

Original Article



Digital Profiling and Developmental Analysis of Vocational Students from the Perspective of Five-Education Integration

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Abstract:

In vocational education, the comprehensive development of students' competencies is a fundamental goal in cultivating high-quality technical talents. This study, grounded in the philosophy of Five-Education Integration (moral, intellectual, physical, aesthetic, and labor education), focuses on vocational students and constructs digital profiles by integrating a weighted composite model with advanced data processing techniques. Through multi-dimensional analyses across semesters, genders, grade levels, and majors, the research intuitively captures both group-level and individual competency characteristics. The findings reveal that achieving balanced development across the five domains requires a comprehensive consideration of internal and external factors. Practical recommendations include optimizing curriculum design, expanding aesthetic education, enhancing the practical aspects of labor education, and continuously improving the profiling model through big data analytics and artificial intelligence technologies. This work offers theoretical foundations and practical strategies for advancing holistic education reform in vocational institutions.

Keywords: Five-Education Integration; Vocational Education; Digital Profiling; Comprehensive Quality Assessment; Model Optimization.

Introduction

With the increasing demand for highly skilled and comprehensively developed technical talents in modern society, vocational education has assumed an increasingly prominent role within China's educational system. However, traditional vocational education has long emphasized technical skill training at the expense of students' holistic development. This tendency not only constrains students' personal growth but also fails to meet the nation's evolving needs for innovative and interdisciplinary talents amid economic transformation. Therefore, it has become imperative for vocational education to shift from a single-skill training paradigm toward a comprehensive model that fosters development across moral, intellectual, physical, aesthetic, and labor domains. Nevertheless, the challenge of scientifically and systematically assessing students' holistic development across these five domains remains a critical issue in contemporary educational research.

The advancement of digital technologies offers promising solutions to this problem. In recent years, data-driven student profiling techniques have made significant strides in educational contexts. Xijin Tan [1] established a comprehensive student evaluation system based on multi-source data analysis, providing empirical support for educational assessment models; Voogt, J. et al. [2] demonstrated that the application of digital profiling technologies notably enhances the scientific rigor and objectivity of educational evaluations. From the perspective of Five-Education Integration, Maria et al. [3] explored pathways for vocational education reform aimed at promoting coordinated development across all five dimensions. Furthermore, Wang, L. et al. [4] emphasized that labor education plays a critical role in cultivating students' practical skills and social responsibility, though existing evaluation systems in this area remain inadequate. Internationally, many scholars

have systematically reviewed the application of educational big data technologies, highlighting their potential in supporting personalized education and precision decision-making [5–6].

Despite these advancements, research on the holistic development of vocational students based on the Five-Education framework faces two major challenges: first, existing studies often focus on isolated dimensions (such as intellectual or moral development) and lack dynamic evaluations that capture comprehensive growth; second, current assessment models exhibit insufficient capacity for multidimensional data integration and dynamic performance tracking, thus failing to fully reflect the evolving nature of students' comprehensive competencies [7–8].

In response, this study constructs a digital profiling model for vocational students from the perspective of Five-Education Integration. By

quantitatively evaluating students' development across the five domains—moral, intellectual, physical, aesthetic, and labor education—we aim to propose targeted strategies for educational improvement, thereby providing both theoretical and practical support for advancing the implementation of holistic development concepts within vocational education.

2. Method

2.1 Research Model

This study constructs a digital profiling model grounded in the Five-Education Integration framework. Utilizing survey data collected from 207 students across the domains of moral, intellectual, aesthetic, physical, and labor education, the research employs standardized processing methods to transform the raw scores of each dimension into corresponding weights, as summarized in Table 1.

Table 1. Weight Distribution Across the Five Educational Dimensions

Dimension	Average Score	Standard Deviation	Weight
Moral Education	3.2	0.745	0.31
Intellectual Education	3.2	0.609	0.31
Physical Education	1.4	0.597	0.13
Aesthetic Education	1.4	0.568	0.13
Labor Education	1.3	0.433	0.12

Building upon this foundation, the present study proposes the following mathematical model to evaluate the comprehensive development of vocational students, enabling dynamic representation of students' growth across the Five-Education domains and providing empirical support for educational optimization:

$$\text{TSC} = 0.31 \times \text{D} + 0.31 \times \text{I} + 0.13 \times \text{P} + 0.13 \times \text{A} + 0.12 \times \text{L}$$

Equation 1

Where, TSC denotes the Total Student Competency Score; D represents the Moral Education score, encompassing ethical awareness, civic responsibility, personal integrity, and behavioral conduct; I denotes the Intellectual Education score, reflecting academic achievements, innovation capacity, problem-solving skills, and critical thinking abilities; P reflects the Physical Education score, assessing

students' physical fitness, health consciousness, and engagement in athletic activities; A refers to the Aesthetic Education score, covering accomplishments in arts education, creative expression, and participation in cultural activities; and L corresponds to the Labor Education score, measuring practical work skills, hands-on learning experiences, and involvement in community service initiatives..

