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Does Educational Background Matter? The Role of Competency Alignment in Learning Outcomes among Fashion Education Students

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Abstract
Students entering vocational higher education often have different secondary educational backgrounds, which are commonly assumed to influence their academic achievement. This study examined whether educational background affects learning outcomes when students learn competencies that are relatively new to all learners. A quantitative causal-comparative (*ex post facto*) design was employed involving 83 undergraduate students enrolled in the Fashion Education Study Program who had completed the *Fabric Construction Techniques* course. Participants were classified into graduates of *SMK Fashion* (n = 32) and graduates of senior high schools (*SMA*) or non-fashion vocational high schools (n = 51). Learning outcomes were analysed using descriptive statistics and an independent-samples *t*-test. Students from *SMK Fashion* achieved a slightly higher mean score than the comparison group (83.47 vs. 82.45), but the difference was not statistically significant, $t(81) = 0.793$, $p = .430$, with a small effect size ($d = 0.18$). These findings indicate that secondary educational background explained little variation in learning outcomes. The study suggests that academic performance in vocational higher education depends less on school type than on the alignment between prior learning experiences and university competencies. The findings highlight competency alignment as an important explanation of learning outcomes in vocational higher education.

Keywords: *competency alignment, domain-specific prior knowledge, educational background, learning outcomes, vocational higher education*

INTRODUCTION

Higher education is not merely responsible for transmitting knowledge but also for ensuring that all students have equitable opportunities to achieve the intended learning outcomes (Biggs et al., 2022; Chaeruman et al., 2025). This responsibility becomes increasingly challenging in vocational higher education, where students enter university with diverse educational backgrounds and prior learning experiences. Differences in secondary education pathways, previous learning experiences, and exposure to vocational skills contribute to varying levels of academic preparedness upon entry into higher education. Such differences have long attracted attention in educational research because they are believed to influence students' academic adjustment, engagement in learning, and subsequent learning outcomes.

One of the most extensively studied learner characteristics is prior knowledge. Knowledge and experiences acquired before engaging in new learning are widely recognized as facilitating students' ability to connect new information with their existing cognitive structures, thereby promoting more effective learning. (Brod, 2021) argues that prior knowledge serves as the foundation for constructing new knowledge; however, its benefits emerge only when learners' existing knowledge is relevant to the content being learned. A similar conclusion was reached by (Simonsmeier et al., 2022), whose meta-analysis demonstrated that the influence of prior knowledge on learning outcomes is not universal.

Rather than being determined solely by learners' existing knowledge, its impact depends largely on the characteristics of the learning content, the quality of instruction, and the nature of the assessment. These findings challenge the long-held assumption that students' initial characteristics are always the dominant determinant of academic success.

This perspective has important implications for vocational education. Vocational education programs are designed to develop professional competence through authentic learning experiences that integrate knowledge, practical skills, and professional attitudes (Mulder & Winterton, 2017; Sukmana et al., 2025). Within this context, students who have acquired relevant practical experience prior to entering higher education are often assumed to possess an academic advantage over those without comparable experience. A growing body of research suggests that continuity between prior learning experiences and higher education can facilitate students' adjustment to academic demands, particularly when previously acquired competencies align with those required in university learning (Bruun et al., 2025; Grosemans et al., 2017; Raciti et al., 2024; Smith & Van Aken, 2020). Nevertheless, such an advantage should be understood because of the alignment between previously acquired competencies and subsequent learning requirements, rather than as an inherent benefit associated with students' secondary school background.

The Fashion Education Study Program provides an appropriate setting for examining this argument. Students enrolled in the program come from diverse educational backgrounds, including senior high schools (*SMA*), vocational high schools specializing in Fashion Design (*SMK Fashion*), and vocational high schools from non-fashion disciplines. These diverse backgrounds result in different levels of prior learning experiences upon entry into higher education. Students graduating from SMK Fashion have typically acquired fundamental competencies in fashion, including familiarity with tools and materials, basic sewing techniques, and standard workplace procedures through their secondary education. In contrast, students from SMA and non-fashion vocational schools generally have little or no formal learning experience directly related to these competencies. Consequently, differences in prior learning experiences are often considered a plausible explanation for variations in academic performance, particularly in courses that build directly upon competencies previously acquired in vocational secondary education.

