutional context and collaborative practices.

Additional evidence from Estonia and Finland further emphasises the relevance of idea generation in vocational education. Al Dulaimi et al. (2022) found that innovation capabilities in the education sector were strongly associated with institutional support and collaborative environments, highlighting that such conditions enable teachers to generate and implement new ideas in their

practice. Innovation capabilities significantly influence human development competitiveness in the UAE's education sector, underscoring the importance of institutional support and collaborative environments in fostering idea generation and innovative practices. These international perspectives underscore the cross-cultural importance of cultivating educational settings that encourage creativity in teaching.

Bandura's (1986) Social Cognitive Theory posits that behaviour is the result of reciprocal interactions among cognitive, behavioural, and environmental influences. In the context of innovative work behaviour, teachers' cognitive processes (e.g., idea generation) interact with environmental factors such as organisational culture and leadership support, which in turn shape the extent to which innovative practices are enacted. Janssen's (2000) model of IWB can be understood through this lens, where idea generation originates from internal cognitive factors, but its promotion and implementation depend on environmental support. Similarly, Amabile's componential theory of creativity (1996) highlights the joint influence of domain expertise, intrinsic motivation, and supportive environments on creative outcomes. Applied to vocational education, these perspectives suggest that fostering innovative work behaviour requires not only individual creativity but also enabling conditions within schools and vocational institutions (Pazin et al., 2022). To illustrate these theoretical linkages, a conceptual model is presented in Figure 1.