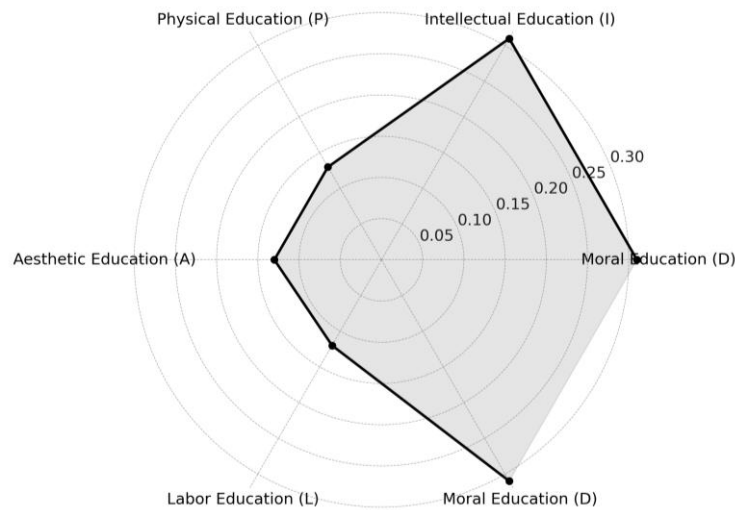
This model adopts a five-dimensional data fusion approach, integrating both structured and unstructured student data to dynamically illustrate the developmental characteristics of vocational students across the Five-Education framework.

2.2 Weight Assignment and Analysis

The distribution of weights across the five educational dimensions in the model is presented in Table 2 and Figure 1:

Table 2. Weight Assignment in the Comprehensive Five-Education Model

Educational Dimension	Moral Education (D)	Intellectual Education (I)	Physical Education (P)	Aesthetic Education (A)	Labor Education (L)
Weight	0.31	0.31	0.13	0.13	0.12

**Figure 1. Proportional representation of five educational domains in the overall competency model**

From the above, it can be clearly observed that Moral Education (D) and Intellectual Education (I) are assigned the highest weights, each accounting for 31%. This distribution reflects the educational emphasis on fostering students' ethical awareness, civic responsibility, and academic excellence. Within vocational education, the cultivation of moral values is closely associated with the development of professional ethics, personal integrity, and social responsibility, while intellectual growth underpins technical expertise, critical thinking, innovation capacity, and lifelong learning—fully aligned with the overarching goal of preparing high-quality, technically proficient professionals. Physical Education (P) and Aesthetic Education (A) are assigned equal weights of 13%. Physical education plays a vital role in promoting students' physical health, resilience, and engagement in active lifestyles, whereas aesthetic education contributes to enhancing cultural literacy, creative expression, and artistic appreciation. Together, these dimensions substantially support the holistic growth of vocational students. Labor Education (L) carries a slightly lower weight of 12%. Although labor education remains a crucial pillar for cultivating practical competencies, problem-solving skills, and experiential learning abilities, its relatively limited curricular implementation

and the challenges associated with standardized assessment have resulted in a modestly lower weighting within the model.

3. Result and Discussion

3.1 Horizontal Comparative Analysis

3.1.1 Gender-Based Comparative Analysis

Based on gender differences, baseline data across each educational dimension and the overall Five-Education Score were collected. As shown in Table 3, the results of the Shapiro-Wilk (S-W) test¹ indicated that the scores for Moral Education and Labor Education among male students exhibited statistical significance with p-values less than 0.05. However, the absolute values of kurtosis for these two dimensions were less than 10, and the absolute values of skewness were less than 3, suggesting that although the data were not perfectly normal, they could be reasonably treated as normally distributed for the purposes of this study[9]. For all other dimensions, the p-values exceeded 0.05, confirming the assumption of normality.

¹ Shapiro-Wilk test: a statistical method used to assess the normality of a sample distribution, particularly suitable for small sample sizes.

Table 3. Descriptive Statistics of Five-Education Scores by Gender

Dimension	Sample Size	Mean	Standard Deviation	Skewness	Kurtosis	Shapiro-Wilk Test (W)	
						W Statistic	p
Male - Moral Education	50	82.160	9.464	-0.604	-0.475	0.945	0.021*
Female - Moral Education	50	87.120	7.199	-0.253	-0.043	0.959	0.080
Male - Intellectual Education	50	82.906	7.157	-0.153	-0.511	0.982	0.657
Female - Intellectual Education	50	83.070	6.212	-0.651	0.040	0.959	0.083
Male - Physical Education	50	78.920	6.636	-0.565	1.486	0.960	0.088
Female - Physical Education	50	76.940	6.326	-0.279	0.660	0.958	0.076
Male - Aesthetic Education	50	79.980	10.364	-0.403	-0.769	0.955	0.053
Female - Aesthetic Education	50	80.920	8.542	-0.240	-0.502	0.977	0.445
Male - Labor Education	50	89.840	5.829	-0.968	0.971	0.932	0.007**
Female - Labor Education	50	90.880	3.905	-0.274	-0.046	0.977	0.427
Male - Five-Education Total Score	50	82.612	5.201	-0.531	0.048	0.969	0.219
Female - Five-Education Total Score	50	83.510	4.543	-0.098	-0.661	0.981	0.580

*p<0.05 ** p<0.01

Since the normality assumption was satisfied for most dimensions, independent samples t-tests² were conducted to evaluate the differences between male and female students. As shown in Table 4, three out of six comparisons yielded p-values less than 0.05, indicating statistically significant differences[10]. Specifically, the mean score for Moral Education among male students

(82.16) was significantly lower than that of female students (87.12). Similarly, the mean Intellectual Education score for male students (78.62) was notably lower than that for females (83.20). Furthermore, the total Five-Education Score for male students was also lower compared to that of female students. The obvious comparison can be seen in Figure 2.