The assumption that graduates of SMK Fashion possess an academic advantage is reasonable when university courses require foundational competencies that have already been developed during secondary education, such as pattern construction or garment construction techniques. However, this assumption may not apply uniformly across all courses offered in the Fashion Education Study Program. The Fabric Construction Techniques course represents a different instructional context. Rather than extending competencies commonly taught in vocational secondary schools, the course introduces students to a range of fabric-making techniques, including crochet, hairpin lace, macramé, tatting lace, knitting, and pom pom technique. These techniques are generally not taught in depth during secondary education, even in most SMK Fashion programs. As a result, students from different educational backgrounds are likely to begin the course with relatively comparable levels of competence. Under these circumstances, students' secondary school background may no longer constitute a determining factor in their learning outcomes.

To date, studies investigating the influence of secondary school background on learning outcomes in Fashion Education have primarily focused on courses that directly build upon competencies acquired in vocational secondary education. In contrast, empirical evidence remains limited for courses that do not require specific prerequisite competencies. Courses such as Fabric Construction Techniques provide an opportunity to examine whether prior learning experiences continue to influence academic achievement when all students are introduced to competencies that are relatively new to them. Accordingly, this study aims to examine differences in learning outcomes in the Fabric Construction Techniques course between students graduating from SMK Fashion and those from SMA or non-fashion vocational schools.

The distinctive nature of the Fabric Construction Techniques course further reinforces the rationale for this study. The course is not designed as a direct continuation of competencies acquired during secondary education but rather as a new learning experience for all students. Throughout the semester, students progressively learn a variety of fabric-making techniques, including crochet, hairpin lace, macramé, tatting lace, knitting, and pom pom technique. Because no specific prerequisite competencies are required, all students are provided with equal opportunities to develop the necessary knowledge and practical skills during the course. Consequently, learning outcomes are expected to depend more on the quality of learning experiences provided in higher education than on students'

previous educational experiences. This perspective is consistent with the principle of constructive alignment, which emphasizes that intended learning outcomes are achieved through the systematic alignment of learning outcomes, teaching and learning activities, and assessment (Biggs et al., 2022)

Most previous studies examining the influence of students' educational background have assumed that prior learning experiences inevitably lead to differences in academic achievement. Although this assumption has received empirical support in courses that directly extend competencies acquired during secondary education, evidence remains limited for courses that do not require prior vocational competencies, particularly in the field of fashion education. Consequently, it remains unclear whether secondary school background continues to influence learning outcomes when students undertake new learning experiences within the same instructional environment. This gap suggests that the relationship between educational background and academic achievement should not be interpreted solely in terms of students' prior characteristics but should also consider the nature of the competencies being taught.

Rather than merely comparing learning outcomes between students from *SMK Fashion* and those from senior high schools (*SMA*) or non-fashion vocational high schools, the present study extends previous research by examining whether the influence of educational background depends on the alignment between students' prior learning experiences and the competencies introduced in higher education. The *Fabric Construction Techniques* course was deliberately selected because it introduces competencies that are relatively new to all students and does not require prior mastery of specific vocational skills. This instructional context provides a more rigorous basis for examining whether differences in educational background continue to influence learning outcomes when all students begin the course with comparable opportunities to develop the required knowledge and practical skills. Consequently, the study seeks not only to determine whether differences in learning outcomes exist but also to provide empirical evidence on the extent to which students' initial characteristics continue to shape academic achievement when learning opportunities are intentionally designed to be equitable.

The significance of this study extends beyond the instructional design of a single course. If no significant differences in learning outcomes are identified across educational backgrounds, the findings would suggest that a well-designed learning environment can effectively support students with diverse prior experiences in achieving comparable learning outcomes. Conversely, if differences remain evident, the findings may provide an empirical basis for designing targeted academic interventions, such as bridging programmes, foundational competency enhancement, or structured learning support. More broadly, this study contributes to the growing discussion on inclusive and equitable learning in vocational higher education by highlighting the interaction between students' prior educational experiences and the characteristics of university learning environments. Based on this rationale, the present study aims to examine differences in learning outcomes in the *Fabric Construction Techniques* course between students graduating from *SMK Fashion* and those from senior high schools (*SMA*) or non-fashion vocational high schools.