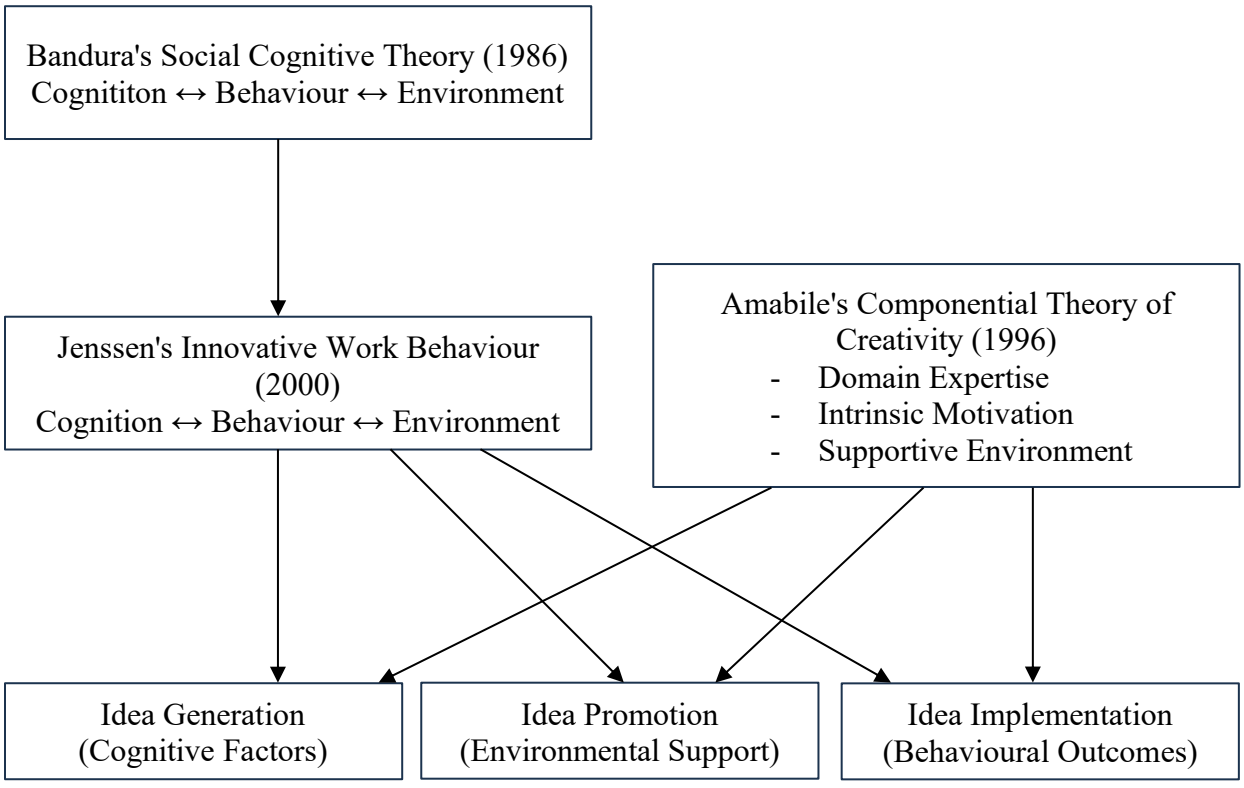

Figure 1. Conceptual model integrating Social Cognitive Theory, innovative work behaviour, and componential theory of creativity.

As shown in Figure 1, the conceptual model positions Bandura's (1986) Social Cognitive Theory as the overarching framework, within which cognitive, behavioural, and environmental factors interact to shape innovative work behaviour. Janssen's (2000) model is embedded in this framework, illustrating how idea generation arises from internal cognitive processes, while idea promotion and implementation are dependent on environmental and organisational support. Amabile's (1996) componential theory of creativity reinforces this dynamic, emphasising that domain expertise, intrinsic motivation, and supportive conditions contribute to the enactment of innovative practices. The model highlights that teachers' innovative work behaviour is the result of both individual cognitive resources and enabling institutional environments.

Moreover, literature from higher education research suggests that innovative teaching behaviours often stem from institutional support systems that reward creativity. According to Fullan and Langworthy (2014), innovation thrives in learning ecosystems that strike a balance between autonomy and accountability. In practice, when teachers have the freedom to explore new teaching approaches while receiving constructive feedback, idea generation becomes embedded in everyday instructional planning (Shahroom & Hussin, 2018). In secondary education, research by Stoll et al. (2006) indicates that schools functioning as learning organisations are more likely to foster IWB among teachers. These institutions tend to emphasise shared goals, continuous professional development, and reflective practice, all of which support the emergence of new ideas. Thus, drawing parallels between general education and vocational education highlights universal strategies for promoting teacher-led innovation (Pedraja-Rejas et al., 2025).

A study by Schleicher (2012) within OECD countries revealed that professional autonomy, leadership trust, and inter-teacher collaboration are pivotal in nurturing innovative competencies. This aligns with the Malaysian TVET context, where enhancing teacher agency through such mechanisms could strengthen idea generation capabilities. Therefore, incorporating global perspectives on vocational education and training reinforces the rationale for this study (Avis, 2024). In the Malaysian context, barriers such as rigid curricula, limited industry exposure, and bureaucratic constraints have been documented as hindrances to teacher innovation. These issues not only restrict access to up-to-date knowledge but also discourage creative risk-taking in instructional practices (Mesuwini & Mokoena, 2024).

Recent research identified multiple barriers faced by Malaysian TVET institution directors in managing industry-institution partnerships, including limited managerial skills, governance issues, and industry collaboration constraints (Mohamad et al., 2023). Without strong institutional support for experimentation and ideation, many teachers lack the psychological safety needed to engage in innovative practices. Understanding how idea generation operates under these constraints is therefore crucial for informing policies and reforms that promote innovation in vocational colleges.

Recognising these gaps, the present study aims to examine the effect of idea generation on IWB among Malaysian TVET teachers. By doing so, it seeks to fill a void in current research and offer empirical evidence to support innovation-promoting strategies. Anchored in established theoretical models and enriched by global perspectives, this study aspires to inform leadership practices, professional development policies, and institutional frameworks that can foster sustainable innovation in vocational education.

The following research objectives were established to provide a clear focus for the study:

1. To examine the overall levels of idea generation and innovative work behaviour among TVET teachers in Malaysian vocational colleges.
2. To investigate the relationship between idea generation and innovative work behaviour.
3. To determine the extent to which idea generation significantly predicts innovative work behaviour among TVET teachers.

