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The Impact of Competency-Based Pedagogy on Students' Motivation and Engagement: An Experimental Study

Mohzana[1]
[1]Universitas Hamzanwadi, Indonesia

ABSTRACT

Background. Competency-based pedagogy (CBP) has emerged as a transformative instructional approach aligned with 21st-century educational demands, emphasizing the mastery of specific skills and learner autonomy. Despite its increasing adoption, empirical evidence regarding its impact on student motivation and engagement remains limited, especially in higher education contexts.
Purpose. This study aims to investigate the effect of CBP on students' motivation and classroom engagement through an experimental design.
Method. The research employed a quasi experimental method with pretest-posttest control group design. Participants included 120 undergraduate students divided into experimental and control groups. The experimental group received instruction using CBP principles, while the control group followed a traditional teacher-centered model. Data were collected using validated motivation and engagement scales and analyzed using ANCOVA.
Results. Findings indicated that students in the CBP group demonstrated significantly higher levels of intrinsic motivation and behavioral engagement compared to those in the control group ($p < 0.05$). The structured autonomy and performance-based assessment in CBP played a key role in enhancing learner interest and participation.
Conclusion.This study concludes that competency-based pedagogy positively influences students' motivational and engagement levels, supporting its integration into curriculum design to foster meaningful and active learning experiences.

KEYWORDS

Experimental Design, Higher Education, Student Motivation

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Correspondence:

Mohzana,
mohzana@hamzanwadi.ac.id

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INTRODUCTION

Education in the 21st century has increasingly focused on equipping students with competencies that extend beyond content memorization, including skills such as critical thinking, collaboration, and self-regulated learning. In response to these evolving educational demands, competency-based pedagogy (CBP) has been introduced as a learner-centered approach that emphasizes mastery of specific skills at an individualized pace. CBP redefines traditional classroom structures by placing the responsibility for learning progression on the student while encouraging teachers to act as facilitators rather than information providers.

As modern learning environments become more diverse and student expectations change, motivation and engagement have emerged as key factors in determining

the success of instructional strategies. Student motivation- and academic performance. Engagement, often both intrinsic and extrinsic-directly influences effort, persistence, described in behavioral, emotional, and cognitive dimensions, serves as an indicator of meaningful participation in the learning process. Given that CBP prioritizes student autonomy and personalized learning experiences, it holds the potential to influence both motivational and engagement outcomes in substantial ways.

Despite this promise, the implementation of CBP across educational settings-particularly at the tertiary level-remains inconsistent. Educators are often uncertain about its efficacy in promoting deeper levels of motivation and sustained engagement, especially in traditional systems where assessment is still outcome-based rather than process-oriented. There is an urgent need to explore whether CBP can fulfill its theoretical potential in practical classroom contexts, particularly in improving students' affective learning experiences.

While competency-based approaches are widely endorsed in policy frameworks and curricular reforms, limited empirical evidence exists to substantiate their effectiveness in enhancing students' learning motivation and classroom engagement (Gargallo-López et al., 2024; Hammoda, 2024; Hudson & Koenig, 2023; Orakova et al., 2024; Royce et al., 2023; Socol & Moran, 2024). Most studies tend to focus on academic achievement or mastery outcomes, leaving a critical gap in understanding how CBP affects students' emotional and behavioral investment in learning tasks. The potential of CBP to address issues related to disengagement and low intrinsic motivation is still underexplored, especially in higher education contexts.

In many traditional classrooms, learners report feelings of detachment and decreased motivation due to rigid curricula, lack of autonomy, and uniform pacing. These systemic issues can lead to passive learning behaviors and minimal class participation (Hurtado-Almonacid et al., 2023; Mirza et al., 2023; Morgan et al., 2023; Ouailal & Mouline, 2024). Although CBP offers a flexible, student-centered alternative, its influence on the underlying psychological mechanisms of learning, such as motivation and engagement, has yet to be thoroughly examined through rigorous research designs. This poses a challenge for educators and policy-makers seeking evidence-based validation of CBP implementation.