METHOD

This study employed a quantitative approach using a causal-comparative (ex post facto) research design. The design was considered appropriate because the study examined differences in learning outcomes between groups that naturally differed in their educational background prior to entering higher education, namely graduates of *SMK Fashion* and graduates of senior high schools (*SMA*) or non-fashion vocational high schools. Since educational background had already existed before the study was conducted, neither group assignment nor learning conditions could be manipulated by the researchers. Consequently, the observed differences represent naturally occurring variations rather than the effects of an experimental intervention. A causal-comparative design is widely recommended for investigating potential differences between pre-existing groups when random assignments and manipulation of the independent variable are neither feasible nor ethically appropriate (Creswell & Plano Clark, 2018; Ratar et al., 2025).

The study involved all undergraduate students enrolled in the Fashion Education Study Program who had completed the *Fabric Construction Techniques* course during the 2025/2026 academic year. Because the cohort consisted of only 83 eligible students, all students meeting the inclusion criteria were included in the study, eliminating the need for sample selection. To be eligible, students were required to have successfully completed the course, obtained a final course grade

recorded in the university academic information system, and complete information regarding their secondary educational background. Consequently, the final sample comprised 83 students.

The independent grouping variable was students' secondary educational background. Rather than classifying participants solely according to school type, the grouping was established based on the relevance of their prior learning experiences to the field of fashion education. Accordingly, participants were categorized into two groups: graduates of *SMK Fashion* (n = 50) and graduates of senior high schools (*SMA*) or non-fashion vocational high schools (n = 33). This classification was grounded in the concept of *domain-specific prior knowledge*, which proposes that prior learning influences subsequent learning only when previous experiences are directly related to the competencies being acquired. Since graduates of non-fashion vocational schools generally do not receive formal instruction in fashion-related competencies, they were grouped together with *SMA* graduates because both groups entered higher education without formal preparation in fashion education.

The dependent variable was students' learning outcomes in the *Fabric Construction Techniques* course, represented by the final course grade awarded according to the assessment policy of the Fashion Education Study Program. Final grades reflected students' overall achievement throughout the semester, including theoretical understanding and practical performance. All data were obtained from institutional academic records and anonymized prior to analysis to ensure participant confidentiality. Data analysis was performed using IBM SPSS Statistics. Prior to hypothesis testing, data quality was examined to ensure the absence of missing values and influential outliers that could bias the analysis. Descriptive statistics were then computed to summarize learning outcomes for each group, including the number of participants (*n*), mean, standard deviation (*SD*), median, minimum and maximum scores, and the 95% confidence interval (95% CI).

The assumptions underlying parametric analysis were evaluated using the Shapiro–Wilk test for normality and Levene's test for homogeneity of variance (Field, 2024). Although the normality assumption was not fully satisfied, visual inspection of Q–Q plots indicated only minor deviations from normality, and homogeneity of variance was confirmed. Given the relatively balanced group sizes and the well-established robustness of the independent-samples *t*-test to moderate violations of normality under homogeneous variances, group differences in learning outcomes were analysed using an independent-samples *t*-test (Field, 2024). The results are reported as mean differences, 95% confidence intervals, *t* statistics, degrees of freedom, *p* values, and effect sizes. Effect size was estimated using Cohen's *d* to complement statistical significance by indicating the practical magnitude of the observed difference (Cohen, 1988; Lakens, 2013; Sullivan & Feinn, 2013). Following (Cohen, 1988) guidelines, *d* values of 0.20, 0.50, and 0.80 were interpreted as small, medium, and large effects, respectively. Statistical significance was evaluated at $\alpha = .05$.

RESULTS AND DISCUSSION

The study involved 83 undergraduate students enrolled in the Fashion Education Study Program who had successfully completed the *Fabric Construction Techniques* course during the 2025/2026 academic year. Based on their secondary educational background, 32 students (38.6%) were graduates of *SMK Fashion*, whereas 51 students (61.4%) were graduates of senior high schools (*SMA*) or non-fashion vocational high schools. The distribution indicates that most participants entered the programme without formal educational preparation in fashion, providing a suitable basis for examining whether educational background influences subsequent learning outcomes.

