

Value-Added Evaluation: A Practical Path for Cultivating Key Competencies

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Abstract: As a new path for cultivating students' key competencies, value-added evaluation, compared with traditional evaluation which has limitations such as singularity, utilitarianism and unfairness, focuses more on individual progress, emphasizes processes, and highlights fairness. Based on students' initial level, value-added evaluation pays attention to longitudinal tracking and process-oriented indicators, and has an inherent logic that drives the development of key competencies. Starting from educational practice, value-added evaluation can refine key competencies into observable indicators, stimulate students' internal motivation for learning, and provide teachers with accurate teaching feedback. Furthermore, by making efforts to build a diversified evaluation subject system, adopt diverse evaluation methods, and strengthen the application of incentive evaluation results, it promotes the development of students' key competencies. However, due to the current bottlenecks in technology and practice, it is still necessary to explore the breakthroughs and development directions of value-added evaluation.

Keywords: Value-Added Evaluation; Key Competencies; Educational Evaluation Reform; Practical Path.

1. Introduction

In the process of deepening educational reform, cultivating students' key competencies has become a core task in the field of education. The overall framework of Key Competencies for Chinese Students' Development clearly defines key competencies as the essential qualities and key abilities that students need to adapt to lifelong development and social development, covering three major dimensions: cultural foundation, independent development, and social participation [1]. However, the traditional evaluation model represented by "result-oriented evaluation" centers on academic performance and has obvious limitations, making it difficult to meet the needs of cultivating key competencies. Its singularity, which focuses on evaluating academic test scores, makes it impossible to effectively assess the development of non-academic competencies; its utilitarianism, which over-pursues scores, ignores the efforts and progress of students in the learning process; and its unfairness, affected by innate factors, disturbs educational evaluation and makes it unable to truly reflect educational effects. Against this background, as an emerging evaluation concept, value-added evaluation provides new ideas for solving the dilemmas of traditional evaluation, and it is urgent to conduct in-depth research on its role and practical path in the cultivation of key competencies.

2. Comparative Analysis of Value-Added Evaluation and Traditional Evaluation Introduction

2.1. Characteristics and Limitations of Traditional Evaluation Models

In educational evaluation, the traditional evaluation model represented by result-oriented evaluation has long occupied a dominant position. With academic performance as its core indicator, this evaluation method has promoted the development of education in exam-oriented assessment.

However, with the evolution of the times and the renewal of educational concepts, the limitations of this evaluation model have become increasingly prominent.

The traditional evaluation model takes academic performance as the core or even the sole indicator, and overly relies on scores to measure students' development. In traditional educational practice, schools conduct tests on students' academic level before enrollment; after a certain period of time, they evaluate the quality of education by comparing the changes in students' scores before and after enrollment. This kind of evaluation can be regarded as an application of value-added evaluation, but it is limited to the comparison of students' score changes. It is not only a product of the "score-only" orientation but also a simplification and over-singularization of the evaluation's original purpose. This evaluation method reduces students' learning achievements to test scores—whether in daily quizzes, mid-term exams, or final exams, scores have become the key criterion for judging students' performance. Its singularity results in the inability to include non-academic competencies such as practical skills, emotional attitudes, and innovative thinking in the evaluation scope, failing to fully reflect students' comprehensive quality and development potential, and thus restricting the consideration of students' all-round development.

Guided by the traditional evaluation model dominated by result-oriented evaluation, test scores become the ultimate goal. This leads schools and teachers to excessively focus on scores and rankings, while the process in which students adjust their learning methods, overcome difficulties, and achieve phased progress during the learning process is often overlooked. This kind of evaluation, which emphasizes results over processes, can hardly motivate students for sustained development, is not conducive to cultivating students' autonomous learning ability and perseverance, and violates the requirement of nurturing students through the educational process.

Furthermore, the traditional evaluation model fails to fully consider the impact of innate factors such as family background and initial academic foundation on students'

scores. Students differ in their family economic conditions, cultural environment, and knowledge reserve upon enrollment—these factors directly or indirectly affect academic performance. However, traditional evaluation simply attributes scores to students' own abilities and efforts, ignoring the interference of innate factors. As a result, the evaluation results cannot objectively reflect the actual effect of education, which is unfair to students from less privileged family backgrounds and also runs counter to the concept of educational equity.