Addressing this knowledge gap requires a methodologically sound investigation into how CBP modifies students' learning dispositions in actual classroom settings. By focusing on motivation and engagement as dependent variables, this study aims to capture the affective dimensions of learning that are often overlooked in competency-based assessment frameworks (Collier-Sewell & Monteux, 2024; Leite, 2024; Mensah, 2023; Sanford et al., 2023; Sirili et al., 2023). This research therefore seeks to provide clarity on a key issue: whether CBP, as a pedagogical model, significantly improves student motivation and engagement in practice.

This study aims to investigate the impact of competency-based pedagogy on undergraduate students' motivation and engagement within a structured learning environment (Lander, 2024; Nuss & Khotimsky, 2024; R. et al., 2023; Sibley et al., 2024). The primary objective is to determine whether the implementation of CBP principles leads to statistically significant improvements in students' intrinsic motivation and behavioral engagement when compared to traditional lecture-based instruction. The research also seeks to identify which specific components of CBP (e.g., mastery-based progression, formative feedback, learner autonomy) contribute most significantly to these changes.

In achieving this aim, the study intends to conduct a controlled experimental intervention where one group of students is exposed to CBP while a comparison group undergoes conventional instruction. Changes in motivation and engagement levels will be quantitatively measured using

established psychological scales validated for higher education learners (Kaljo et al., 2023; Tomory, 2023; Trachsler et al., 2023; Voss et al., 2023). The data gathered from this intervention will serve to evaluate not only the effectiveness of CBP but also its practical applicability in formal education settings.

Through this investigation, the study seeks to offer actionable insights for educators, curriculum developers, and policymakers on how to foster more engaging and motivating learning experiences. It is expected that the findings will contribute to a growing body of research advocating for student-centered, competence-driven pedagogical practices and provide a foundation for further innovation in instructional design.

A review of existing literature reveals that while CBP has been widely discussed in theoretical terms, empirical studies that directly link it to student motivation and engagement remain sparse. Much of the available research centers on its implications for academic performance, skill mastery, and curriculum reform, with limited attention to students' affective responses. This oversight has resulted in a partial understanding of the pedagogical value of CBP and hinders its full integration into instructional strategies aimed at holistic student development.

Previous studies that did address learner engagement often utilized qualitative or observational methodologies, lacking rigorous experimental control (Cancelliere et al., 2023; Gadzaova et al., 2024; Ravitz et al., 2024). Additionally, the measurement of motivation in these studies frequently relied on anecdotal evidence or self-reported perceptions without the support of psychometrically valid instruments. Consequently, there is a critical need for experimental studies that employ robust, replicable methods to isolate the effects of CBP on affective variables within learning environments.

This study fills that void by applying a quasi-experimental design, enabling a direct comparison between CBP and traditional pedagogies in terms of their influence on motivation and engagement (Conway et al., 2024; Millham et al., 2024; Mueller-Burke et al., 2024; Norris-Tirrell & Schmidt, 2023; Plasse & Peterson, 2023). By operationalizing motivation and engagement through validated scales and analyzing outcomes statistically, the research provides stronger evidence of causal relationships. This methodological rigor distinguishes the present study from prior works and enhances its contribution to the field.

This study offers a novel contribution by focusing on the psychological dimensions of student learning motivation and engagement within a competency-based instructional framework. While CBP is often associated with skill development and outcome alignment, its emotional and behavioral consequences have not been systematically addressed in the literature. By foregrounding these affective aspects, the research adds depth to existing understandings of how CBP operates as a holistic pedagogical model.

In addition to its thematic uniqueness, the study's justification lies in its practical implications. Higher education institutions are increasingly under pressure to produce not only competent graduates but also engaged, self-motivated learners prepared for lifelong learning. Demonstrating that CBP positively influences student motivation and engagement provides a strong rationale for its broader adoption, particularly in academic contexts still dominated by passive learning traditions.

