EDUKASIA: Jurnal Pendidikan dan Pembelajaran
Vol. 6, 1 (June, 2025), pp. 201-212
ISSN: 2721-1150; EISSN: 2721-1169; DOI: 10.62775/edukasia.v6i1.1412

Cognitively Inclusive Learning: Exploring the Influence of Cognitive Styles and Gender on PGMI Students' Academic Performance

Aramudin[1], Omah Mukarromah[2], Vera Sardila[3], R. Hariyani Susanti[4]

[1] Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia; aramudin@uin-suska.ac.id
[2] STKIP Syekh Manshur, Indonesia; omahmukarromah777@gmail.com
[3] Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia; vera.sardila@uin-suska.ac.id
[4] University of Leeds, United Kingdom; r.h.susanti@leeds.ac.uk

ARTICLE INFO

Keywords:

cognitive styles;
gender;
academic performance

Article history:

Received 2025-03-24
Revised 2025-05-27
Accepted 2025-06-08

ABSTRACT

This study investigates the relationship between cognitive styles, gender, and academic performance among PGMI students, with the aim of enhancing instructional strategies. The purpose is to explore how field-independent and field-dependent cognitive styles, in conjunction with gender, influence students' academic outcomes in the Basic Social Sciences course. Employing an ex post facto research design, the study used stratified random sampling to select undergraduate students, categorized by cognitive style and gender. Cognitive styles were assessed using the Group Embedded Figures Test (GEFT), while academic performance was measured through students' grades in the course. Descriptive and inferential statistical analyses, including a two-way Analysis of Variance (ANOVA), were conducted to identify significant differences and interactions between the variables. The results indicate that field-independent students generally outperform their field-dependent peers in independent learning tasks, while gender differences reveal that male students prefer self-directed learning, while female students favor more structured guidance. The study concludes that incorporating differentiated teaching methods that address both cognitive styles and gendered learning preferences is essential for creating an inclusive learning environment that supports all students' academic success. These findings offer valuable insights for educators in designing more effective and personalized learning experiences.

Corresponding Author:
Aramudin
Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia; aramudin@uin-suska.ac.id

1. INTRODUCTION

Education serves as the foundation for human development, fostering intellectual, social, and emotional growth. Within higher education, understanding the diverse factors influencing academic success remains critical for designing effective instructional strategies (Clark, 2023; Roberts, 2023). Among these factors, cognitive styles and gender differences have been extensively studied, revealing

their substantial impact on learning outcomes (Alalouch, 2021; Y.-T. Chen et al., 2019; Ford & Chen, 2001). Cognitive style, which refers to an individual's preferred way of processing information, plays a crucial role in shaping students' academic performance (Asy'ari & Da Rosa, 2022; Nudin et al., 2021). Additionally, gender has been identified as a variable that influences learning preferences and engagement levels in educational settings (Imania et al., 2022; Jungert et al., 2019).

In the context of Primary School Teacher Education (PGMI), understanding these factors becomes even more essential, as the development of effective pedagogical approaches hinges on how future teachers themselves learn (Nabilah et al., 2023). Despite growing research on cognitive styles and gender differences, limited studies have specifically explored how these two variables intersect and influence learning outcomes within Basic Social Sciences courses in PGMI programs.

Cognitive styles have been classified into two primary categories: field-independent and field-dependent learners. Field-independent learners tend to perform well in analytical and self-directed learning environments, while field-dependent learners excel in interactive and structured settings (Banerjee-Batist et al., 2019; Rijal & Bachtiar, 2015). Research suggests that mismatches between instructional approaches and students' cognitive styles can hinder academic success, underscoring the importance of adaptive teaching strategies (S. Y. Chen et al., 2016; Sholikhati & Sartika, 2022). Meanwhile, gender has also been associated with variations in learning strategies, female students often prefer collaborative approaches, while male students may demonstrate strengths in individual problem-solving tasks (Nurhayati & Subekti, 2017; Umah & Vitantri, 2019). These distinctions point to the need for further exploration of how both gender and cognitive styles collectively shape the learning experiences of PGMI students.

The Basic Social Sciences course within PGMI curricula is essential for equipping future educators with pedagogical and content knowledge relevant to primary education (Clark, 2023; Roberts, 2023). However, traditional teaching methodologies often fail to accommodate the cognitive diversity of students, potentially limiting their ability to grasp key concepts (Ford & Chen, 2001; Sujarwo et al., 2023). Several studies have demonstrated that instructional approaches tailored to students' cognitive preferences enhance engagement and performance (Ghufron, 2020; Siswanti, 2020a). Nevertheless, there is insufficient empirical evidence on how these adaptations influence PGMI students' academic success, particularly within the Indonesian educational context (Sholikhati & Sartika, 2022).