2.2. Breakthroughs and Innovations of Value-Added Evaluation

Value-added evaluation originates from the economic term "value-added," which refers to the increase in the value of assets or commodities during investment. Scholars in the United States were the first to introduce "value-added" into the field of education to evaluate the individual changes that students undergo after receiving education, and gradually developed the concept of "value-added evaluation" (or "value-added assessment"). In education, value-added evaluation takes students' own initial level as the benchmark to measure the "value-added" of their competencies over a certain period. Different from the horizontal comparison in traditional evaluation, value-added evaluation focuses on longitudinal tracking, fully respects individual differences among students, and pays attention to each student's progress based on their original foundation. By regularly assessing students' learning status and mapping their personal growth curves, it clearly presents the trajectory of students' development, which can stimulate students' learning motivation and self-confidence, enabling each student to achieve breakthroughs at their own pace of development.

The key competency-oriented approach essentially transforms education and teaching from "imparting knowledge" to "developing students' competencies." To evaluate the development of students' key competencies, the core lies in whether the knowledge in textbooks has been transformed into correct values, key abilities, and essential qualities in students. Value-added evaluation can incorporate process-oriented indicators such as students' knowledge application and growth reflection into the evaluation scope, breaking free from the traditional evaluation's reliance on result-oriented scores. It assesses students' development from multiple dimensions and perspectives, fully restoring their learning status and growth process. By integrating process evaluation into teaching, teachers can obtain more comprehensive teaching feedback, understand students' strengths and weaknesses in learning, and provide a basis for personalized teaching; students can also gain a clearer understanding of their own learning process and adjust their learning strategies in a timely manner.

Value-added evaluation should be an assessment that adopts a developmental perspective and ultimately promotes the development of students' competencies. It is an organic integration of diagnostic evaluation, formative evaluation, and summative evaluation. Through scientific statistical methods, value-added evaluation eliminates uncontrollable external factors such as family background and socioeconomic status [2], to accurately assess the "net effect" of educational interventions. It focuses on the contribution of educational practice itself to students' progress, avoids the interference of innate factors on evaluation results, and provides a fair evaluation environment for all students.

Whether students come from privileged families or ordinary ones, they can receive fair evaluation in the value-added evaluation system, which objectively reflects their growth and progress in the educational process and effectively promotes the realization of educational equity.

3. The Inherent Logic of Value-Added Evaluation Driving the Development of Key Competencies

3.1. Connotation and Development Characteristics of Key Competencies

To clarify the application direction and logic of value-added evaluation, two issues need to be identified and addressed. First, whether the so-called non-academic performance is included in the evaluation and regarded as the goal of students' academic development is a matter of value-rational choice in education. Second, whether the quantification of non-academic performance can go beyond simple and intuitive statistics to truly reflect students' all-round competency development is a technical operational difficulty in evaluation.

Key Competencies for Chinese Students' Development clearly states that key competencies, with the cultivation of well-rounded individuals as the core, cover three major dimensions: cultural foundation, independent development, and social participation, each of which includes specific competency requirements. The cultural foundation dimension comprises humanistic attainments and scientific spirit. The former requires students to possess humanistic accumulation, feelings, and aesthetic taste, while the latter emphasizes rational thinking, critical questioning, and inquiry ability. The independent development dimension focuses on learning to learn and healthy living, involving abilities such as being fond of learning and good at learning, reflective ability, information literacy, as well as cherishing life, having a sound personality, and self-management. The social participation dimension includes responsibility and practical innovation, covering social responsibility, national identity, international understanding, as well as labor awareness, problem-solving, and technology application abilities. It can be said that key competencies lie within the scope of educational goals, not outside them. The cultivation of key competencies itself is the goal of education and a value-rational choice in nurturing people.

From the perspective of educational practice, the development of key competencies features gradualness and comprehensiveness. Gradualness is reflected in the fact that the improvement of key competencies is a process of gradual accumulation and deepening, which continuously improves as students acquire more knowledge and gain richer experience. Comprehensiveness is manifested in the interconnection and mutual influence of various competency dimensions, forming an organic whole. Students may involve the development of multiple competency dimensions simultaneously in a single learning or practical activity. What value-added evaluation can do is to focus all aspects of education on the development of students' key competencies, providing a practical basis for truly awakening students' subjectivity and stimulating their potential in education.