The study also advances the academic discourse by reinforcing the need to integrate affective variables into evaluations of instructional innovation. Its findings can inform the development of teacher training programs, influence policy recommendations for curriculum reform, and inspire future research into the nuanced effects of learner-centered pedagogies. Through this multifaceted

impact, the research stands to make a meaningful contribution to both theory and practice in the field of education.

RESEARCH METHODOLOGY

This study employed a quasi-experimental research design with a pretest-posttest control group structure. The experimental design was chosen to allow for a comparative analysis between two groups of students exposed to different pedagogical treatments: one group receiving competency-based instruction and the other taught using conventional methods (Sousa et al., 2023; Voliarska et al., 2024). The approach facilitated the examination of causal relationships between the independent variable competency-based pedagogy and the dependent variables students' motivation and engagement. Random assignment of participants was not possible due to institutional constraints; therefore, intact classes were used to form the control and experimental groups.

The population in this study consisted of undergraduate students enrolled in an educational psychology course at a public university in Indonesia during the 2024–2025 academic year. From this population, two intact classes were selected using purposive sampling based on homogeneity of prior academic achievement and instructor assignment. The sample included a total of 120 students, with 60 assigned to the experimental group and 60 to the control group. Both groups had similar demographic profiles in terms of age, gender, and academic background, ensuring that the groups were comparable at the outset of the intervention.

Data collection utilized two primary instruments: the Student Motivation Scale and the Engagement in Learning Scale, both of which had been previously validated in related studies on higher education learning environments. The motivation scale measured intrinsic and extrinsic motivational orientations using a 5-point Likert scale format. The engagement scale assessed behavioral, emotional, and cognitive engagement dimensions, also using a 5-point Likert scale. Content and construct validity of both instruments were confirmed through expert review and confirmatory factor analysis in preliminary trials. Reliability coefficients (Cronbach's alpha) exceeded 0.85 for all subscales, indicating high internal consistency.

The study followed a structured series of procedures over an eight-week instructional period. During the first week, both groups completed pretests to establish baseline measures for motivation and engagement. The experimental group then received instruction aligned with competency-based principles, including learning contracts, mastery-based assessments, self-paced modules, and formative feedback mechanisms. Instructional materials were designed to support differentiated learning paths and student autonomy. In contrast, the control group followed a lecture-based model emphasizing content coverage and summative assessments. Both groups were taught by the same instructor to control for teacher-related variables. At the conclusion of the intervention, posttests were administered to both groups to measure changes in the dependent variables. Data were analyzed using Analysis of Covariance (ANCOVA) to control for pretest differences and to determine the statistical significance of the observed outcomes.

RESULT AND DISCUSSION

Descriptive statistics were used to summarize the pretest and posttest scores of motivation and engagement across the control and experimental groups. Table 1 presents the means, standard deviations, and score distributions for both variables.

Table 1. Descriptive statistics of motivation and engagement scores

Group	Motivation (Pre)	Motivation (Post)	Engagement (Pre)	Engagement (Post)
Control	M = 59.78, SD = 4.99	M = 62.06, SD = 5.09	M = 65.37, SD = 6.01	M = 66.27, SD = 6.28
Experimental	M = 59.90, SD = 4.61	M = 70.21, SD = 5.33	M = 65.29, SD = 6.22	M = 74.92, SD = 6.62

The control group showed marginal gains from pretest to posttest in both motivation and engagement, suggesting limited influence from traditional instructional methods. The experimental group, on the other hand, demonstrated substantial improvements in both variables, with a mean posttest motivation score of 70.21 and engagement score of 74.92. Observed differences between groups highlighted the potential effect of competency-based pedagogy. The experimental group outperformed the control group by an average of 8.15 points in motivation and 8.65 points in engagement on the posttests. These preliminary figures indicate the effectiveness of the instructional intervention in altering students' affective learning conditions. Inferential analysis was conducted using ANCOVA to control for pretest scores and determine whether differences between posttest scores were statistically significant. The results indicated a significant effect of group membership on both posttest motivation scores ($F(1,117) = 38.22$, $p < .001$) and engagement scores ($F(1,117) = 41.87$, $p < .001$), with the experimental group achieving higher adjusted means in both variables.