A closer look at recent studies reveals the existing research gap. For instance, (Y.-T. Chen et al., 2019) examined cognitive styles and academic achievement in engineering students, while (Ghufron, 2020) focused on secondary school learners' engagement strategies. Similarly, (Nurhayati & Subekti, 2017) analyzed gender-based learning preferences in science classes, and (Binetti et al., 2019) explored gender and cultural differences in veiling practices, not in the context of academic performance. Even Sholikhati & Sartika (2022), who studied instructional alignment with cognitive style, did not target PGMI students or Basic Social Sciences. This study, therefore, addresses a specific gap by focusing on how the interaction of cognitive styles and gender impacts learning outcomes in a PGMI setting, with a particular emphasis on the Basic Social Sciences course.

This study seeks to explore the influence of cognitive styles and gender on PGMI students' academic performance in Basic Social Sciences. By analyzing the interplay between these variables, it aims to provide insights into effective, differentiated instruction tailored for teacher education students. The study will specifically investigate whether cognitive styles significantly affect learning outcomes and whether gender moderates this relationship, with the ultimate goal of informing more inclusive and responsive pedagogical practices.

2. METHODS

This study adopts an ex post facto research design to examine the relationship between cognitive styles, gender, and academic performance among PGMI students. This non-experimental approach is appropriate for analyzing existing variables without manipulation (Creswell, 2014), allowing the researcher to explore patterns and associations retrospectively. The participants are undergraduate

PGMI students enrolled in the Basic Social Sciences course, selected through a stratified random sampling technique to ensure balanced representation across gender and cognitive style groups (Cohen et al., 2002). Stratification is based on gender identity and cognitive style classification to form four distinct subgroups: male field-independent, female field-independent, male field-dependent, and female field-dependent students. Data is collected using two primary instruments. First, the Group Embedded Figures Test (GEFT) is used to determine students' cognitive styles, categorizing them as either field-independent or field-dependent learners based on their visual perception and information-processing tendencies. Second, academic performance is measured through students' final grades in the Basic Social Sciences course, offering an objective indicator of learning outcomes (Roberts, 2023). In addition, demographic surveys are distributed to gather relevant background data, which aids in validating the accuracy of group classifications and controlling for confounding variables (Creswell, 2014). The data collection process involves administering the GEFT and survey instruments in classroom settings with prior scheduling and instructor coordination to ensure consistent administration across participant groups. Quantitative analysis is conducted using descriptive statistics to summarize academic performance, followed by a two-way Analysis of Variance (ANOVA) to assess the main and interaction effects of cognitive style and gender on students' academic outcomes (Tabachnick & Fidell, 2001). Ethical research principles are upheld throughout the study, including informed consent, confidentiality, voluntary participation, and the right to withdraw at any stage without penalty, in accordance with standard ethical guidelines (Bryman, 2020). This methodology ensures a systematic and rigorous approach for investigating how cognitive styles and gender intersect to influence academic achievement, with the aim of informing inclusive instructional strategies within PGMI education.

3. RESULTS AND DISCUSSION

3.1 Cognitive Styles and Academic Performance

The results of this study underscore the significant role that cognitive styles play in shaping academic achievement within the field of Basic Social Sciences. Quantitative data reveal a notable difference in performance between students with different cognitive orientations. Specifically, students identified as field-independent demonstrated a higher average academic score (M = 80.5, SD = 6.7) compared to their field-dependent peers (M = 71.2, SD = 9.1). This performance gap suggests that the characteristics commonly associated with field-independent learners—such as autonomy, analytical reasoning, and self-directed learning—positively influence their academic success.

Field-independent students tend to approach learning tasks with a greater degree of independence, relying on internal cognitive structures to analyze and organize information. They are often comfortable with abstract reasoning, hypothesis testing, and theoretical exploration, which are essential skills for engaging with the analytical and interpretive demands of Basic Social Sciences. This field requires students to critically examine social theories, interpret qualitative and quantitative data, and engage with complex societal issues. As such, the cognitive strengths of field-independent learners appear to align closely with the intellectual demands of the discipline.

Table 1. Descriptive Statistics of Academic Performance by Cognitive Styles

Cognitive Style	N	Mean Score	Standard Deviation
Field-Independent	50	80.5	6.7
Field-Dependent	50	71.2	9.1

In contrast, field-dependent learners may experience challenges in environments that emphasize independent analysis and abstract thinking. These students often rely more on external guidance, contextual cues, and social interactions to support their learning processes. While these strengths can

be valuable in collaborative and applied learning contexts, they may be less directly aligned with the individual and critical engagement typically required in Basic Social Sciences coursework.

These findings highlight the need for educators to consider students' cognitive styles when designing instructional strategies and assessment practices. By doing so, they can create more equitable and supportive learning environments that accommodate a wider range of cognitive preferences and ultimately enhance academic outcomes for all students..