² The t-test: a statistical method used to compare the means of two related groups under different conditions.

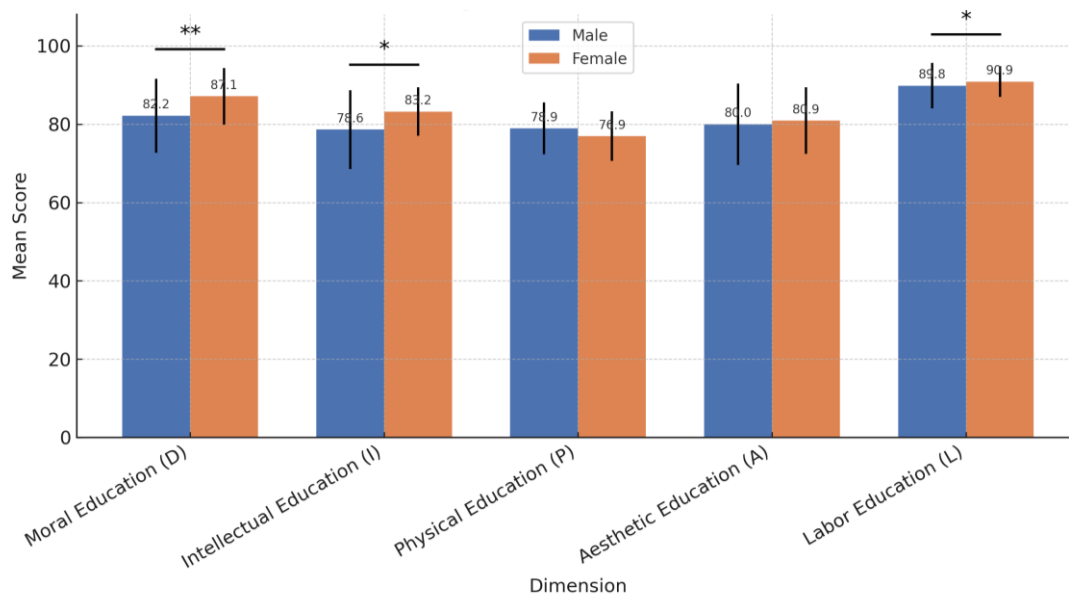
Table 4. Results of t-Tests Comparing Five-Education Scores by Gender

Dimension	Mean \pm SD		Mean Difference (M - F)	t	p
	Male	Female			
Moral Education	82.16 \pm 9.46	87.12 \pm 7.20	-4.96	-2.726	0.009**
Intellectual Education	78.62 \pm 10.09	83.20 \pm 6.18	-4.58	-2.652	0.011*
Physical Education	78.92 \pm 6.64	76.94 \pm 6.33	1.98	1.470	0.148
Aesthetic Education	79.98 \pm 10.36	80.92 \pm 8.54	-0.94	-0.519	0.606
Labor Education	89.84 \pm 5.83	90.88 \pm 3.91	-1.04	-1.050	0.299
Five-Education Total Score	81.28 \pm 5.46	83.44 \pm 4.62	-2.16	-2.590	0.013*

* p<0.05 ** p<0.01

From a gender-based perspective (Figure 2 and Figure 3), female students exhibited significantly higher Moral Education scores compared to their male counterparts. This difference may be attributed to females generally demonstrating stronger emotional regulation, a greater sense of responsibility, and better disciplinary awareness, whereas male students may require further improvement in behavioral habits and compliance with rules. In terms of Intellectual Education, the average score for female students was slightly higher than that of males, possibly due to females' advantages in study habits and attention to detail. Although male students may excel in certain specific academic disciplines, their overall scores could be diminished by lower performance in other subjects. For Physical Education, male

students scored marginally higher than females, likely reflecting males' advantage in physical strength and endurance. Although females tend to perform better in flexibility and stamina[11], their overall physical scores were slightly lower. Regarding Aesthetic Education, female students again scored higher, which may be explained by stronger aesthetic sensitivity and greater artistic expressiveness among females, while males generally showed less interest in artistic activities. In Labor Education, female students also achieved slightly higher scores, though the gap was relatively small. This suggests that both genders exhibited comparable levels of practical and collaborative skills, with females showing a slight edge in the meticulousness of task completion.

**Figure 2 Comparison of Five-Education scores between genders (*p < 0.05)**

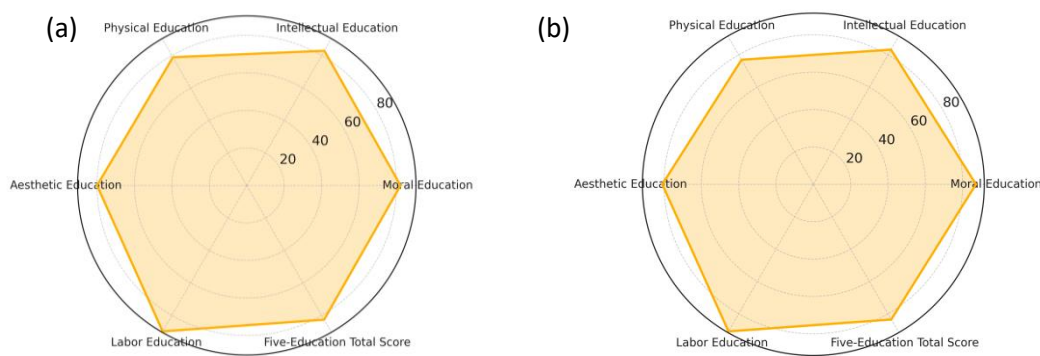


Figure 3.(a) Visualization of Five-Education Scores for Male Students ; (b) Visualization of Five-Education Scores for Female Students

Overall, the total Five-Education score was slightly higher for female students, indicating that, within the research sample, females demonstrated a more balanced development across all domains, whereas male students exhibited more prominent strengths in specific areas.

