

A Survey of Preschool Children's Approaches to Learning (ATL) from the Perspective of the Kindergarten-Primary School Transition: Evidence from 515 Children in Nanning, China

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Abstract: To address the transition from kindergarten to primary school and to systematically understand the current development of approaches to learning among preschool children, this study surveyed 515 children from three public kindergartens in Nanning City. Survey data were collected using the Children's Approaches to Learning Observation and Assessment Scale. Descriptive statistics, difference analysis, and correlation analysis were conducted on eight dimensions: initiative, goal awareness, persistence, reflection, imagination and creativity, concentration, curiosity, and independence. The results showed that: (1) the average scores of the eight dimensions were 2.51 to 3.09, and the simple average of the eight dimensions was about 2.83; (2) there were significant differences in the scores of children of different grades on the eight dimensions (all $P < 0.001$); (3) the gender difference was mainly reflected in the fact that girls scored significantly higher than boys on seven dimensions, while the difference in independence was not significant, and the effect size of each dimension was small ($|d| \approx 0.12$ to 0.38); (4) there were significant positive correlations among the eight dimensions of approaches to learning, with correlation coefficients of 0.418 to 0.703. The survey shows that the overall level of young children's approaches to learning is moderate. They are relatively independent and curious, but reflection, imagination and creativity, and concentration are still aspects that deserve special attention. Kindergartens can implement tiered support based on the observed grade-level differences, while taking into account the small gender differences and the coordinated development of various dimensions, to promote the balanced development of approaches to learning.

Keywords: Preschool children; Approaches to learning; Developmental level; Kindergarten-primary school transition

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1. Problem statement

Approaches to learning (ATL) reflect an individual's tendencies, attitudes, habits, and approaches to

learning. They do not refer to the knowledge and skills acquired by the individual, but rather to how the individual acquires knowledge and skills ^[1]. Cultivating approaches to learning is of great significance to the development of young children and is the core content of the transition from kindergarten to primary school. In the *Guidelines for Learning and Development of Children Aged 3–6*, the “Learning and Development Goals” and “Educational Suggestions” sections of each domain all incorporate the development of ATL and emphasize that “neglecting the cultivation of children’s approaches to learning and simply pursuing knowledge and skills learning is short-sighted and harmful” ^[2]. In the context of the transition from kindergarten to primary school, approaches to learning may play an important role in children’s adaptation to classroom routines, task demands, sustained learning, and self-management in primary school. They therefore represent an important component of school readiness alongside knowledge and skills.

1.1. Core concept definition

In existing research, ATL refers to the distinctive patterns that children exhibit during the learning process, encompassing multiple dimensions and elements (as shown in **Table 1**). For instance, in the ECLS-K framework, approaches to learning are conceptualized as behaviors that affect the ease with which children can benefit from the learning environment ^[3]. In the HighScope curriculum, approaches to learning are defined as the basic factors that affect young children’s learning in various fields, specifically including six Key Developmental Indicators (KDIs): Initiative, Planning, Engagement, Problem Solving, Use of Resources, and Reflection ^[4]. Wang Baohua and Feng Xiaoxia pointed out, based on literature research, that approaches to learning are key factors in young children’s academic success ^[5]. In the present study, approaches to learning are operationalized through eight dimensions: Independence, Curiosity, Goal Awareness, Initiative, Persistence, Concentration, Imagination and Creativity, and Reflection.