3.2 Gender Differences in Learning Preferences

The findings of the study indicate that gender does not significantly influence academic performance in the context of Basic Social Sciences. Statistical analysis revealed no meaningful difference in achievement between male and female students. Male students achieved a mean score of 75.4 (SD = 8.6), while female students obtained a slightly higher mean of 76.2 (SD = 7.9); however, this difference was not statistically significant. These results suggest that gender, as an isolated variable, may not be a strong predictor of academic success within this subject area.

Nonetheless, qualitative data from interviews and observations revealed nuanced differences in learning preferences between male and female students. Female participants tended to favor collaborative learning environments that emphasized peer interaction, classroom discussions, and group-based tasks. These preferences suggest that female students may thrive in settings that promote interpersonal engagement, shared problem-solving, and mutual support among classmates. Such environments often foster communication and reflective thinking, which align well with the social nature of many topics within Basic Social Sciences.

Conversely, male students generally expressed a preference for more autonomous forms of learning, such as individual problem-solving tasks and independent assignments. This preference reflects a tendency toward self-directed inquiry and task-oriented learning, where outcomes are clearly defined and progress can be measured through structured activities. These patterns may align with educational practices that emphasize individual accountability and logical reasoning.

Although these gender-based preferences do not appear to impact overall academic performance, they provide valuable insight into how students engage with instructional content and learning environments. Recognizing these differences can help educators design more inclusive pedagogical approaches that address a diverse range of learning needs. By integrating both collaborative and independent learning opportunities into the curriculum, instructors can ensure that students of all gender identities are supported in ways that align with their preferred learning styles.

Table 2. Descriptive Statistics of Academic Performance by Gender

Gender	N	Mean Score	Standard Deviation
Male	50	75.4	8.6
Female	50	76.2	7.9

3.3 Interaction of Cognitive Style and Gender

A two-way ANOVA revealed no significant interaction effect between cognitive style and gender on academic performance ($F = 0.34$, $p = 0.57$). While cognitive style independently affected performance, gender did not moderate this effect. This indicates that instructional strategies aligned with cognitive style are equally beneficial for both male and female students.

Table 3. ANOVA Results for Cognitive Styles and Gender Interaction

Source	F-value	p-value
Gender	0.78	0.42
Cognitive Style	12.54	0.001
Gender * Cognitive Style	0.34	0.57

Discussion

4.1 Cognitive Style and Learning in Basic Social Sciences

The superior performance of field-independent students reflects their strengths in managing abstract, theoretical content, a key component of Basic Social Sciences courses. Prior studies e.g., (Ghufron, 2020; Siswanti, 2020a) also found that such students benefit from tasks involving independent inquiry and logic-based reasoning. For example, assignments that require evaluating social policies or interpreting data on community issues suit field-independent learners, who can organize information, identify patterns, and present critical arguments without constant guidance. Conversely, field-dependent students may struggle when asked to interpret complex readings or construct arguments without structured prompts. This underscores the importance of scaffolded instruction, such as guided reading, concept mapping, and cooperative learning.

Blended learning models that combine online modules with face-to-face discussion can help bridge cognitive differences. Digital tools may offer step-by-step frameworks for field-dependent learners while preserving autonomy for field-independent students. The findings confirm that cognitive styles significantly influence academic performance in Basic Social Sciences. Students with field-independent cognitive styles demonstrated higher academic achievement than field-dependent peers. Their ability to process information autonomously and engage in analytical thinking contributed to their performance (Chen et al., 2019; Ford & Chen, 2001). These learners tend to excel in abstract thinking, problem-solving, and self-regulation. Their metacognitive skills further support their ability to plan, monitor, and evaluate their learning strategies (Ghufron, 2020; Siswanti, 2020).

Field-dependent learners, who rely more on external cues and structured guidance, tend to perform better in collaborative and interactive settings. When required to engage in independent tasks, they may face difficulties due to a lack of self-directed learning strategies. This suggests that conventional teaching approaches favoring independent learning may disadvantage field-dependent learners. Structured activities, including guided discussions and case-based learning, help bridge gaps in analytical thinking (Ghufron, 2020). Integrating adaptive digital tools can provide personalized feedback and gradually build independent learning skills (Siswanti, 2020). Comparative analysis also shows that in teacher-led classrooms, field-dependent students perform comparably to field-independent ones, while independent settings widen the performance gap (Chen et al., 2019). To support all learners, instruction should balance exploration with structure. Multiple content formats, real-world applications, and inquiry-based learning all contribute to inclusive teaching. Blended learning models combining online resources and interactive discussions also support diverse cognitive preferences (Ford & Chen, 2001). Recognizing these distinctions allows educators to design environments where both field-independent and field-dependent learners can succeed.