Table 1. Distribution of Participants by Secondary Educational Background

Secondary Educational Background	n	%
SMK Fashion	32	38.6
Senior high school (*SMA*)/Non-fashion vocational high school	51	61.4
Total	83	100.0

The sample represents the diversity of educational backgrounds within the Fashion Education Study Program. Such variation is essential for evaluating whether prior learning experiences related to fashion education contribute to differences in students' learning outcomes. Descriptive analysis indicated that students who graduated from *SMK Fashion* achieved a slightly higher mean score (M = 83.47, SD = 5.64) than those who graduated from senior high schools (*SMA*) or non-fashion vocational

high schools (M = 82.45, SD = 5.72). The mean difference between the two groups was 1.02 points, while the standard deviations were comparable, indicating a similar degree of score variability across groups.

Table 2. Descriptive Statistics of Learning Outcomes by Secondary Educational Background

Secondary Educational Background	n	Mean	SD
SMK Fashion	32	83.47	5.64
Senior high school (SMA)/Non-fashion vocational high school	51	82.45	5.72

Although students from *SMK Fashion* obtained a marginally higher average score, the small mean difference and the comparable variability between groups suggest that the overall distributions of learning outcomes were broadly similar. Whether this observed difference represents a statistically meaningful effect was further examined through inferential statistical analysis. Prior to inferential analysis, the assumptions of normality and homogeneity of variance were examined to evaluate the suitability of the independent-samples *t*-test. The Shapiro–Wilk test indicated that learning outcomes in both the *SMK Fashion* group ($W = 0.782$, $p < .001$) and the *SMA*/non-fashion vocational high school group ($W = 0.822$, $p < .001$) deviated significantly from a normal distribution. However, visual inspection of the Normal Q–Q plots showed that most observations closely followed the reference line, with only minor deviations at the lower tail of the distribution. Boxplots also identified a small number of outliers, none of which substantially affected the overall distribution of the data. Levene's test indicated that the assumption of homogeneity of variance was satisfied ($F = 0.103$, $p = .749$). Considering the relatively balanced sample sizes, homogeneous variances, and only minor departures from normality observed in the graphical inspection, the independent-samples *t*-test was retained for hypothesis testing because it is considered robust to moderate violations of normality under these conditions.

Table 3. Results of Assumption Testing

Assumption	Test	Statistic	*p*	Decision
Normality (*SMK Fashion*)	Shapiro–Wilk	0.782	< .001	Not normal
Normality (SMA/SMK Non-fashion)	Shapiro–Wilk	0.822	< .001	Not normal
Homogeneity of variance	Levene	0.103	0.749	Homogeneous

To determine whether students' secondary educational background was associated with differences in learning outcomes, an independent-samples *t*-test was conducted. The analysis showed that students graduating from SMK Fashion achieved a slightly higher average score than students from senior high schools (SMA) or non-fashion vocational high schools. However, this difference did not reach statistical significance, $t(81) = 0.793$, $p = .430$.

Table 4. Comparison of Learning Outcomes by Secondary Educational Background

Comparison	Mean ± SD	Mean Difference	*t*	*df*	*p*	95% CI	Cohen's *d*
SMK Fashion vs. *SMA*/SMK Non Fashion	83.47 ± 5.64 vs. 82.45 ± 5.72	1.02	0.793	81	0.43	−1.54 to 3.57	0.18

The estimated mean difference of 1.02 points indicates that students from SMK Fashion performed only marginally better than those from the comparison group. More importantly, the 95% confidence interval ranged from −1.54 to 3.57, indicating considerable uncertainty around the estimated difference and suggesting that the true difference may be negligible. This interpretation is further supported by the small effect size (Cohen's $d = 0.18$), indicating that the observed difference has limited practical significance. Taken together, the statistical significance test, confidence interval, and effect size consistently indicate that students' secondary educational background contributed minimally to differences in learning outcomes in the *Fabric Construction Techniques* course.