3.1.2 Grade-Based Comparative Analysis

An analysis of baseline data across each educational dimension and the overall Five-Education Score for first-year and second-year vocational students is presented. As shown in Table 5, the Shapiro-Wilk (S-W) test results

indicated that the Moral Education scores for both first- and second-year students, the Aesthetic Education scores for first-year students, and the Labor Education scores for both cohorts exhibited statistically significant p-values ($p < 0.05$). However, given that the kurtosis values were within acceptable ranges and skewness values were less than 3 in absolute terms, these distributions were still considered approximately normal for the purposes of this study. All other dimensions demonstrated normality with p-values greater than 0.05.

Table 5. Descriptive Statistics of Five-Education Scores by Grade Level

Dimension	Sample Size	Mean	Standard Deviation	Skewness	Kurtosis	Shapiro-Wilk Test (W)	
						W Statistic	p
First-Year - Moral Education	50	84.680	7.870	-1.026	1.958	0.923	0.003**
Second-Year - Moral Education	50	84.600	9.592	-0.448	-0.712	0.951	0.038*
First-Year - Intellectual Education	50	81.178	7.160	-0.241	-0.822	0.971	0.245
Second-Year - Intellectual Education	50	85.794	5.713	-0.420	0.060	0.977	0.439
First-Year - Physical Education	50	76.940	7.355	-0.105	0.473	0.967	0.181
Second-Year - Physical Education	50	78.920	5.473	-0.650	1.692	0.957	0.064
First-Year - Aesthetic Education	50	79.760	9.824	-0.771	-0.596	0.885	0.000**
Second-Year - Aesthetic Education	50	81.520	9.303	0.056	-1.045	0.961	0.095
First-Year - Labor Education	50	89.780	4.652	-1.116	3.266	0.925	0.003**
Second-Year - Labor Education	50	90.940	5.239	-0.950	0.720	0.927	0.004**
First-Year - Five-Education Total Score	50	82.562	5.848	-0.674	0.531	0.964	0.131
Second-Year - Five-Education Total Score	50	84.596	4.593	-0.451	-0.320	0.961	0.094

* $p < 0.05$ ** $p < 0.01$

Since the assumption of normality was satisfied for most dimensions, independent samples t-tests were conducted to compare the means between first-year and second-year students. As shown in Table 6, one out of six comparisons revealed a

statistically significant difference. Specifically, the mean Intellectual Education score of first-year students (81.18) was significantly lower than that of second-year students (85.79). The obvious comparison can be seen in Figure 3.

Table 6. Results of t-Tests Comparing Five-Education Scores by Grade Level

Dimension	Mean \pm SD		Mean Difference (First - Second)	t	p
	First-Year	Second-Year			
Moral Education	84.68 \pm 7.87	84.60 \pm 9.59	0.08	0.042	0.967
Intellectual Education	81.18 \pm 7.16	85.79 \pm 5.71	-4.62	-3.786	0.000**
Physical Education	76.94 \pm 7.36	78.92 \pm 5.47	-1.98	-1.666	0.102
Aesthetic Education	79.76 \pm 9.82	81.52 \pm 9.30	-1.76	-0.952	0.346
Labor Education	89.78 \pm 4.65	90.94 \pm 5.24	-1.16	-1.116	0.270
Five-Education Total Score	82.56 \pm 5.85	84.60 \pm 4.59	-2.03	-1.905	0.063

* p<0.05 ** p<0.01

From a grade-level perspective (Figure 3 and Figure 4), the Moral Education scores of first-year and second-year students were relatively close, reflecting the consistent and stable effectiveness of the institution's moral education efforts. In contrast, second-year students scored significantly higher in Intellectual Education, which may be attributed to the progressive deepening of academic content in the second year and the students' better adaptation to the learning environment and academic expectations[12]. First-year students may have scored slightly lower due to the challenges of adjusting to a new environment and adapting to university-level study rhythms. Regarding Physical Education,

second-year students also achieved slightly higher average scores, possibly due to their greater familiarity with physical training courses and assessment standards[13]. Aesthetic Education scores were similarly higher among second-year students, which may reflect their broader course selections, increased participation in artistic activities, and gradual development of aesthetic appreciation. For Labor Education, second-year students again performed slightly better, likely due to their greater engagement in social practice activities[14], extracurricular opportunities, and accumulated experience in task organization and teamwork.