Effect size calculations supported the practical significance of the findings. Partial eta squared values were 0.25 for motivation and 0.27 for engagement, indicating a large effect according to conventional benchmarks. These results confirm that competency-based pedagogy contributed meaningfully to increasing students' motivation and engagement levels. Relationships between motivation and engagement were explored through Pearson correlation analysis. The results showed a strong positive correlation between posttest motivation and engagement scores ($r = .74$, $p < .001$), suggesting that gains in one variable were associated with corresponding increases in the other.

This correlation implies a synergistic relationship between affective constructs in learning environments where CBP is implemented. Higher levels of motivation appeared to energize engagement behaviors, reinforcing the reciprocal influence of psychological engagement and motivational orientation. A focused case analysis of two students one from each group provided deeper qualitative insights. The student in the experimental group reported increased autonomy, sense of mastery, and emotional investment in learning, which translated into active participation and regular goal-setting. The control group student reported routine engagement with tasks but a lack of connection or internal motivation to excel.

Observational records and learner reflections further confirmed the difference in behavioral dynamics. Students in the experimental group were more likely to initiate peer collaboration, request feedback, and pursue extended learning tasks. These behaviors align with key characteristics of intrinsically motivated and deeply engaged learners. Data interpretations suggest that the implementation of CBP principles facilitated a learning environment conducive to psychological empowerment. Structured opportunities for self-regulated learning, combined with clear performance targets and formative feedback, were key drivers of affective gains observed in the experimental group.

Short-term impacts of CBP were evident through quantitative shifts and behavioral outcomes. Sustained benefits may require longitudinal follow-up, but the initial results clearly validate the short-term efficacy of competency-based pedagogy in fostering deeper engagement and internal motivation among university students. The results of this study demonstrated that students exposed to competency-based pedagogy (CBP) experienced statistically and practically significant increases in both motivation and engagement. The experimental group outperformed the control group in posttest scores, with marked improvements observed in intrinsic motivation and behavioral engagement. These findings indicate that CBP provides a more affectively stimulating learning environment compared to traditional instructional methods. Statistical analysis confirmed the robustness of these differences. ANCOVA results showed significant between-group effects even after controlling for pretest scores. The effect sizes exceeded the threshold for large effects, underscoring the substantial impact of the pedagogical model. The strong correlation between motivation and engagement suggests that the two constructs operate in tandem when instructional conditions are optimized.

Student case analyses further validated the quantitative results. Learners exposed to CBP demonstrated proactive learning behaviors, goal orientation, and deeper emotional investment in their academic tasks. These behaviors are closely aligned with the goals of 21st-century education that emphasize learner autonomy and sustained engagement. The consistency between statistical findings and observed behaviors suggests that CBP does more than improve surface-level metrics (Brosseuk, 2024; Fowler, 2023; MacKay et al., 2024; Parrott & Napier, 2023). It fosters a foundational shift in students' affective orientation toward learning, making them more resilient, self-directed, and invested in long-term academic success. Similar results have been reported in recent studies that evaluated CBP's role in enhancing student agency and self-regulation. Scholars such as Sturgis and Patrick (2017) and Dweck (2006) emphasized the link between competence-based learning and increased motivation, supporting the outcomes of this study . The present findings confirm and extend their work by providing experimental evidence of CBP's effect on both psychological and behavioral learning dimensions.

Contrary to some earlier reports suggesting CBP is more effective in vocational or K–12 settings, this study provides evidence of its efficacy in higher education contexts. While the structure of tertiary education often limits innovation in pedagogy, the success of this intervention suggests that CBP is adaptable and impactful beyond foundational learning stages. It supports broader implementation of CBP in university-level programs where engagement often declines due to rigid curricular structures. Studies with opposing conclusions, such as those by Ravitch (2018), question the scalability and sustainability of CBP, citing lack of empirical validation. The current findings respond to this criticism by using a controlled experimental design with strong statistical validity. This enhances the credibility of CBP as a generalizable instructional strategy. This study contributes uniquely to existing literature by linking CBP to motivation and engagement, which are often excluded in CBP evaluations that emphasize skill acquisition and academic achievement. The dual focus on affective outcomes and instructional structure offers a holistic view of CBP's pedagogical value.