Table 1. Definition of concepts related to approaches to learning

Scholar	Concepts or constituent elements
<i>Guidelines for Learning and Development of Children Aged 3–6</i>	Approaches to learning encompass learning attitudes, behavioral habits, and approaches to learning, which are gradually formed and developed in early childhood and have a key impact on children’s current and future learning. Their core elements include: curiosity and learning interest, active participation awareness, focused and serious learning state, persistence in the face of difficulties, willingness to explore and try, and imaginative and creative thinking characteristics ^[2] .
Yan Chaoyun	Approaches to learning comprise an individual’s tendencies, attitudes, habits, styles, and traits in the learning process. Specifically, they can be divided into five core dimensions: curiosity and interest in exploration, willingness to initiate learning, task persistence and attention maintenance, creativity and invention ability, and the ability to reflect on and explain the learning process ^[1] .
Cao Zhengshan	Approaches to learning are relatively enduring psychological and behavioral characteristics that children gradually develop and consistently exhibit during their participation in various learning activities. They are intrinsic qualities that support children’s continuous learning and development ^[6] .
Kagan, Sharon Lynn	Approaches to learning refer to the individualized learning styles adopted by an individual when dealing with different learning tasks. They include five core dimensions: curiosity about new tasks and challenges, proactive learning tendency, persistence and attention stability in completing tasks, ability to interpret and reflect on learning results, imagination and creativity, and stable cognitive style ^[7] .
Cassidy S	Approaches to learning comprise the distinctive behavioral styles and process characteristics that an individual exhibits when performing tasks in learning habits, learning attitudes, learning patterns, and specific learning situations. They represent the core competency of “how to learn,” which differs from knowledge and skills themselves ^[8] .
Early Learning and Development Benchmarks	The core components of approaches to learning include: inclinations, dispositions, attitudes, habits, and styles that reflect the many ways that children involve themselves in learning ^[9] .

As the transition from kindergarten to primary school deepens and the nation comprehensively promotes the scientific connection between kindergartens and primary schools, kindergartens generally emphasize the cultivation of approaches to learning. However, in practice, problems still exist, such as vague transition goals, insufficient grade-level specificity, unclear strengths and weaknesses, and inadequate attention to key ATL dimensions relevant to primary school adaptation. To conduct scientific and effective cultivation, it is essential to first focus on the perspective of kindergarten–primary school transition, accurately grasp the true development level, grade-level characteristics, gender differences, and internal structure of children’s approaches to learning, and clarify which ATL dimensions represent relative strengths and which require further support. Based on this, this study, relying on survey data from 515 children, conducted a current-status survey, systematically presenting an overview of the development of children’s approaches to learning in Nanning City, and providing empirical evidence for kindergartens to optimize educational strategies and implement precise support with a focus on the kindergarten–primary school transition.

1.2. Research questions

Accordingly, this study aimed to describe the overall profile of preschool children’s approaches to learning in the context of the kindergarten–primary school transition, examine grade-level and gender differences, and explore the associations among the eight dimensions. The following research questions guided the study:

RQ1. What is the overall profile of preschool children’s approaches to learning across the eight dimensions?

RQ2. Do preschool children’s ATL scores differ across kindergarten grade levels?

RQ3. Do preschool children’s ATL scores differ by gender?

RQ4. How are the eight dimensions of preschool children’s approaches to learning associated with one another?

2. Research methods

2.1. Research subjects

A cluster sampling method was used to select 515 children from three public kindergartens in Nanning City, including 270 boys and 245 girls; 171 children in the first-year kindergarten group, 168 children in the second-year kindergarten group, and 176 children in the third-year kindergarten group. All children were within the normal age range, had no obvious abnormalities in physical or mental development, and their parents gave informed consent.

2.2. Research tools

Wang *et al.* described an eight-dimensional framework of early childhood approaches to learning comprising independence, curiosity, goal awareness, initiative, persistence, concentration, imagination and creativity, and reflection ^[5]. The present study used the “Children’s Approaches to Learning Observation and Assessment Scale” based on this framework. This assessment tool sets specific and practical observation indicators for each dimension, using a 1–5 level scoring system, where 1 is the lowest level and 5 is the highest. Previous research has reported satisfactory psychometric properties for the scale ^[5]. In this study, the scale was used to systematically observe and quantify manifestations of approaches to learning among 515 children in various educational activities during the transition from kindergarten to primary school. The results showed that the

overall reliability of the scale in this study's sample data was Cronbach's $\alpha > 0.85$, and the content validity index (CVI) was > 0.90 , meeting the requirements of psychometric standards.