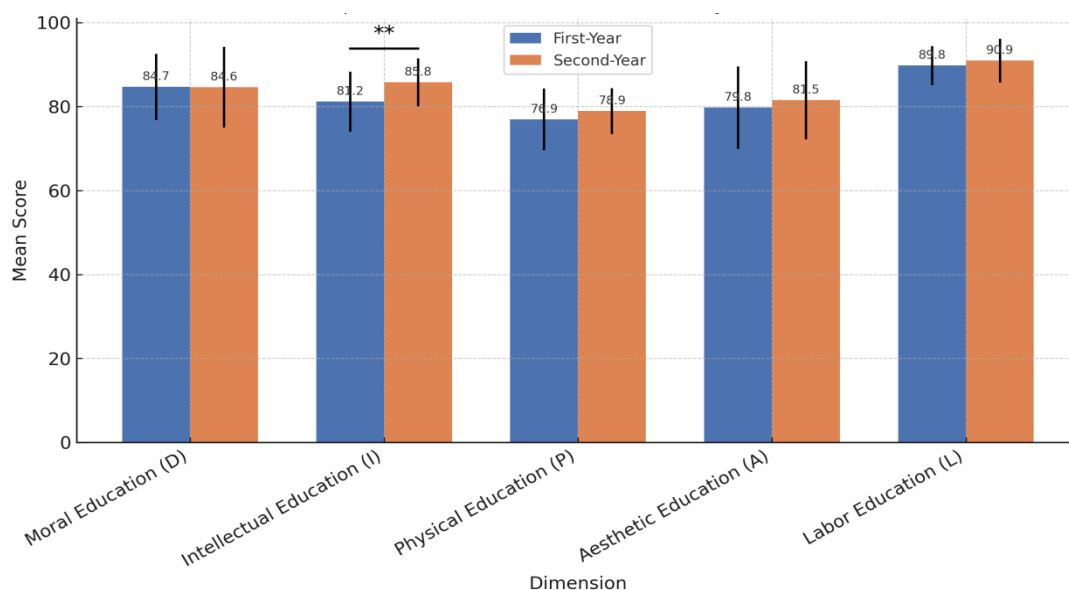


Figure 3. Comparison of Five-Education scores by Grade-level. (p < 0.01)**

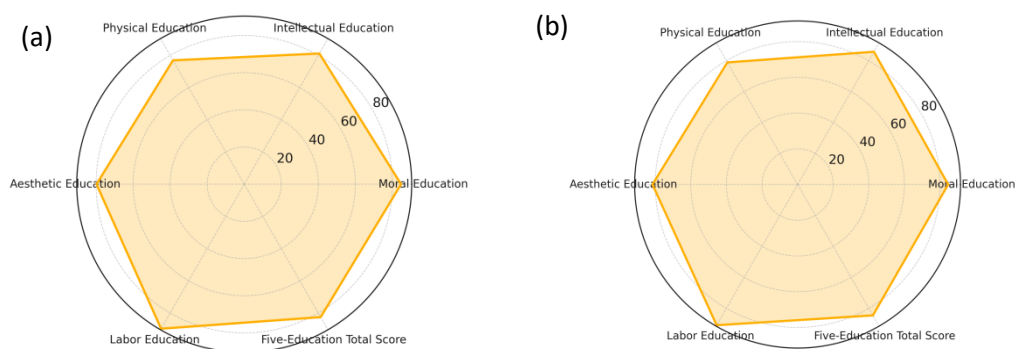


Figure 4. (a) Visualization of Five-Education Scores for First-Year Students ; (b) Visualization of Five-Education Scores for Second-Year Students

Overall, second-year students demonstrated better overall performance in the Five-Education scores, suggesting that after adapting to the university environment, they were able to achieve sustained development and improvement, particularly in areas such as intellectual and aesthetic education.

3.1.3 Major-Based Comparative Analysis

A comparative analysis was conducted between students majoring in Virtual Reality Application Technology (hereinafter referred to as Major 1) and students majoring in Film and Animation (hereinafter referred to as Major 2) across each

educational dimension and the overall Five-Education Score. As shown in Table 7, the results of the Shapiro-Wilk (S-W) test indicated that Moral Education scores for both majors, the Intellectual Education and Physical Education scores for Major 1, and the Labor Education scores for Major 2 exhibited statistically significant p-values ($p < 0.05$). Nonetheless, given that the skewness and kurtosis values remained within acceptable ranges, the distributions were considered approximately normal for this study. All other dimensions demonstrated normality with p-values greater than 0.05.

Table 7. Descriptive Statistics of Five-Education Scores by Major

Dimension	Sample Size	Mean	Standard Deviation	Skewness	Kurtosis	Shapiro-Wilk Test (W)	
						W Statistic	p
Major 1 - Moral Education	50	89.000	6.996	-0.734	0.213	0.944	0.020*
Major 2 - Moral Education	50	80.280	8.137	-0.766	-0.032	0.938	0.011*
Major 1 - Intellectual Education	50	85.172	7.283	-0.887	0.226	0.923	0.003**
Major 2 - Intellectual Education	50	81.326	6.467	-0.244	-0.632	0.976	0.388
Major 1 - Physical Education	50	78.160	6.222	-0.678	1.470	0.953	0.046*
Major 2 - Physical Education	50	77.700	6.873	-0.165	0.611	0.970	0.228
Major 1 - Aesthetic Education	50	77.360	10.470	-0.009	-0.978	0.954	0.052
Major 2 - Aesthetic Education	50	83.920	7.284	-0.318	-0.686	0.964	0.133
Major 1 - Labor Education	50	90.760	3.977	-0.245	-0.489	0.973	0.317
Major 2 - Labor Education	50	89.960	5.799	-1.030	1.203	0.920	0.002**
Major 1 - Five-Education Total Score	50	85.112	3.944	-0.438	-0.235	0.976	0.407
Major 2 - Five-Education Total Score	50	81.900	3.615	-0.164	-0.116	0.982	0.646