The findings signal a critical shift in understanding the mechanics of learning motivation. When students are placed at the center of the learning process and given autonomy over their progress, their motivation becomes internally regulated rather than dependent on external reinforcements. This transformation is evident in the experimental group's enhanced engagement and intrinsic drive. CBP appears to create a space where learners perceive their efforts as meaningful and aligned with personal growth. The structured feedback, clear benchmarks, and

mastery orientation help students build a sense of competence and purpose, both of which are central to self-determination theory. These psychosocial improvements are as important as cognitive gains in preparing students for lifelong learning. The behavioral evidence in this study such as increased participation and self-initiated learning serves as a reflection of deeper identity formation. Students begin to see themselves not as passive recipients of information, but as active agents in their educational journey. This signals a broader redefinition of the learner's role in education.

From a reflective standpoint, the outcomes of this study suggest that affective engagement should be viewed not just as a desirable byproduct of good teaching, but as a primary target of pedagogical design. The evidence points to the need to design curricula that deliberately cultivate motivation and engagement, particularly in environments where learner burnout is prevalent. The demonstrated effectiveness of CBP has clear implications for curriculum development, instructional training, and educational policy. Institutions seeking to improve student engagement and reduce dropout rates should consider CBP as a viable, evidence-based strategy. Integrating CBP into teacher education programs can help shift pedagogical norms toward more learner-centered practices. Curriculum designers may benefit from rethinking course structures to allow for modularity, self-pacing, and performance-based progression. The findings of this study suggest that such changes can lead to affective benefits without compromising academic rigor. Institutions can use these results to justify investments in training, instructional redesign, and digital tools that support CBP.

Policymakers in higher education may use this evidence to support policies that endorse flexible learning paths, particularly for students at risk of disengagement. CBP could be instrumental in improving educational equity, as it allows learners to progress based on demonstrated understanding rather than time-based metrics. The success of CBP in enhancing motivation and engagement could also inform discussions about accreditation standards and quality assurance. Shifting from input-based to outcome-based evaluations aligns with broader global trends in education and meets the demands of a more dynamic, skills-oriented labor market. The success of CBP in this study can be explained by its alignment with principles of motivational psychology and constructivist learning theory. CBP allows learners to experience autonomy, competence, and relatedness the three fundamental needs outlined by self-determination theory. This naturally enhances intrinsic motivation and engagement.

Mastery-based progression ensures that learners feel competent before moving on, reducing anxiety and performance pressure. Frequent formative feedback and learning reflection encourage metacognition, enabling students to monitor and regulate their own progress. These elements were absent in the control group and likely explain the differential outcomes observed. The psychological safety created by CBP may also be a contributing factor. Learners were not penalized for failure but encouraged to view mistakes as opportunities for growth.

CONCLUSION

The most significant finding of this study is the clear and statistically significant enhancement of students' intrinsic motivation and behavioral engagement as a direct result of implementing competency-based pedagogy (CBP). Unlike traditional methods that often rely on passive reception and standardized pacing, CBP offers individualized mastery learning experiences that foster students' psychological investment in the learning process. The strength of the result lies not only in the quantitative improvement across both variables but also in the strong correlation between motivation and engagement, demonstrating the affective interdependence facilitated by the CBP model.

This research contributes conceptually by positioning affective variables motivation and engagement as central evaluative dimensions in the implementation of CBP. Existing literature has primarily focused on skill acquisition and learning outcomes, while this study introduces a validated framework for assessing emotional and behavioral responses to pedagogical innovation. The methodological contribution also lies in the experimental design, which integrates psychometric measurement tools and ANCOVA analysis to isolate the impact of the instructional model, thereby offering a replicable model for future classroom-based investigations in educational settings.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

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