3.2. Paths of Value-Added Evaluation Driving the Development of Key Competencies

The formation of key competencies is not achieved overnight; instead, it is developmental, continuous, and spiral-upward. This means that the educational evaluation with key competencies as the ultimate goal should also be progressively deepened and advanced [3]. Value-added evaluation provides a practical path to enhance the operability and measurability of key competency cultivation by refining each dimension of key competencies into observable and assessable value-added indicators. Through indicator decomposition, abstract competency concepts are linked to specific learning behaviors and achievements, providing clear directions for teachers' teaching and students' learning. For example, "social responsibility" can be decomposed into indicators such as participation in community services and attention to social issues; "innovative ability" can correspond to indicators like project-based learning outcomes and the frequency of putting forward innovative ideas. Indicator decomposition transforms the cultivation of key competencies from an "abstract concept" into "specific tasks," helping teachers design targeted teaching activities, guiding students to clarify learning goals, and effectively promoting the implementation of competency cultivation.

By regularly feeding back the "competency value-added curve," value-added evaluation provides students with intuitive feedback on their progress, stimulating their internal motivation for learning. When students see that their value-added curve shows an upward trend, they can truly feel the results brought by their efforts, enhance their sense of learning accomplishment and self-confidence, and thus invest in learning more proactively. If the curve grows slowly, students can also clearly recognize their own shortcomings and take the initiative to adjust their learning strategies. This feedback mechanism, based on understanding one's own situation and progress, breaks the incentive model of "score ranking" in traditional evaluation, enabling students to shift from "passive learning" to "active development" and significantly improving their learning autonomy.

The data analysis results generated by value-added evaluation can provide teachers with accurate teaching feedback, helping them identify shortcomings in competency cultivation and optimize teaching strategies. By analyzing the value-added data of students in various competency dimensions, teachers can clarify which competency dimensions develop well and which have shortcomings, and then adjust teaching contents and methods accordingly. For example, if the value-added of students' "scientific inquiry ability" is insufficient, teachers can optimize the design of experimental teaching and increase inquiry-based training; if the improvement of "cooperative ability" is slow, they can strengthen the application of group cooperative teaching models. Through the closed loop of "evaluation-feedback-adjustment," the goal of "promoting teaching through evaluation" is achieved, continuously improving teaching quality and better meeting the needs of students' key competency development.

4. Strategies for Promoting Students' Competency Value-Added Through Developmental Evaluation

4.1. Establishing a Diversified Evaluation Subject System

As organizers of education and teaching, teachers, relying on their professional knowledge and teaching experience, conduct accurate assessments of students' competency attainment from a disciplinary perspective. In the teaching of various subjects, teachers align with subject competency requirements and use methods such as classroom observation, homework correction, and test assessment to judge students' development in terms of subject knowledge mastery, thinking ability, and practical application. They provide students with professional learning guidance and improvement suggestions, serving as the core subject in the evaluation system.

As the main body of learning, students conduct self-evaluation and reflection by establishing growth portfolios. Self-efficacy has the strongest explanatory power for the willingness to engage in value-added evaluation and is the preferred intervention target for improving middle school students' acceptance of value-added evaluation [4]. Growth portfolios record students' learning achievements, progress processes, existing problems, and improvement plans. Students regularly review the contents of the portfolios, summarize learning experiences, analyze their own strengths and weaknesses, and set personalized learning goals. Self-evaluation enhances students' self-cognition ability, promotes autonomous learning and self-improvement, and is an indispensable link in the evaluation system.

Parents provide supplementary basis for evaluation by feeding back students' competency performance at home. Parents pay attention to students' moral behavior, living habits, learning autonomy, and emotional management ability at home, and feed back relevant information to schools and teachers. This helps teachers fully understand students' development in the family environment, realize the collaborative education between family and school, and improve the comprehensiveness of evaluation.

In group cooperative learning, peers provide feedback on each other's contribution in cooperation through mutual evaluation. Peers evaluate from aspects such as cooperation participation, task completion quality, and team collaboration ability. This helps students recognize their own performance in cooperation, learn from others' strengths, improve cooperation ability and critical thinking, and enrich the evaluation perspective.