* $p < 0.05$ ** $p < 0.01$

Since most dimensions met the assumption of normality, independent samples t-tests were performed to compare the mean scores between the two majors. As shown in Table 8, significant differences were observed in four out of six comparisons. Specifically, the mean Moral Education score of Major 1 students (89.00) was significantly higher than that of Major 2 students (80.28). The mean Intellectual Education score of

Major 1 students (85.17) was also significantly higher than that of Major 2 students (81.33). In contrast, the mean Aesthetic Education score of Major 1 students (77.36) was significantly lower than that of Major 2 students (83.92). Finally, the overall Five-Education Score was significantly higher for Major 1 students (85.11) compared to Major 2 students (81.90).

Table 8. Results of t-Tests Comparing Five-Education Scores by Major

Dimension	Mean \pm SD		Mean Difference (Major 1 - Major 2)	t	p
	Major 1	Major 2			
Moral Education	89.00 \pm 7.00	80.28 \pm 8.14	8.72	5.494	0.000**
Intellectual Education	85.17 \pm 7.28	81.33 \pm 6.47	3.85	2.737	0.009**
Physical Education	78.16 \pm 6.22	77.70 \pm 6.87	0.46	0.395	0.695
Aesthetic Education	77.36 \pm 10.47	83.92 \pm 7.28	-6.56	-3.573	0.001**
Labor Education	90.76 \pm 3.98	89.96 \pm 5.80	0.80	0.897	0.374
Five-Education Total Score	85.11 \pm 3.94	81.90 \pm 3.61	3.21	5.441	0.000*

* p<0.05 ** p<0.01

From the perspective of specialized majors (Figure 3), students majoring in Virtual Reality Application Technology demonstrated relatively higher Moral Education scores. This may be closely associated with the nature of the major, where virtual reality projects often demand strong teamwork[15], adherence to professional standards, and ethical conduct. In contrast, students in the Film and Animation major tend to emphasize creativity and personal expression, which may lead to relatively lower engagement in areas related to civic responsibility and social ethics[16]. The advantage of Virtual Reality majors in Intellectual Education may stem from the curriculum's strong emphasis on technical development, logical reasoning, and the integration of theoretical knowledge. Although the Film and Animation major focuses heavily on aesthetic design and creative expression, it may place comparatively less emphasis on technical theory or logical thinking training.

There was no significant difference between the

two majors in the Physical Education dimension, indicating similar levels of physical fitness and participation in athletic activities, with physical training occupying a comparable proportion in both curricula. In terms of Aesthetic Education, students majoring in Film and Animation exhibited a distinct advantage, consistent with their professional orientation. Their scores in aesthetic literacy and artistic practice were significantly higher, reflecting the major's emphasis on creativity and visual design. Conversely, the Virtual Reality major places greater emphasis on technical implementation rather than artistic expression. Both majors achieved relatively high scores in Labor Education, reflecting strong practical skills and a well-developed sense of labor responsibility among students[17]. Practical tasks for Virtual Reality students may primarily involve technical project development and virtual environment construction, while those for Film and Animation students may focus on animation production, script design, and character modeling[18].