The present study proposes the following hypotheses:

H1: There is a significant positive relationship between idea generation and innovative work behaviour among TVET teachers.
H2: Idea generation significantly predicts innovative work behaviour among TVET teachers in Malaysian vocational colleges.

2 METHODS

2.1 Design

This study employed a quantitative research approach to examine the effect of idea generation on Innovative Work Behaviour (IWB) among Technical and Vocational Education and Training (TVET) teachers in Malaysian vocational colleges. A cross-sectional survey design was chosen to allow for statistical analysis of the relationship between the variables. The demographic characteristics of the respondents included gender, teaching experience, and geographic region. For regression analysis, teaching experience was categorised into three groups: less than 5 years, 5–10 years, and more than 10 years.

2.2 Participants

A total of 331 TVET teachers from various vocational colleges across Malaysia participated in the study. To ensure balanced representation across different regions including the North, Central, South, East Coast, and East Malaysia, a stratified random sampling technique was employed. This approach strengthened the generalisability of the findings to the wider population of Malaysian TVET teachers.

2.3 Instruments

A structured questionnaire was used to collect data and comprised two sections, section A gathered demographic information, including gender, years of teaching experience, and institutional location. Section B focused on measuring the main constructs: idea generation and innovative work behaviour. The items were adapted from validated scales developed by De Jong and Den Hartog (2010) for idea generation and Janssen (2000) for innovative work behaviour. All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). To ensure the quality of the instrument, the questionnaire underwent a pre-test involving 30 TVET

teachers. Content and face validity were established through expert reviews by seven specialists in educational research and organisational behaviour. Based on the pilot data, the instrument demonstrated high internal consistency, with Cronbach's alpha values of 0.86 for Idea Generation and 0.89 for Innovative Work Behaviour. These values exceed the 0.70 threshold recommended by Sarstedt et al. (2020), confirming the reliability of the instrument. The validity procedures align with recent practices in educational research instrument development, which emphasise the importance of expert judgment in establishing both content and face validity (Lambert & Newman (2023).

2.4 Procedure

The data collection process lasted two months and involved the distribution of questionnaires via Google Forms. Ethical approval was obtained from the university's research ethics committee. All participants were provided with an informed consent form, and confidentiality of responses was strictly maintained. Data were analysed using SPSS Version 26. Descriptive statistics were used to summarise the demographic profile of the respondents and key variables. Pearson correlation analysis was conducted to examine the relationship between idea generation and IWB. To test the hypothesis, a simple linear regression analysis was first conducted to assess the effect of idea generation on IWB. The regression analysis was appropriate because the objective was to determine the predictive relationship between a single independent variable (idea generation) and a dependent variable (IWB).

To further test the robustness of the model, a multiple regression analysis was conducted by including teaching experience (categorised as less than 5 years, 5–10 years, and more than 10 years) as additional predictors. Teaching experience was dummy coded, with less than 5 years used as the reference group, to examine whether idea generation remained a significant predictor of IWB after controlling for teachers' teaching experience. The model's significance was evaluated using F-tests and t-tests, with a 95% confidence level ($p < .05$). Assumptions of linearity, normality, and homoscedasticity were tested and satisfied prior to analysis.

3 RESULTS

This section presents the detailed findings derived from the quantitative analysis conducted in the study. It began with descriptive statistics that summarised the demographic characteristics of the 331 TVET teacher respondents, including gender distribution, teaching experience, geographic location, and disciplinary background. This demographic profile provided essential context for interpreting the behavioural patterns observed. Following this, descriptive statistics for the two principal constructs, namely idea generation and innovative work behaviour (IWB), were reported, offering insight into respondents' self-perceptions and levels of engagement with each variable.