4.2. Adopting Diverse Evaluation Methods

Selecting a correct value-added evaluation model can truly and effectively reflect the evaluated person's initial competency level and the degree of competency development.

Quantitative evaluation uses scale tools to conduct quantitative assessment of students' abilities, ensuring the objectivity and accuracy of evaluation. For example, the "Critical Thinking Scoring Scale" sets scoring criteria from dimensions such as analyzing problems, evaluating evidence, and putting forward viewpoints to quantify students' critical thinking ability; the "Academic Progress Scale" calculates the range of academic value-added by comparing students' academic performance in different periods longitudinally. Quantitative evaluation provides data support for evaluation

and helps teachers accurately grasp students' development level. However, quantitative analysis requires a large amount of data, leading to high evaluation costs such as the demand for professional support in statistical analysis. At the same time, for special scenarios in education, quantitative indicators cannot fully demonstrate the competency of the evaluated objects.

Qualitative evaluation conducts qualitative analysis of students' competency development through methods such as classroom observation, growth interviews, and work analysis. Classroom observation focuses on students' participation, learning attitude, and cooperative performance; growth interviews deeply understand students' learning feelings, confusion, and goals; work analysis evaluates students' knowledge application and innovative ability reflected in works such as homework, creations, and reports. Currently, many educational scholars tend to believe that the analysis of value-added evaluation should be a combination of quantitative and qualitative methods, aiming to accurately analyze students' competency status and fully present students' learning process and growth trajectory.

4.3. Strengthening the Application of Incentive Evaluation Results

Value-added evaluation takes "value-added" as the core focus, and provides an evaluation basis for affirming the growth and progress of more students through the value-added amount. In educational practice, evaluation reports including advantageous value-added items, items to be improved, and improvement strategies can be provided to students to help them clearly understand their own development status. The report identifies students' advantageous fields to enhance their learning confidence; points out the directions to be improved and provides specific improvement suggestions—for example, suggesting increasing reading volume and learning reading skills for "insufficient reading comprehension ability". Personalized reports provide a basis for students to formulate learning plans and promote their autonomous improvement.

At the same time, the "value-added amount" of students' formed competencies can also provide corresponding competency development evaluation reports for teachers and schools. By providing teachers with the analysis of the overall competency value-added of the class, the development trend and existing problems of the class in various competency dimensions are presented. Teachers adjust teaching contents and methods according to the analysis results. If the value-added of the class's "writing ability" is slow, the number of writing training classes can be increased and writing teaching strategies can be optimized; if the "cooperation ability" develops well, the group cooperative teaching model can be further promoted. Class analysis helps teachers realize "promoting teaching through evaluation" and improve teaching quality.

Schools can use the school-wide value-added data to optimize curriculum settings and resource allocation. If the data shows that the value-added of "scientific and technological innovation competency" in a certain grade is insufficient, science and technology innovation courses and club activities can be added; if the teaching effect of a certain subject is significant, experience can be summarized and promoted throughout the school. Value-added data provides a scientific basis for school decision-making, promotes the rational allocation of school educational resources, and

enhances the overall educational quality of the school.

5. Development Bottlenecks and Breakthrough Directions of Value-Added Evaluation

5.1. Technical and Practical Bottlenecks in Development

Value-added evaluation has become an important direction of educational evaluation reform under the guidance of key competencies, but its development still faces two major bottlenecks.

The first is the technical bottleneck of difficult quantification of non-academic competencies. Internationally, systems such as Tennessee Value-Added Assessment System (TVAAS) in the United States and Progress8 in the United Kingdom are relatively mature in the quantitative assessment of academic performance, but they still face challenges in quantifying non-academic competencies [5]. Non-academic competencies such as emotions, values, and social responsibility are subjective and implicit, making them difficult to measure through standardized tests. Although China has made progress in the development of quantitative tools for non-academic competencies, problems such as incomplete indicators and subjective assessment methods still exist, resulting in insufficient accuracy and reliability of value-added assessment for non-academic competencies.

The second is the practical bottleneck of the urgent need to improve teachers' evaluation literacy. Teachers are the key subjects in the implementation of value-added evaluation, but their insufficient evaluation literacy has become a major bottleneck in practice. Some teachers have an in-depth understanding of the concept of value-added evaluation and are still influenced by traditional evaluation concepts; their ability to analyze and apply value-added data is weak, making it impossible to extract effective information from data to guide teaching; and they lack the practical ability to design and implement value-added evaluation, leading to difficulties in the implementation of evaluation plans.