2.3. Data processing

The assessment was conducted by teachers who had received standardized training in a natural setting, using uniform instructions and scoring criteria. All data were processed using SPSS 27.0, and statistical analysis was performed using descriptive statistics, one-way ANOVA, independent samples *t*-test, and Pearson correlation analysis. Given the cross-sectional design, differences across grade levels should not be interpreted as evidence of individual developmental trajectories.

3. Research results

3.1. Overall developmental profile of children's approaches to learning

Descriptive statistics were performed on the survey scores of 515 preschool children across eight dimensions of approaches to learning. **Table 2** shows that the average scores of the eight dimensions ranged from 2.51 to 3.09, and the simple average of the eight dimensions was approximately 2.83. Specifically, independence scored the highest ($M = 3.09$, $SD = 0.78$), slightly above the scale midpoint of 3 points; curiosity ($M = 2.95$, $SD = 0.79$) was the second highest, goal awareness ($M = 2.93$, $SD = 0.85$), and initiative ($M = 2.92$, $SD = 0.86$), persistence ($M = 2.89$, $SD = 0.85$) were relatively close to the scale midpoint, while concentration ($M = 2.70$, $SD = 0.81$), imagination and creativity ($M = 2.58$, $SD = 0.87$), and reflection ($M = 2.51$, $SD = 0.82$) were relatively low. The highest dimension, independence, differed from the lowest dimension, reflection, by 0.58 points, indicating observable variation across dimensions. It is worth noting that, except for independence, the mean scores of the other seven dimensions were all slightly below the midpoint of the scale, suggesting considerable room for improvement.

Table 2. Overall survey scores for each dimension of children's approaches to learning ($N = 515$)

Dimension	Average (M)	Standard deviation (SD)	Score sorting
Independence	3.09	0.78	1
Curiosity	2.95	0.79	2
Goal awareness	2.93	0.85	3
Initiative	2.92	0.86	4
Persistence	2.89	0.85	5
Concentration	2.70	0.81	6
Imagination and Creativity	2.58	0.87	7
Reflection	2.51	0.82	8

3.2. Grade-level differences in children's approaches to learning

One-way ANOVA was conducted using grade level as the grouping variable. **Table 3** shows that significant grade-level differences were found across all eight dimensions (all $P < 0.001$). Looking at the group means, third-year kindergarten children scored the highest on all eight dimensions, first-year kindergarten children scored the lowest, and second-year kindergarten children scored in between, showing an overall gradient trend of increasing across grade levels. Specifically, the largest inter-group difference was observed in

concentration ($F = 59.97$, $P < 0.001$), followed by independence ($F = 47.00$, $P < 0.001$); the inter-group difference in curiosity was relatively small, but still significant ($F = 10.14$, $P < 0.001$). This result indicates consistent cross-sectional differences in children's approaches to learning across grade levels, although the magnitude of these differences varied across dimensions.

Table 3. Comparison of survey scores on approaches to learning of children across grade levels

Dimension	First-year kindergarten ($n = 171$)M $\pm$ SD	Second-year kindergarten ($n = 168$)M $\pm$ SD	Third-year kindergarten ($n = 176$)M $\pm$ SD	F	P
Initiative	2.58 $\pm$ 0.73	2.89 $\pm$ 0.80	3.27 $\pm$ 0.88	32.03	<0.001
Independence	2.71 $\pm$ 0.70	3.08 $\pm$ 0.78	3.47 $\pm$ 0.68	47.00	<0.001
Goal awareness	2.70 $\pm$ 0.77	2.76 $\pm$ 0.89	3.32 $\pm$ 0.74	31.31	<0.001
Persistence	2.58 $\pm$ 0.73	2.81 $\pm$ 0.85	3.27 $\pm$ 0.82	33.16	<0.001
Curiosity	2.75 $\pm$ 0.84	2.95 $\pm$ 0.84	3.13 $\pm$ 0.64	10.14	<0.001
Imagination and Creativity	2.13 $\pm$ 0.72	2.74 $\pm$ 0.91	2.87 $\pm$ 0.79	41.01	<0.001
Concentration	2.24 $\pm$ 0.76	2.76 $\pm$ 0.63	3.09 $\pm$ 0.78	59.97	<0.001
Reflection	2.08 $\pm$ 0.70	2.68 $\pm$ 0.86	2.77 $\pm$ 0.74	41.46	<0.001