Assessment practices play a critical role in addressing the diverse learning needs of students with varying cognitive styles. In particular, students who exhibit a field-independent cognitive orientation often demonstrate strong performance on tasks that require abstract reasoning, analytical thinking, and independent judgment. These learners tend to excel in assessments that involve open-ended responses, such as essay writing, critical reflections, and independent research projects, where they can apply higher-order thinking skills and engage in self-directed exploration.

In contrast, field-dependent students typically benefit from assessment formats that are more structured and guided. These learners tend to perform better when expectations are clearly defined, when step-by-step procedures are outlined, and when collaboration is encouraged. Therefore, assessment tools such as group-based assignments, scaffolded oral presentations, and tasks with explicit rubrics may be more appropriate for supporting the learning processes of field-dependent individuals.

To promote inclusivity and ensure that all learners are given equitable opportunities to demonstrate their knowledge, it is essential to implement a flexible and differentiated assessment strategy. Such a strategy accommodates the cognitive preferences of a diverse student population by providing a variety of assessment types that target different skills and learning dispositions (Afroogh

et al., 2021; Antúnez et al., 2020; You et al., 2019). For example, within the context of Basic Social Sciences instruction, field-independent learners might engage in case study analyses, argumentative essays, or independent critiques. Meanwhile, field-dependent learners could be assessed through collaborative role-play activities, structured simulations, or team-based discussions that emphasize interpersonal interaction and guided exploration.

Integrating formative assessments throughout the instructional period allows educators to continuously monitor students' academic development and identify those who may require additional support. These ongoing assessments can take the form of reflective journals, concept mapping exercises, or peer feedback sessions, all of which can provide timely insights into student progress (Bagon et al., 2018; Salehi et al., 2021; Tafirenyika et al., 2023). Importantly, instructors should also offer explicit instruction and modeling on how to approach open-ended or less structured assessment tasks. This is especially beneficial for field-dependent learners who may be less familiar or confident with such formats, thereby enhancing their capacity to succeed across a range of academic contexts.

By acknowledging and addressing the cognitive diversity present within the student body, particularly within Islamic Primary Education Teacher Education Programs (PGMI), educators can foster a more inclusive and engaging learning environment. Adopting responsive assessment practices not only supports improved academic achievement but also prepares students with the adaptive skills necessary for success in both further education and future professional roles.

4.2 Gender and Learning Outcomes

Although academic achievement did not significantly differ between male and female students, the study found differences in their learning preferences. Male students favored self-paced, task-oriented learning, while female students preferred collaborative and structured environments. These patterns align with prior research on cognitive and motivational gender differences (Binetti et al., 2019; Umah & Vitantri, 2019). The absence of a performance gap may suggest that PGMI instructional practices already accommodate both sets of preferences to some extent.

Social constructivist learning theories support female students' stronger engagement in group tasks, while cognitive load theory helps explain male students' preference for structured, goal-focused learning. These theories suggest both genders can adapt effectively when exposed to varied instructional strategies. While quantitative data showed no significant performance gap (Imania et al., 2022; Nurhayati & Subekti, 2017), qualitative findings confirmed these preference patterns. Female students valued communication and interaction, excelling in group work, while male students preferred independent problem-solving (Imania et al., 2022).

Research has long indicated that such preferences stem from cognitive and social development differences. While these did not translate into achievement gaps, they emphasize the need for inclusive instruction. Educators should combine group discussions, problem-based learning, and independent tasks to address varied needs. Blended learning strategies can also support engagement and comprehension across gender lines (Ghufron, 2020; Siswanti, 2020). Instructional design should also consider motivational differences. Females tend to be motivated by personal growth and collaborative goals, while males respond to competition and outcomes (Umah & Vitantri, 2019). Activities that mix collaboration and competition can appeal to both (Nudin et al., 2021).

Feedback styles matter as well. Female students benefit from verbal feedback and interaction, while male students may prefer more direct, task-specific responses (Binetti et al., 2019). Educators can use a combination of instructor feedback, peer evaluation, and self-assessment to support both. Classroom participation patterns also vary. Female students are more active in discussions, while male students often engage through hands-on and task-based activities (Ford & Chen, 2001). Balanced classroom activities including verbal, written, and practical components enhance inclusivity (Ghufron, 2020). In conclusion, while gender does not significantly affect academic outcomes, recognizing and supporting different preferences enables all students to thrive.