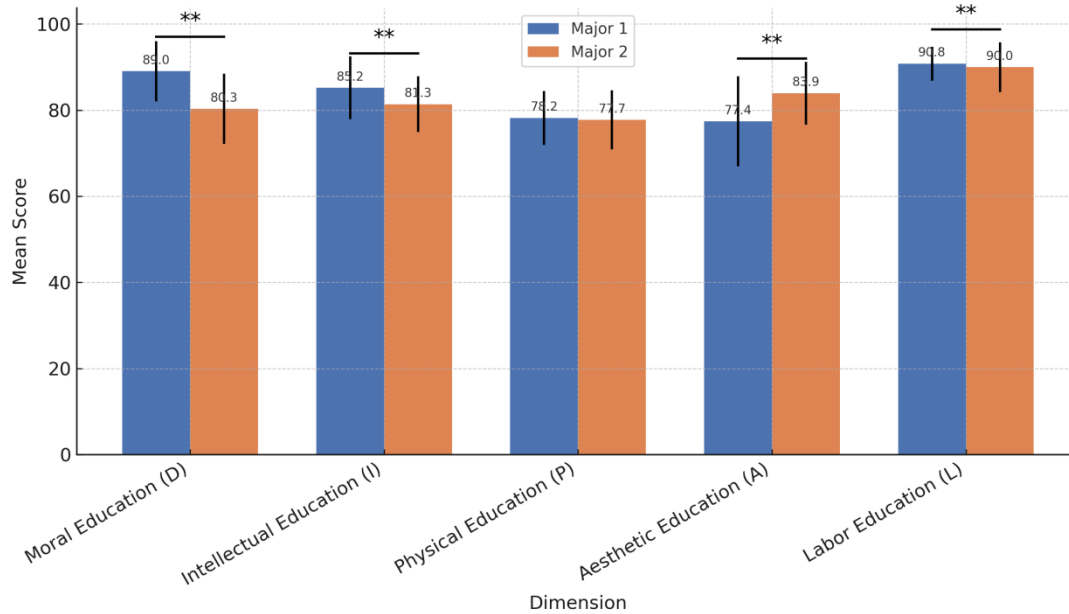


Figure 5. Comparison of Five-Education Scores by Major

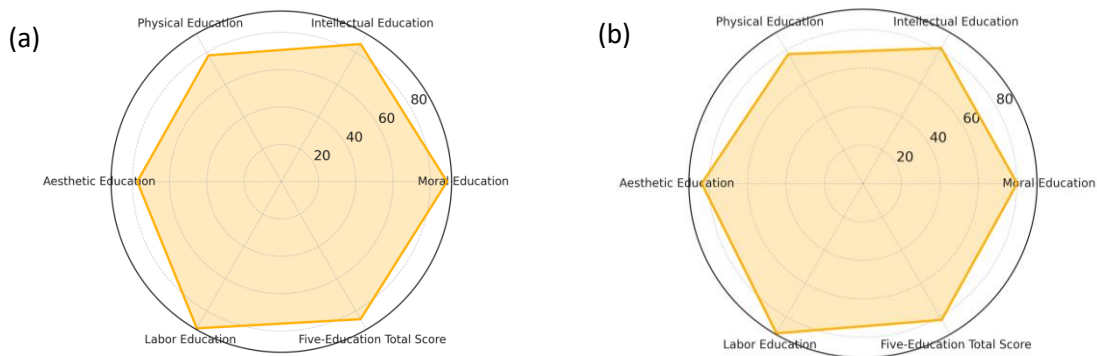


Figure 6. (a) Visualization of Five-Education Scores for Major 1 Students; (b) Visualization of Five-Education Scores for Major 2 Students

Overall, the Five-Education strengths for Virtual Reality majors were primarily reflected in the dimensions of Moral Education, Intellectual Education, and Labor Education, whereas the outstanding performance of Film and Animation majors in Aesthetic Education significantly elevated their overall competency profiles.

3.2 Longitudinal Comparative Analysis

Baseline data across each educational dimension and the overall Five-Education Score were collected for students from the first semester of the 2023–2024 academic year (hereinafter referred to as Semester 1) and the second semester of the 2023–2024 academic year (hereinafter

referred to as Semester 2). As shown in Table 9, the results of the Shapiro-Wilk (S-W) test indicated that the Moral Education scores for both Semester 1 and Semester 2, the Intellectual Education scores for Semester 1, the Physical Education scores for Semester 2, and the Labor Education scores for Semester 1 exhibited statistically significant p-values ($p < 0.05$). Nevertheless, given that skewness and kurtosis values remained within acceptable ranges, the distributions were considered approximately normal for the purposes of this study. All other dimensions demonstrated normality with p-values greater than 0.05.

Table 9. Descriptive Statistics of Five-Education Scores Across Different Semesters

Dimension	Sample Size	Mean	Standard Deviation	Skewness	Kurtosis	Shapiro-Wilk Test (W)	
						W Statistic	p
Semester 1 - Moral Education	50	84.600	9.592	-0.448	-0.712	0.951	0.038*
Semester 2 - Moral Education	50	86.940	6.753	-1.235	3.540	0.910	0.001**
Semester 1 - Intellectual Education	50	85.340	6.518	-0.713	0.231	0.948	0.029*
Semester 2 - Intellectual Education	50	82.568	5.904	-0.446	-0.116	0.972	0.278
Semester 1 - Physical Education	50	78.920	5.473	-0.650	1.692	0.957	0.064
Semester 2 - Physical Education	50	85.120	9.043	-1.031	0.895	0.922	0.003**
Semester 1 - Aesthetic Education	50	81.520	9.303	0.056	-1.045	0.961	0.095
Semester 2 - Aesthetic Education	50	80.140	7.597	-0.609	0.639	0.964	0.125
Semester 1 - Labor Education	50	90.940	5.239	-0.950	0.720	0.927	0.004**
Semester 2 - Labor Education	50	76.180	8.485	0.165	-0.072	0.983	0.686
Semester 1 - Five-Education Total Score	50	84.458	4.204	-0.301	-0.192	0.983	0.682
Semester 2 - Five-Education Total Score	50	83.042	4.226	-0.959	0.847	0.937	0.011*

*p<0.05 ** p<0.01

Independent samples t-tests were conducted to compare the mean scores between Semester 1 and Semester 2. As shown in Table 10, four out of six comparisons yielded p-values less than 0.05, indicating statistically significant differences. Specifically, the mean Intellectual Education score in Semester 1 was 2.77 points higher than in Semester 2. The mean Physical Education score in

Semester 1 was 6.20 points lower than in Semester 2. The mean Labor Education score in Semester 1 was 14.76 points higher than in Semester 2. Furthermore, the overall Five-Education Total Score for Semester 1 (mean = 84.46) was noticeably higher than that for Semester 2 (mean = 83.17).