A Pearson product-moment correlation analysis was conducted to determine the strength and direction of the relationship between idea generation and IWB. This analysis confirmed a statistically significant relationship between the two constructs, serving as a foundation for predictive analysis. Finally, a simple linear regression analysis was performed to examine the extent to which idea generation predicted innovative work behaviour. The regression output

included the regression coefficient, R^2 value, and significance levels, all of which provided empirical support for the study's hypothesis. Together, these analyses offered a comprehensive understanding of how idea generation influenced innovative practices among TVET teachers in Malaysian vocational education settings.

Descriptive statistics were employed to summarise the demographic characteristics of the TVET teachers who participated in the study. Table 1 presents the demographic profile of the respondents. Of the 331 teachers, 159 (48.0%) were male and 172 (52.0%) were female, reflecting a relatively balanced gender distribution and suggesting inclusivity in the representation of both male and female educators in vocational education. This balance is particularly relevant in understanding gender-related dynamics in Innovative Work Behaviour (IWB) within the Malaysian context, where both male and female teachers play equally important roles in shaping student outcomes.

The largest proportion of respondents was from the East Coast region (27.2%), followed by the Northern, Central, Southern, and East Coast regions. This broad regional representation strengthens the generalisability of the findings and provides a more comprehensive view of the innovation landscape in Malaysian TVET institutions. In terms of teaching experience, more than half of the respondents (61.9%) had over 10 years of experience. This distribution implies that the insights gathered are largely informed by seasoned educators who have likely encountered varied pedagogical scenarios and institutional changes, thereby providing a rich foundation for analysing patterns of idea generation and innovation.

Moreover, participants were drawn from various technical disciplines, highlighting the interdisciplinary nature of TVET education. The disciplines included engineering, information technology, hospitality, agriculture, and business studies. Such diversity ensures that the study captures a range of perspectives regarding the role of idea generation in fostering innovative teaching behaviours, as each field may have unique approaches, challenges, and opportunities for innovation. Table 1 provides a detailed breakdown of these demographic characteristics, supporting the contextualisation of subsequent analyses and reinforcing the representativeness of the sample.

Table 1. Demographic profile of respondents (N = 331).

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	159	48.0
	Female	172	52.0
Teaching Experience	Less than 5 years	43	13.0
	5 to 10 years	83	25.1
	More than 10 years	205	61.9
Geographic Region	East Malaysia	90	27.2
	Northern Region	87	26.3
	Central Region	70	21.2
	Southern Region	45	13.6
	East Coast	39	11.8

Table 2 presents the descriptive statistics for the two principal variables examined in this study: idea generation and innovative work behaviour (IWB). The results, derived from a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), demonstrated a mean score of 3.94 (SD = 0.58) for idea generation and a slightly higher mean score of 4.01 (SD = 0.61) for IWB. Based on the 5-point scale interpretation (1.00 - 2.33 = low, 2.34 - 3.66 = moderate, 3.67 - 5.00 = high), both values fell within the high category, indicating that TVET teachers frequently generated new ideas and demonstrated innovative practices in their professional roles. These findings suggested a strong positive inclination toward innovation-related behaviours among the surveyed population.

The observed minimum and maximum scores for idea generation ranged from 2.33 to 5.00, and for IWB from 2.29 to 5.00, reflecting a sufficiently broad range of responses. This variation is important as it demonstrates that the data captures diverse experiences and perceptions among the respondents. While many teachers reported frequent engagement in idea generation and innovation, there are still individuals with moderate or lower engagement, offering nuanced insights into the variability of innovative work behaviour across the teaching cohort.

The standard deviations, which hover around 0.60 for both variables, indicate a moderate spread of scores. This suggests that the responses were neither too tightly clustered around the mean nor widely dispersed, pointing to a healthy level of variability in the data. Such dispersion supports the robustness of the data for inferential statistical analysis, particularly simple linear regression, by confirming the absence of severe ceiling or floor effects that could skew interpretation.

These initial descriptive findings are critical as they establish a foundational understanding of how frequently TVET teachers in Malaysian vocational colleges engage in ideation and innovation. The data imply that innovation is not only present but also prevalent in the professional behaviour of these educators. This reinforces the importance of further examining how one construct of idea generation might influence or predict the other innovative work behaviour through regression analysis.