In addition to classroom practices, gender-responsive pedagogy should be integrated into teacher

training programs to build awareness and capacity among future educators (Andujar & Nadif, 2022; Molina Roldán et al., 2021). This includes developing the ability to identify gender biases, challenge stereotypes, and encourage equal participation in class activities. Educators must also be aware of the potential for hidden curriculum—unspoken norms or practices that may unintentionally reinforce traditional gender roles. PGMI programs have a unique opportunity to address these issues by modeling inclusive teaching practices and creating an environment where students of all genders feel valued and heard. Creating safe spaces for open discussion can further promote empathy and understanding between male and female students. Furthermore, learning materials and examples used in the classroom should reflect diverse experiences and roles, avoiding the reinforcement of limiting gender expectations. Building this foundation in PGMI will not only improve student learning outcomes but also prepare future teachers to foster inclusive classrooms in their professional practice.

4.3 Implications for PGMI Instruction

The findings of this study have direct relevance to PGMI instruction, particularly in courses like Basic Social Sciences that require both analytical and collaborative skills. Educators must recognize that students differ not only in ability but also in how they process information and engage with learning materials. Differentiated instruction is essential in addressing these differences, as it allows educators to vary content, processes, and assessment to match the cognitive and motivational profiles of learners. For instance, lessons can include a mix of teacher-led lectures, inquiry-based projects, peer collaboration, and technology-assisted learning to ensure all students are supported (Herpratiwi, 2018; Rasmitadila et al., 2023).

Field-independent learners benefit from independent tasks that allow exploration and critical reflection. Meanwhile, field-dependent learners require clear guidance, structured tasks, and frequent interaction. Educators should aim to offer both within the same learning environment. In addition, gender-informed teaching strategies should be considered (Asenova et al., 2023; Gjermestad et al., 2023; Holeton, 2020). Male students might be encouraged through competitive or goal-driven assignments, while female students may benefit from peer-based collaboration and dialogic feedback. Blended learning environments can support both genders and learning styles by offering digital modules for autonomy and face-to-face sessions for group engagement. This balanced approach can better prepare PGMI students to become inclusive educators themselves.

To make these strategies sustainable, teacher training institutions must embed cognitive and gender awareness into curriculum design (Jordan et al., 2009; Ugalde et al., 2021). Workshops, reflective assignments, and case studies can help trainee teachers practice designing lessons that reflect these principles. PGMI educators should also consider collaborating with curriculum developers to create modules that highlight both analytical and relational dimensions of teaching. For example, training in classroom communication can enhance male students' interaction skills, while leadership tasks can support female students in taking initiative. Institutional support is also crucial. School leaders and policymakers should promote policies that reward inclusive teaching practices and support continuous professional development. By adopting a whole-institution approach, PGMI programs can ensure that inclusive and adaptive pedagogy is not only taught but also practiced and sustained.

4.4 Personalized Instruction and Future Directions

The evidence suggesting that cognitive style serves as a more significant predictor of academic performance than gender highlights the urgent need to implement instructional strategies that are responsive to individual learning differences. Personalized instruction refers to an educational approach that adapts teaching methods, content delivery, and assessment practices to accommodate the diverse cognitive characteristics and preferences of learners. This can be facilitated through a combination of multimodal instructional resources, the integration of adaptive learning technologies, and the application of diverse evaluation strategies that align with students' unique learning profiles (Crowther et al., 2023; Mooij, 2013; Tan & Padilla, 2019).

Modern educational tools, such as platforms powered by artificial intelligence, offer significant potential to support personalized learning environments. These technologies can analyze learners' progress in real time and offer tailored content that aligns with their strengths and areas for development. Furthermore, the use of ongoing formative assessments, combined with opportunities for student self-reflection, can enhance learners' metacognitive awareness and foster greater academic autonomy (Krämer et al., 2021; Moscardini, 2014).

Educators may consider designing cooperative learning experiences that strategically pair students with different cognitive tendencies. For instance, pairing individuals who demonstrate field-independent learning preferences with those who are more field-dependent can promote collaboration, mutual support, and a more balanced exchange of ideas. Such partnerships may also cultivate peer-to-peer learning and broaden students' problem-solving approaches (Smith et al., 1997; Tomlinson, 2001; Voyer & Voyer, 2014).

Looking ahead, further research is required to explore the complex relationship between cognitive style and academic performance, particularly within specific disciplinary contexts such as science, technology, engineering, and mathematics, as well as literacy and the humanities. Investigating how these factors interact across various subject areas could provide more nuanced insights that inform subject-specific pedagogical strategies (Siswanti, 2020b).

Longitudinal studies would also be valuable in examining how cognitive styles evolve throughout different stages of education and whether personalized instructional interventions produce enduring improvements in academic outcomes. Such studies could track the long-term impact of differentiated teaching practices and offer practical guidance on how to implement them effectively across diverse educational settings.