Table 10. Results of t-Tests Comparing Five-Education Scores Across Semesters

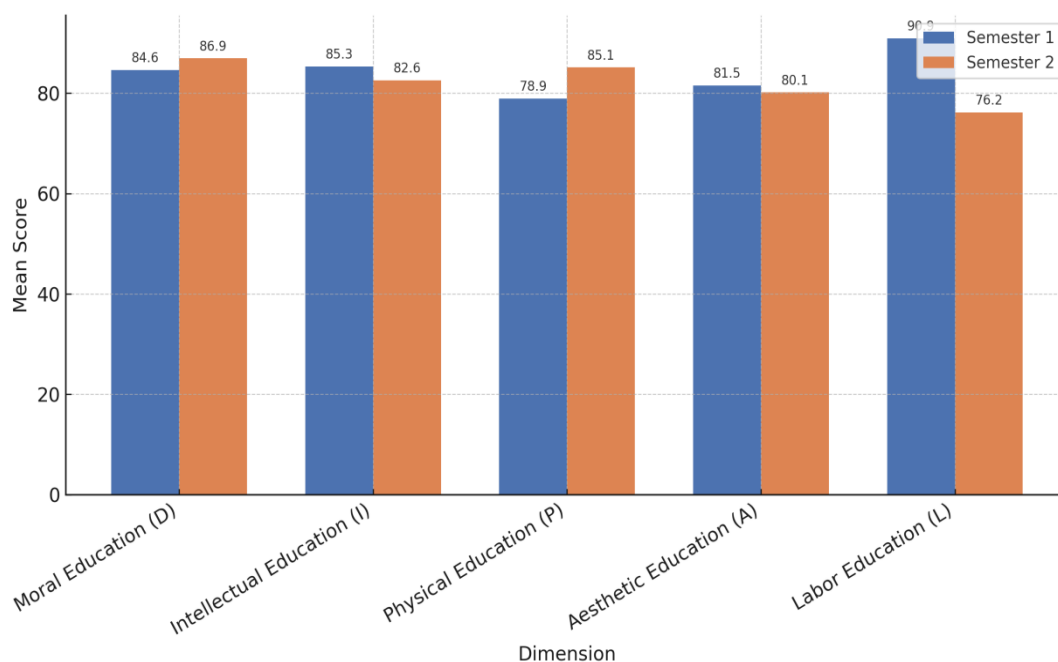
Dimension	Mean \pm SD		Mean Difference (Semester 1 - Semester 2)	t	p
	Semester 1	Semester 2			
Moral Education	84.60 \pm 9.59	86.94 \pm 6.75	-2.34	-1.862	0.069
Intellectual Education	85.34 \pm 6.52	82.57 \pm 5.90	2.77	2.184	0.034*
Physical Education	78.92 \pm 5.47	85.12 \pm 9.04	-6.20	-4.185	0.000**
Aesthetic Education	81.52 \pm 9.30	80.14 \pm 7.60	1.38	0.839	0.406
Labor Education	90.94 \pm 5.24	76.18 \pm 8.48	14.76	13.296	0.000**
Five-Education Total Score	84.46 \pm 4.20	83.17 \pm 3.93	1.29	2.053	0.045*

* p<0.05 ** p<0.01

Regarding the changes in Five-Education scores between Semester 1 (the second half of the 2023–2024 academic year) and Semester 2 (the first half of the 2023–2024 academic year), Figure 7 illustrates several key trends. The Moral Education scores exhibited a noticeable upward trend, which may be attributed to the increased number of thematic educational activities during the first half of the year (such as Youth Day celebrations and Labor Day events), activities that typically reinforce students' values and sense of social responsibility.

In contrast, the Intellectual Education scores showed a moderate decline. This may be explained by the higher levels of interest and motivation observed at the beginning of the academic year (Semester 1), whereas in Semester 2, with heavier academic workloads and increased

difficulty, some students may have experienced fatigue or a decrease in academic engagement. Physical Education scores demonstrated a significant increase, likely due to favorable seasonal conditions (spring and summer), which provided more opportunities for outdoor activities[19]. Additionally, more targeted physical education course planning during Semester 2 may have further stimulated students' enthusiasm for sports participation. A slight decline was observed in Aesthetic Education scores, possibly due to the school's aesthetic education programs primarily consisting of routine coursework, leading to a slight decrease in students' learning interest[20]. Labor Education scores experienced a sharp decline, which may be attributed to the relatively monotonous nature of labor education activities and lower levels of student participation and interest.

**Figure 7. Comparison of Five-Education Scores Between Semester 1 and Semester 2**

Overall, although the improvements in Moral Education and Physical Education partially offset the declines in Intellectual, Aesthetic, and Labor Education, the cumulative effect resulted in a slight overall decrease in the total Five-Education score.

4. Conclusion

Through the digital profiling and analysis of Five-Education scores among vocational students at Beijing Information Vocational and Technical College, this study identified variations in student performance across different semesters, genders, grade levels, and majors. The results demonstrate that the Five-Education integration model effectively promotes the comprehensive development of students; however, practical implementation still requires appropriate adjustments based on external factors, academic scheduling, and individual differences.

Looking forward, vocational institutions are encouraged to establish precise data analytics platforms to provide scientific support for educational decision-making, while also emphasizing the importance of personalized student development. Efforts should be directed toward fostering the synergy and innovation of Five-Education initiatives. This study offers a new perspective for educational reform and development in vocational colleges and lays a foundational framework for the application of digital education in the vocational sector, possessing significant practical implications and forward-looking value.

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