To address the above bottlenecks, two measures are needed. First, strengthen the research and development of quantitative tools for non-academic competencies. On the one hand, draw on international advanced experience and combine it with educational reality to build a scientific indicator system for non-academic competencies; on the other hand, use big data and artificial intelligence technologies to collect multi-source data of students in learning and life (such as social behavior data and practical activity data), and mine the characteristics of non-academic competencies through data analysis to improve the objectivity and accuracy of quantitative assessment. Second, enhance teachers' evaluation literacy through specialized training. The training content should cover value-added evaluation theories, data analysis methods, and skills in designing and implementing evaluation plans; the training method should adopt a combination of online and offline models—online platforms provide self-directed learning resources, while offline sessions conduct case discussions and practical operation training; a long-term training mechanism should be established to regularly organize teachers to exchange and learn, continuously improving their theoretical level and practical ability in evaluation.

5.2. Focused Breakthrough Directions at Present

Value-added evaluation is a means rather than an end. Grasping its breakthrough over the traditional evaluation model is the key to promoting the development of key competencies.

Promote interdisciplinary integration to build a comprehensive value-added evaluation system. The traditional evaluation takes disciplines as units, making it difficult to reflect students' comprehensive quality. In the future, interdisciplinary integration should be promoted to build a value-added evaluation system covering the "five educations" (moral, intellectual, physical, aesthetic, and labor education). In advancing students' all-round development and ensuring the effective implementation of the "five educations" initiative, the cultivation of students' ideological awareness, practical ability, innovative ability, and sense of well-being should no longer be restricted to limited time and space as "scores", but should be given more opportunities for cultivation and development. Focusing on the value-added essence of key competencies essentially means promoting and encouraging students' ability to understand things, accumulate knowledge, participate in practice, and engage in social interactions. This enables students to recognize and take their subjective role, stimulating more enthusiasm, so that they can transform the knowledge learned at school into competencies and abilities highly adapted to society through interest-based choices.

Advance home-school-community collaboration to expand evaluation scenarios and data sources. As evaluation indicators shift from emphasizing basic performance to focusing on progress, collaboration among families, schools, and communities should be promoted. Value-added evaluation emphasizes students' subjective awareness, but school management and family effectiveness also play an important cumulative role in the development of students' key competencies; even whether teachers and families guide students in developing key competencies is a crucial factor affecting value-added. Currently, evaluation is mainly limited to school scenarios, resulting in a single source of data. In the future, we should promote home-school-community collaboration, break down the barriers of evaluation among the three parties, and expand evaluation scenarios and data sources. Schools can cooperate with communities to record students' community practice data; establish home-school communication platforms to allow parents to timely feedback on students' performance at home; and integrate resources from social institutions to obtain data on students' participation in social practice and interest-based training. Through multi-scenario and multi-source data, a comprehensive evaluation of students can be achieved, forming a joint force for collaborative education among families, schools, and communities.

Customize differentiated value-added goals to meet personalized development needs.

In the transformation of evaluation content from singularity to diversity, students' all-round development should be promoted. Students have differences in interests, strengths, and development needs, and unified value-added goals cannot meet the needs of personalized development. In the future, differentiated value-added goals should be customized based on students' interests and strengths. For students with artistic talents, an additional "aesthetic creation" value-added dimension should be added to focus on the improvement of their artistic creation and appreciation abilities; for students with sports talents, the evaluation should focus on the development of their sports skills and sportsmanship; for students with scientific and technological innovation talents, attention should be paid to the progress of their scientific inquiry and innovative abilities. Differentiated goals can stimulate students' potential strengths, promote their personalized growth, and provide students with more choices and possibilities in the breadth of their growth and development.

6. Conclusion

As an important direction of educational evaluation reform, value-added evaluation plays an irreplaceable role in cultivating students' key competencies. While recognizing the current challenges, we should be more confident that with the continuous advancement of technology and the accumulation of practical experience, value-added evaluation will play a greater role in future education. This will provide more scientific and effective support for students' all-round development and promote the reform of educational evaluation towards a more equitable and high-quality direction.

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