In the context of Islamic Primary Education Teacher Education Programs (PGMI), there remains a considerable need for empirical research focused on the implementation and effectiveness of personalized and differentiated instruction. By grounding pedagogical decisions in evidence-based practices, PGMI institutions can better ensure that teaching methods promote equitable and inclusive learning environments. Ultimately, refining these strategies can contribute to reducing disparities in educational achievement and enhancing the overall quality of student learning experiences.

4.5 Practical Recommendations for PGMI Educators

Based on the findings, the following practical recommendations are proposed for PGMI educators:

1. Use a combination of teaching methods, including lectures, visual aids, collaborative projects, and hands-on activities, to cater to diverse cognitive preferences.
2. Offer structured guidance and scaffolding for field-dependent learners, while providing autonomy and exploration opportunities for field-independent students.
3. Design classroom tasks that incorporate both collaboration and independent work to engage students of different gender-related learning preferences.
4. Integrate feedback mechanisms that include verbal interaction, written comments, and self-assessment to support varied learner needs.
5. Foster an inclusive learning culture that values diversity in cognitive styles and gender by encouraging students to reflect on their learning processes and share strategies with peers.

By applying these approaches, PGMI educators can build more inclusive and adaptive classrooms where all students have the opportunity to succeed.

4. CONCLUSION

This study aimed to examine the influence of cognitive styles and gender on the academic performance of PGMI students in the Basic Social Sciences course. The results show that cognitive styles significantly affect learning outcomes, with field-independent students performing better due to their analytical and self-directed learning abilities. Field-dependent students, in contrast, often struggle in environments that demand autonomy and abstract reasoning. Although no significant differences in

academic achievement were found between male and female students, the study identified clear differences in learning preferences. Male students preferred self-paced, task-focused activities, while female students tended to favor structured guidance and collaborative learning. These findings highlight the importance of acknowledging both cognitive and gender-based learning tendencies in instructional design.

For PGMI educators, the findings offer practical insights into creating more inclusive learning environments. Teachers are encouraged to implement blended learning models that combine independent study with interactive discussions, use diverse content delivery methods such as visuals and hands-on activities, and provide scaffolded support for students who need more structure. Lessons should include a mix of collaborative and individual tasks to address varying gender-based learning preferences. In addition, offering multiple assessment types can help students demonstrate their understanding in ways that align with their strengths. By adopting these differentiated strategies, educators can support diverse learners more effectively and promote equitable academic achievement for all PGMI students.

REFERENCES

Afroogh, S., Esmalian, A., Donaldson, J. P., & Mostafavi, A. (2021). Empathic design in engineering education and practice: an approach for achieving inclusive and effective community resilience. *Sustainability (Switzerland)*, *13*(7). https://doi.org/10.3390/su13074060

Alalouch, C. (2021). Cognitive Styles, Gender, and Student Academic Performance in Engineering Education. *Education Sciences*, *11*(9), 502. https://doi.org/10.3390/educsci11090502

Andujar, A., & Nadif, F. Z. (2022). Evaluating an inclusive blended learning environment in EFL: a flipped approach. *Computer Assisted Language Learning*, *35*(5–6). https://doi.org/10.1080/09588221.2020.1774613

Antúnez, Á., del Henar Pérez-Herrero, M., Rosário, P., Vallejo, G., & Núñez, J. C. (2020). Engagement SPIRALS in elementary students: A school-based self-regulated learning approach. *Sustainability (Switzerland)*, *12*(9). https://doi.org/10.3390/su12093894

Asenova, M., Del Zozzo, A., & Santi, G. (2023). Unfolding Teachers' Interpretative Knowledge into Semiotic Interpretative Knowledge to Understand and Improve Mathematical Learning in an Inclusive Perspective. *Education Sciences*, *13*(1). https://doi.org/10.3390/educsci13010065

Asy'ari, M., & Da Rosa, C. T. W. (2022). Prospective Teachers' Metacognitive Awareness in Remote Learning: Analytical Study Viewed from Cognitive Style and Gender. *International Journal of Essential Competencies in Education*, *1*(1), 18–26. https://doi.org/10.36312/ijece.v1i1.731

Bagon, Š., Gačnik, M., & Starčič, A. I. (2018). Information communication technology use among students in inclusive classrooms. *International Journal of Emerging Technologies in Learning*, *13*(6). https://doi.org/10.3991/ijet.v13i06.8051

Banerjee-Batist, R., Reio, T. G., & Rocco, T. S. (2019). Mentoring Functions and Outcomes: An Integrative Literature Review of Sociocultural Factors and Individual Differences. *Human Resource Development Review*, *18*(1), 114–162. https://doi.org/10.1177/1534484318810267

Binetti, M. J., Nováková, K. S., & Pavlikova, M. (2019). Multiculturalism or feminism? Arguments about the use of the integral veil. *XLinguae*, *12*(1), 70–79. https://doi.org/10.18355/XL.2019.12.01.05

Bryman, A. (2020). The Nature of Qualitative Research. In *Quantity and Quality in Social Research*. https://doi.org/10.4324/9780203410028-6

Burton R. Clark. (2023). *The Higher Education System: Academic Organization in Cross-National Perspective*. University of CaliforniaPress.