The most important contribution of the present study lies not merely in the finding that no statistically significant difference was observed in learning outcomes between students from different secondary educational backgrounds, but in explaining why such differences failed to emerge. Although students graduating from SMK Fashion achieved a slightly higher mean score than those from senior high schools (SMA) and non-fashion vocational high schools, the difference was neither statistically

significant nor educationally meaningful. Rather than confirming the widely accepted assumption that vocational school graduates consistently outperform their peers in vocational higher education, the findings indicate that educational background alone is insufficient to explain students' academic achievement (Torenbeek et al., 2010). Instead, the influence of previous educational experiences appears to depend on the extent to which competencies acquired before entering university remain relevant to the competencies introduced in higher education (Renta Davids et al., 2017).

This interpretation challenges a long-standing assumption in vocational education research. Educational background has frequently been regarded as a direct predictor of students' academic performance because graduates of vocational secondary schools are assumed to possess stronger practical knowledge and technical skills than graduates of general secondary schools. Consequently, many comparative studies have attempted to determine whether vocational school graduates consistently achieve better learning outcomes than their peers from non-vocational educational pathways. While such comparisons provide useful descriptive evidence, they often overlook an important issue: educational background itself does not produce learning outcomes. Rather, learning outcomes emerge through the interaction between learners' previous experiences, the competencies required within a course, and the quality of instructional experiences provided during higher education.

The present study offers an alternative perspective by suggesting that educational background should be interpreted as a contextual rather than deterministic characteristic of learners (de Vries et al., 2024). Students undoubtedly enter university with different educational experiences, yet these experiences are not equally valuable across all learning situations. Previous learning contributes positively only when learners are able to activate relevant knowledge and skills while engaging with new instructional content (Renta Davids et al., 2017). Consequently, educational background cannot be viewed as a universal indicator of academic potential because its contribution depends on whether previously acquired competencies remain instructionally relevant. This perspective moves beyond a simple comparison of school types by focusing on the educational mechanisms through which previous experiences influence subsequent learning.

The findings can be understood through the perspective of domain-specific prior knowledge. (Simonsmeier et al., 2022) argued that prior knowledge facilitates learning only when previously acquired knowledge corresponds closely with the concepts and skills required in subsequent learning situations. (Buchin & Mulligan, 2024) demonstrated that prior knowledge does not represent a general academic advantage but instead exerts its influence selectively within relevant knowledge domains. This mechanism is further explained by (Hattan et al., 2024), who showed that prior knowledge supports learning only after relevant cognitive structures are successfully activated and connected to new instructional content. The concept of transfer of learning provides further theoretical support (Renta Davids et al., 2017). Students from SMK Fashion had greater experience in garment construction, sewing, apparel production, and pattern making. However, the Fabric Construction Techniques course introduced crochet, hairpin lace, macramé, tatting lace, knitting, and Balinese ikat, representing relatively unfamiliar competencies for nearly all students. Consequently, opportunities for positive transfer were limited because the competencies previously acquired were not sufficiently aligned with the competencies required in the course (Ma et al., 2024).

This observation highlights the distinction between educational background and competency alignment. Educational background identifies where learning occurred, whereas competency alignment reflects the correspondence between previously acquired competencies and current learning requirements. The findings indicate that competency alignment provides a more meaningful explanation of learning outcomes than school type itself. The characteristics of the Fabric Construction Techniques course further support this interpretation. Students from different educational backgrounds entered the course with relatively similar opportunities to acquire the intended competencies because the competencies were largely new to all learners. Consequently, learning outcomes became increasingly dependent upon instructional experiences provided during university learning rather than previous educational pathways.

The present findings also reinforce the principle of constructive alignment, which proposes that meaningful learning occurs when intended learning outcomes, learning activities, and assessment are systematically aligned. All participants experienced identical instructional objectives, practical activities, demonstrations, feedback, and assessment criteria. Such consistency created equitable opportunities for competence development despite differences in educational background. This interpretation underscores the importance of instructional design in vocational higher education.

Well-designed learning environments can substantially reduce disparities associated with previous educational pathways. Through demonstrations, guided practice, experimentation, formative feedback, and repeated performance, students progressively construct new procedural knowledge and practical competence.