Note: M is the mean, and SD is the standard deviation.

Post-hoc comparisons of LSD (Least Significant Difference) revealed a hierarchical pattern in the grade-level differences across different dimensions. Significant differences were observed in each pair of the three grade groups (first-year kindergarten, second-year kindergarten, and third-year kindergarten) for initiative, independence, persistence, curiosity, and concentration, showing a clear progressive increase. Regarding goal awareness, there was no significant difference between first-year and second-year kindergarten ($P = 0.490$), but third-year kindergarten significantly outperformed both first-year and second-year kindergarten. In terms of imagination and creativity, there was no significant difference between second-year and third-year kindergarten ($P = 0.134$), but third-year kindergarten generally outperformed first-year kindergarten. Regarding reflection, there was no significant difference between second-year and third-year kindergarten ($P = 0.286$), but both groups outperformed first-year kindergarten. Therefore, significant overall grade-level differences were observed across all eight dimensions, with the mean generally increasing with grade level. However, some dimensions exhibited a possible plateau suggested by the cross-sectional data.

3.3. Gender differences in early childhood approaches to learning

Independent samples *t*-tests were conducted with gender as the grouping variable. **Table 4** shows that, except for independence, girls scored significantly higher than boys in the mean scores of the other seven dimensions: initiative (3.01 vs. 2.83, $P = 0.021$), goal awareness (3.07 vs. 2.81, $P < 0.001$), persistence (3.02 vs. 2.78, $P = 0.001$), curiosity (3.02 vs. 2.87, $P = 0.031$), imagination and creativity (2.69 vs. 2.49, $P = 0.009$), concentration (2.86 vs. 2.56, $P < 0.001$), and reflection (2.61 vs. 2.43, $P = 0.014$); there was no significant gender difference in independence (3.14 vs. 3.05, $P = 0.191$). Looking at the mean differences, the largest difference between boys and girls was observed for concentration, at 0.30 points; the difference

in goal awareness was 0.26 points, and in persistence was 0.24 points. The differences in other significant dimensions ranged from 0.15 to 0.20 points. Overall, the gender differences were statistically significant, but the actual magnitude of the differences was relatively small.

Table 4. Comparison of survey scores on approaches to learning of children of different genders

Dimension	Gender (mean $\pm$ standard deviation)		<i>t</i>	<i>P</i>
	Boys (<i>n</i> = 270) M $\pm$ SD	Girls (<i>n</i> = 245) M $\pm$ SD		
Initiative	2.83 $\pm$ 0.86	3.01 $\pm$ 0.85	-2.322	0.021
Independence	3.05 $\pm$ 0.80	3.14 $\pm$ 0.77	-1.309	0.191
Goal awareness	2.81 $\pm$ 0.88	3.07 $\pm$ 0.79	-3.455	<0.001
Persistence	2.78 $\pm$ 0.85	3.02 $\pm$ 0.84	-3.260	0.001
Curiosity	2.87 $\pm$ 0.79	3.02 $\pm$ 0.78	-2.160	0.031
Imagination and Creativity	2.49 $\pm$ 0.87	2.69 $\pm$ 0.86	-2.626	0.009
Concentration	2.56 $\pm$ 0.82	2.86 $\pm$ 0.77	-4.374	<0.001
Reflection	2.43 $\pm$ 0.82	2.61 $\pm$ 0.82	-2.469	0.014

Note: All significance tests are two-tailed tests.