Chen, S. Y., Huang, P.-R., Shih, Y.-C., & Chang, L.-P. (2016). Investigation of multiple human factors in personalized learning. *Interactive Learning Environments*, *24*(1), 119–141. https://doi.org/10.1080/10494820.2013.825809

Chen, Y.-T., Liou, S., & Chen, L.-F. (2019). The Relationships among Gender, Cognitive Styles, Learning Strategies, and Learning Performance in the Flipped Classroom. *International Journal of Human–Computer Interaction*, *35*(4–5), 395–403. https://doi.org/10.1080/10447318.2018.1543082

Cohen, L., Manion, L., & Morrison, K. (2002). *Research Methods in Education*. Routledge. https://doi.org/10.4324/9780203224342

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.

Crowther, G. J., Adjapong, E., & Jenkins, L. D. (2023). Teaching science with the "universal language" of music: alignment with the Universal Design for Learning framework. *Advances in Physiology Education*, *47*(3). https://doi.org/10.1152/ADVAN.00006.2023

Durrotun Nabilah, Ismail, & Elly Matul Imah. (2023). Identifikasi Penalaran Kreatif-Imitatif Siswa dengan Gaya Kognitif Reflektif. *EDUKASIA: Jurnal Pendidikan Dan Pembelajaran*, *4*(1). https://doi.org/10.62775/edukasia.v4i1.229

Ford, N., & Chen, S. Y. (2001). Matching/mismatching revisited: An empirical study of learning and teaching styles. *British Journal of Educational Technology*, *32*(1). https://doi.org/10.1111/1467-8535.00173

Ghufron, M. N. (2020). Kepuasan Pembelajaran Secara Online: Apakah Gaya Belajar Mempunyai Pengaruh? *QUALITY*, *8*(1). https://doi.org/10.21043/quality.v8i1.7508

Gjermestad, A., Skarsaune, S. N., & Bartlett, R. L. (2023). Advancing inclusive research with people with profound and multiple learning disabilities through a sensory-dialogical approach. *Journal of Intellectual Disabilities*, *27*(1). https://doi.org/10.1177/17446295211062390

Herpratiwi, H. (2018). The effectiveness of the inclusive education model for students with special needs on cognitive learning achievement. *Jurnal Pendidikan Progresif*, *8*(2). https://doi.org/10.23960/jpp.v8.i2.201811

Holeton, R. (2020). Toward Inclusive Learning Spaces: Physiological, Cognitive, and Cultural Inclusion and the Learning Space Rating System. *EDUCAUSE Review*, *November*.

Imania, H., Latifah, M., & Yuliati, L. N. (2022). Kecemasan, Efikasi Diri Akademik, Motivasi Belajar: Analisis Jenis Kelamin pada Mahasiswa selama Pandemi Covid-19. *Jurnal Ilmu Keluarga Dan Konsumen*, *15*(3). https://doi.org/10.24156/jikk.2022.15.3.251

Jordan, A., Schwartz, E., & McGhie-Richmond, D. (2009). Preparing teachers for inclusive classrooms. *Teaching and Teacher Education*, *25*(4). https://doi.org/10.1016/j.tate.2009.02.010

Jungert, T., Hubbard, K., Dedic, H., & Rosenfield, S. (2019). Systemizing and the gender gap: examining academic achievement and perseverance in STEM. *European Journal of Psychology of Education*, *34*(2). https://doi.org/10.1007/s10212-018-0390-0

Krämer, S., Möller, J., & Zimmermann, F. (2021). Inclusive Education of Students With General Learning Difficulties: A Meta-Analysis. *Review of Educational Research*, *91*(3). https://doi.org/10.3102/0034654321998072

Molina Roldán, S., Marauri, J., Aubert, A., & Flecha, R. (2021). How Inclusive Interactive Learning Environments Benefit Students Without Special Needs. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.661427

Mooij, T. (2013). Designing instruction and learning for cognitively gifted pupils in preschool and primary school. *International Journal of Inclusive Education*, *17*(6). https://doi.org/10.1080/13603116.2012.696727

Moscardini, L. (2014). Developing equitable elementary mathematics classrooms through teachers learning about children's mathematical thinking: Cognitively Guided Instruction as an inclusive pedagogy. *Teaching and Teacher Education*, *43*. https://doi.org/10.1016/j.tate.2014.06.003

Nudin, F., Rufi'i, R., & Walujo, D. (2021). Pengaruh E-Learning, Pembelajaran Langsung, dan Faktor Gaya Kognitif Terhadap Hasil Belajar Prakarya Kewirausahaan. *Edcomtech: Jurnal Kajian Teknologi Pendidikan*, *6*(2). https://doi.org/10.17977/um039v6i12021p222

Nurhayati, E., & Subekti, F. E. (2017). Deskripsi Kemampuan Penalaran Matematis Siswa Ditinjau dari Gaya Belajar dan Gender. *AlphaMath: Journal of Mathematics Education*, *3*(1).