The findings also help explain inconsistencies reported in previous studies. Research demonstrating advantages for vocational school graduates has typically examined courses characterised by high competency continuity between secondary and higher education. In contrast, the present course exhibited relatively low competency continuity because it introduced specialised textile construction techniques unfamiliar to most students. Rather than contradicting previous findings, the present study identifies competency alignment as the contextual factor explaining why educational background sometimes predicts learning outcomes and sometimes does not. The theoretical contribution extends beyond confirming the importance of prior knowledge. The study proposes competency alignment as the mechanism linking previous educational experiences with subsequent academic achievement. Educational background itself possesses limited explanatory power unless accompanied by analysis of the competencies students actually bring into university learning environments.

From a practical perspective, lecturers should base instructional planning on competency requirements rather than assumptions about students' previous educational pathways. When competency alignment is high, existing competencies may be leveraged through authentic projects and advanced practical tasks. When competency alignment is low, structured demonstrations, scaffolding, guided practice, formative assessment, and continuous feedback become increasingly important (Soyka & Schaper, 2024). Similarly, lecturers should avoid assuming that graduates of vocational secondary schools will always outperform graduates of general secondary schools. Competence should be evaluated through students' demonstrated performance rather than inferred from school type.

The implications of the present study extend to programme management and curriculum development. Academic support should be organised according to competency requirements rather than educational background alone. Curriculum developers should systematically analyse competency alignment to identify courses requiring prerequisite competencies and those introducing entirely new competencies. The findings also contribute to educational equity in higher education. Students from diverse educational pathways can achieve comparable learning outcomes when provided with equivalent instructional opportunities, continuous feedback, and sufficient opportunities for practice. Educational diversity should therefore be regarded as a resource rather than an obstacle.

Several limitations should be acknowledged. The study focused on one undergraduate program and one practical course, limiting the generalizability of the findings. Learning outcomes were represented by final course grades without considering other variables that may influence academic achievement, such as motivation, self-regulated learning, prior informal learning, or extracurricular experiences. Future research should examine courses characterized by varying levels of competency alignment across multiple vocational disciplines and institutions, as learning outcomes are likely to be shaped by the interaction between learner characteristics, instructional contexts, and domain-specific competencies (Löfgren et al., 2023). Taken together, the present study demonstrates that educational background alone provides only a partial explanation of learning outcomes in vocational higher education. Previous educational experiences become educationally meaningful only when they remain aligned with the competencies introduced in subsequent learning environments. Competency alignment therefore offers a more robust conceptual framework than school type for explaining why educational background predicts academic achievement in some contexts but not in others. By shifting attention from institutional pathways to the relevance of previously acquired competencies, the study advances understanding of prior knowledge, transfer of learning, instructional effectiveness, and educational equity within vocational higher education.

CONCLUSION

This study found that secondary educational background did not significantly influence students' learning outcomes in the Fabric Construction Techniques course. Although students graduating from SMK Fashion obtained slightly higher mean scores than those from SMA and non-fashion vocational high schools, the difference was neither statistically significant nor practically meaningful. These findings indicate that secondary educational background alone provides limited explanation for academic achievement in this learning context. More importantly, the study

demonstrates that competency alignment offers a more meaningful explanation of learning outcomes than school type itself. Prior educational experiences appear to support academic achievement only when previously acquired competencies remain relevant to those introduced in higher education. When students learn relatively new competencies, instructional experiences and learning opportunities become more influential than educational background in shaping learning outcomes. This finding extends current understanding of domain-specific prior knowledge by highlighting competency alignment as the mechanism linking previous learning experiences with subsequent academic performance. The findings have important implications for vocational higher education. Curriculum planning, instructional design, and academic support should be based on analyses of competency alignment rather than assumptions about students' educational backgrounds. Future research should examine this framework across different vocational disciplines and courses with varying levels of competency continuity to further validate its applicability in diverse educational contexts.

DECLARATION OF GENERATIVE AI

The authors declare that no generative AI or AI-assisted technologies were used in the writing process of this manuscript.

CONFLICTING INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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