Table 2. Descriptive statistics for key variables (N = 331).

Variable	Min	Max	Mean	Std. Deviation
Idea Generation	2.33	5.00	3.94	0.58
Innovative Work Behaviour (IWB)	2.29	5.00	4.01	0.61

To further evaluate the relationship between the two primary constructs in this study, a Pearson product-moment correlation analysis was conducted. This statistical test is widely recognised for determining the strength, direction, and significance of a linear association between two continuous variables, in this case, idea generation and Innovative Work Behaviour (IWB) among TVET teachers. As shown in Table 3, the analysis revealed a correlation coefficient of $r = .60$, which was statistically significant at the $p < .001$ level (Field, 2024). This finding indicates a strong positive association between the two variables, suggesting that teachers who frequently engage in generating new ideas are more likely to demonstrate innovative behaviours in their professional practices. Recent studies in educational innovation support this trend, showing that cognitive

engagement in ideation significantly correlates with the adoption of new instructional strategies and technological integration (Ghardashi et al., 2022).

According to modern guidelines for effect size interpretation in behavioural sciences, a correlation value between 0.70 and 0.89 reflects a strong relationship (Schober et al., 2018). Therefore, the observed correlation of $r = .70$ in this study indicates a strong positive relationship between idea generation and IWB. This underscores the critical role of creative ideation in fostering innovation-oriented behaviours such as curriculum redesign, instructional experimentation, and integration of new learning tools. This empirical result also strengthens the theoretical underpinnings of the study. Specifically, it aligns with Janssen's (2000) three-phase model of IWB, which identifies idea generation as the initial and essential phase in the innovation process. The strong correlation validates the model's claim that ideation precedes promotion and implementation.

Furthermore, the finding is consistent with Bandura's Social Cognitive Theory, which emphasises that cognitive beliefs and perceived capabilities significantly influence behaviour. Individuals who are confident in their creative potential tend to engage more frequently in innovative tasks (Bandura, 1986). In the teaching environment, this means that teachers who feel efficacious in generating ideas are more likely to act upon them in the form of pedagogical innovation.

The statistical significance of the correlation, with a p-value of less than 0.001, confirms that the relationship between idea generation and IWB is unlikely to have occurred by chance. This level of significance enhances the generalisability of the results to the broader population of Malaysian TVET teachers. It also provides a strong rationale for proceeding with regression analysis to explore the predictive power of idea generation on innovative work behaviour in greater detail (Sarstedt et al., 2020).

Beyond statistical and theoretical implications, the strong positive correlation has important practical consequences for educational leadership and policy. If idea generation is indeed a strong driver of innovative teaching practices, institutions must focus on cultivating environments that encourage creativity. Current best practices include innovation hubs, reflective teaching workshops, and flexible curriculum frameworks that empower teachers to engage in ideation and act on novel ideas (Pedraja-Rejas et al., 2025).

Table 3. Correlation matrix.

Variable	1	2
1. Idea Generation	-	
2. Innovative Work Behaviour (IWB)	.70***	-

Note. ***$p < .001$.

To test the hypothesis that idea generation significantly predicts innovative work behaviour (IWB), a simple linear regression analysis was conducted. The regression model was found to be statistically significant, $F(1, 329) = 70.34$, $p < .001$, as shown in Table 4, indicating that idea generation contributes significantly to explaining the variance in IWB among TVET teachers. The

F-statistic confirms that the model as a whole is a good fit for the data, rejecting the null hypothesis that the model explains no variance in the outcome variable (Field, 2024; Hair et al., 2021).

The unstandardised regression coefficient (B = 0.68) suggests that for every one-unit increase in the idea generation score, the IWB score increases by 0.68 units, assuming all other factors are constant. This means that a teacher who actively engages in proposing new approaches, experimenting with teaching strategies, or solving instructional problems creatively is statistically more likely to demonstrate higher levels of innovative behaviour (Salleh et al., 2023).