Rasmitadila, R., Rachmadtullah, R., Samsudin, A., Nurtanto, M., & Jauhari, M. N. (2023). Limited face-to-face learning on students in inclusive classrooms during the Covid-19 pandemic: Perceptions of elementary school teachers in Indonesia. *Cogent Education*, *10*(1). https://doi.org/10.1080/2331186X.2023.2213612

Rijal, S., & Bachtiar, S. (2015). Hubungan antara Sikap, Kemandirian Belajar, dan Gaya Belajar dengan Hasil Belajar Kognitif Siswa. *JURNAL BIOEDUKATIKA*, *3*(2). https://doi.org/10.26555/bioedukatika.v3i2.4149

Roberts, M. (2023). *Primary Education Voices*.

Salehi, S., Ballen, C. J., Trujillo, G., & Wieman, C. (2021). Inclusive Instructional Practices: Course Design, Implementation, and Discourse. *Frontiers in Education*, *6*. https://doi.org/10.3389/feduc.2021.602639

Sholikhati, M., & Sartika, S. B. (2022). Profil Keterampilan Berpikir Analisis Siswa SMP dalam Menyelesaikan Soal IPA Berdasarkan Gender. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *5*(1). https://doi.org/10.23887/jppsi.v5i1.42221

Siswanti, Y. (2020a). Peran Gaya Belajar Dalam Memediasi Hubungan Antara Tipe Kepribadian Dengan Prestasi Akademik (Studi Kasus Pada Mahasiswa Fakultas Ekonomi UPN " Veteran" Yogyakarta). *Researchgate.Net*, *April 2007*.

Siswanti, Y. (2020b). *Peran Gaya Belajar Dalam Memediasi Hubungan Antara Tipe Kepribadian Dengan Prestasi Akademik (Studi Kasus Pada Mahasiswa Fakultas Ekonomi UPN "Veteran" Yogyakarta)*.

Smith, L., Dockrell, J., & Tomlinson, P. (1997). Piaget, Vygotsky and beyond: Future issues for developmental psychology and education. In *Child Development*.

Sujarwo, S., Fathoni, M., Astuti, Y. A., & Sondang, S. (2023). Analisis Hubungan dan Pengaruh antara Gaya Belajar dan Gaya Berpikir terhadap Capaian Akademik Mahasiswa Manajemen Informatika. *Remik*, *7*(1). https://doi.org/10.33395/remik.v7i1.12121

Tabachnick, B. G., & Fidell, L. S. (2001). Tabachnick, Fidell_2001.pdf. In *Using Multivariate Statistics*.

Tafirenyika, J., Mhizha, S., & Ejuu, G. (2023). Building inclusive early learning environments for children with a disability in low-resource settings: Insights into challenges and opportunities from rural Zimbabwe. *Frontiers in Education*, *8*. https://doi.org/10.3389/feduc.2023.1029076

Tan, P., & Padilla, A. (2019). Prospective mathematics teachers' engagement with inclusive equity: An exploratory case study in anti-ableist sociopolitical grounding. *Teaching and Teacher Education*, *86*. https://doi.org/10.1016/j.tate.2019.06.007

Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms*. ASCD.

Ugalde, L., Santiago-Garabieta, M., Villarejo-Carballido, B., & Puigvert, L. (2021). Impact of Interactive Learning Environments on Learning and Cognitive Development of Children With Special Educational Needs: A Literature Review. In *Frontiers in Psychology* (Vol. 12). https://doi.org/10.3389/fpsyg.2021.674033

Umah, U., & Vitantri, C. A. (2019). Representasi Visual Matematis Mahasiswa Dalam Memodelkan Kejadian Dinamis Ditinjau Dari Perbedaan Gaya Kognitif Dan Jenis Kelamin. *FIBONACCI: Jurnal Pendidikan Matematika Dan Matematika*, *5*(1). https://doi.org/10.24853/fbc.5.1.87-96

Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. *Psychological Bulletin*, *140*(4), 1174–1204. https://doi.org/10.1037/a0036620

You, S., Kim, E. K., & Shin, K. (2019). Teachers' Belief and Efficacy Toward Inclusive Education in Early Childhood Settings in Korea. *Sustainability*, *11*(5). https://doi.org/10.3390/su11051489