The standardised coefficient *(β* = .60) provides a scale-free measure of effect size and demonstrates a strong, positive relationship between the independent and dependent variables. In recent behavioural science research, β values above 0.50 are often interpreted as large effects (Schober et al., 2018), suggesting that idea generation is not only statistically significant but also practically influential in shaping innovation-related teaching behaviours.

The coefficient of determination (R^2 = .36) indicates that 36% of the variance in IWB can be explained by the idea generation variable alone. This represents a moderate-to-large effect size in educational research, highlighting the predictive power of cognitive ideation on behavioural innovation outcomes. The adjusted R^2 of 0.35 further supports the model's reliability by accounting for sampling error and the number of predictors (Sarstedt et al., 2020).

Additionally, the t-value of 8.39 ($p < .001$) for the predictor confirms the statistical significance of idea generation in the model. This high t-value indicates that the observed relationship is unlikely to have occurred by chance, reinforcing the strength and reliability of idea generation as a predictor of innovative teaching behaviour.

Together, these results empirically support the hypothesis that idea generation has a statistically significant and positive effect on innovative work behaviour among TVET teachers. The findings align with Janssen's (2000) model of innovative work behaviour, in which idea generation initiates the innovation sequence. They are also consistent with Bandura's (1986) Social Cognitive Theory, which emphasises the role of internal cognitive factors such as ideation, belief in personal efficacy, and outcome expectation in shaping behavioural outcomes in professional settings (Zainal & Mohd Matore, 2021).

Table 4. Simple linear regression results for idea generation predicting IWB.

Predictor	B	SE	β	t-value	p-value	F-value	Sig. (p)
Idea Generation	0.68	0.07	.60	8.39	.000	70.34	.000

Note. $R^2 = 0.36$, Adjusted $R^2 = 0.35$.

These findings confirm that idea generation is a statistically significant and practically meaningful predictor of innovative work behaviour. The moderate-to-large effect size (R^2 = .36) indicates that interventions focused on enhancing teachers' ability to generate ideas could substantially improve innovation in teaching practices. Professional development initiatives, leadership support, and

collaborative environments that promote ideation could meaningfully elevate IWB across TVET institutions.

To further test the robustness of the model, a multiple regression analysis was conducted by adding teaching experience (categorised as less than 5 years, 5–10 years, and more than 10 years) as additional predictors (see Table 5). The <5 years category was treated as the reference group. The overall model was significant, $F(3, 327) = 65.20$, $p < .001$, with an R^2 of .37. Idea generation remained a significant predictor of innovative work behaviour ($B = 0.66$, $SE = 0.07$, $\beta = .59$, $t = 8.35$, $p < .001$). In contrast, teaching experience was not a significant predictor: neither the 5–10 years group ($B = 0.05$, $SE = 0.09$, $\beta = .02$, $t = 0.56$, $p = .574$) nor the more than 10 years group ($B = 0.09$, $SE = 0.10$, $\beta = .04$, $t = 0.90$, $p = .368$) differed significantly from the reference group. These findings indicate that innovative work behaviour among teachers does not significantly vary according to years of teaching experience but is strongly predicted by idea generation.

Table 5. Multiple regression predicting IWB.

Predictor	B	SE	β	t	p
Idea Generation	0.66	0.07	.59	8.35	.000
Teaching Experience (5–10 yrs)	0.05	0.09	.02	0.56	.574
Teaching Experience (>10 yrs)	0.09	0.10	.04	0.90	.368

Note. Reference group = Less than 5 years. $R^2 = .37$, Adjusted $R^2 = .36$, $F(3, 327) = 65.20$, $p < .001$.

4 DISCUSSION

The findings of this study revealed a meaningful relationship between idea generation and Innovative Work Behaviour (IWB) among TVET teachers. This suggests that teachers who regularly generate original ideas are more likely to adopt innovative teaching approaches, experiment with new pedagogical tools, and implement creative strategies in their classrooms. Such behaviours contribute significantly to improving educational delivery in vocational institutions. This means that teachers who adopt diverse teaching approaches and actively engage in experimenting with instructional strategies are better positioned to enhance innovative practices in vocational education (Salleh et al., 2023).

This study offers strong theoretical support for Janssen's (2000) model of innovative work behaviour, which conceptualises idea generation as the initial step in the innovation process. The findings also correspond with Bandura's (1986) Social Cognitive Theory, which explains that behaviour is shaped by internal thought processes and reinforced by environmental factors. In this context, the cognitive act of generating ideas emerges as a critical driver of observable innovative behaviours. This aligns with recent research showing that when teachers possess strong self-belief in their abilities and receive institutional support, they are more likely to engage in innovative work behaviour and translate their ideas into practice (Zainal & Mohd Matore, 2021).

From a practical perspective, the association between idea generation and IWB points to the importance of developing institutional environments that nurture creativity. Encouraging collaborative learning communities, interdisciplinary brainstorming, and reflective professional dialogues can stimulate ideation among teachers. Providing safe and supportive environments that allow for pedagogical experimentation without fear of failure can further enhance innovation. Pedraja-Rejas et al. (2025) noted that when schools offer access to resources, autonomy in curriculum design, and leadership support, teachers are more willing to take creative risks and initiate change.

The practical implications of these findings suggest that professional development should be strategically designed to enhance teachers' creative capacities, as idea generation was found to be a strong and significant predictor of innovative work behaviour ($\beta = .59$, $p < .001$). Training initiatives could include design thinking workshops, creative problem-solving clinics, and collaborative curriculum co-creation sessions that actively engage teachers in generating and testing new ideas for classroom practice. Such initiatives not only stimulate ideation but also promote shared responsibility for innovation across teaching teams.

Institutional recognition mechanisms are also essential in sustaining teachers' engagement with innovation. Awards for innovative teaching projects, explicit inclusion of creativity in performance evaluations, and promotion criteria that value pedagogical experimentation can validate and reinforce innovative contributions. Leadership further plays a pivotal role by creating enabling conditions such as allocating protected time for innovation, establishing reward and mentoring systems, and modelling openness to experimentation (Fullan & Langworthy, 2014). These measures directly align with the study's findings by linking environmental support to the activation of teachers' cognitive resources, thereby fostering a culture of sustainable innovation in vocational education.

Moreover, this study contributes new empirical insight into the Malaysian TVET context by confirming the relevance of idea generation in driving teacher innovation. While existing literature has broadly acknowledged the role of creativity in education, few studies have specifically addressed how ideation translates into innovative behaviour among vocational educators in Malaysia. Research by Mohamed et al. (2022) affirms that educators who regularly engage in cognitive exploration and reflective practice are more likely to adopt new teaching practices. Given the rapidly evolving, industry-linked demands of TVET, fostering a culture of ideation is essential to ensure educators remain dynamic and responsive to change.

That said, this study is not without limitations. Its cross-sectional design limits the ability to conclude causality, and the use of self-reported measures may introduce response bias. Future research would benefit from longitudinal or mixed method approaches to deepen the understanding of innovation over time. Additionally, exploring the role of mediating or moderating factors such as organisational climate, leadership support, or peer influence may offer a more comprehensive picture of the conditions under which idea generation leads to innovation (Sarstedt et al., 2020).

In conclusion, the study highlights the central role of idea generation in influencing innovative work behaviour among Malaysian TVET educators. The findings offer crucial guidance for educational leaders and policymakers in designing interventions that empower teachers to think

creatively and innovate within their practice. As Malaysia advances its agenda for TVET transformation, cultivating a workforce of educators who can generate and implement new ideas is essential to equip students with skills relevant to a fast-changing, technology-driven world.

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AUTHOR CONTRIBUTIONS

The first author conceived and designed the study. The second author was responsible for data collection and analysis. All three authors contributed to the interpretation of the results, participated in drafting and revising the manuscript, and approved the final version for submission.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this study.

DATA AVAILABILITY STATEMENT

All data generated or analysed during this study are included in this published article. Additional datasets are available from the corresponding author on reasonable request.

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