In terms of effect size, the absolute values of Cohen's *d* for initiative, goal awareness, persistence, curiosity, imagination and creativity, concentration, and reflection are approximately 0.19–0.38. If the insignificant dimension of independence is included, the effect sizes for each dimension are approximately 0.12–0.38, all within the small effect range. Concentration has the largest effect size ($d \approx 0.38$), while independence has the smallest ($d \approx 0.12$). This indicates that although girls' average scores on most dimensions are statistically significant, the actual differences between boys and girls are generally limited. Therefore, in educational practice, it is inappropriate to use this to form fixed gender labels, but rather to focus more on the individual developmental level and specific needs of young children.

3.4. Correlations among the dimensions of children's approaches to learning

Pearson correlation analysis (as shown in **Table 5**) revealed significant positive correlations among all eight dimensions of approaches to learning (all $P < 0.001$), with correlation coefficients ranging from 0.418 to 0.703, indicating a relatively close association between different approaches to learning. Initiative and independence showed the highest correlation ($r = 0.703$), indicating a strong positive link between them; goal awareness and persistence also showed a high correlation ($r = 0.672$), as did imagination and creativity and reflection ($r = 0.687$). In contrast, curiosity and concentration showed the lowest correlation ($r = 0.418$), but it was still significant. Overall, the correlation coefficients were mainly distributed in the moderate to strong correlation range, suggesting that approaches to learning have a certain degree of interrelatedness; at the same time, the correlations between different dimensions were not entirely consistent, indicating that each dimension still has relatively independent characteristics. It should be noted that correlation analysis reflects the degree of association between variables and cannot be used to directly infer a causal influence between one ATL dimension and another.

Table 5. Correlation matrix for the dimensions of early childhood approaches to learning ($N = 515$)

Dimension	1	2	3	4	5	6	7	8
1. Initiative	1							
2. Independence	0.703**	1						
3. Goal awareness	0.601**	0.583**	1					
4. Persistence	0.622**	0.579**	0.672**	1				
5. Curiosity	0.561**	0.577**	0.537**	0.450**	1			
6. Imagination and Creativity	0.642**	0.586**	0.555**	0.559**	0.602**	1		
7. Concentration	0.433**	0.521**	0.561**	0.547**	0.418**	0.474**	1	
8. Reflection	0.579**	0.592**	0.616**	0.602**	0.610**	0.687**	0.497**	1

Note: ** $P < 0.01$ (two-sided).

4. Discussion

4.1. Uneven development across ATL dimensions highlights areas for further support during the kindergarten–primary school transition

The results of this study show that the average scores of 515 preschoolers in Nanning City across eight ATL dimensions ranged from 2.51 to 3.09, with a simple mean of approximately 2.83, placing them at a moderate level on the scale. Independence ($M = 3.09$, $SD = 0.78$), curiosity ($M = 2.95$, $SD = 0.79$), and goal awareness ($M = 2.93$, $SD = 0.85$) were relatively high, while reflection ($M = 2.51$, $SD = 0.82$), imagination and creativity ($M = 2.58$, $SD = 0.87$), and concentration ($M = 2.70$, $SD = 0.81$) were relatively low. The difference of 0.58 points between independence and reflection represents the gap between the highest and lowest scores across the eight dimensions. These results suggest that while preschoolers currently possess a certain foundation in basic approaches to learning such as independent participation, self-care, and exploratory interest, there is still room for further development in ATL dimensions involving sustained engagement, generating new ideas, and reviewing and adjusting the learning process.

Meanwhile, this study found relatively low scores in reflection, imagination and creativity, and concentration, with reflection scoring the lowest ($M = 2.51$, $SD = 0.82$), concentration at 2.70 ($SD = 0.81$), and imagination and creativity at 2.58 ($SD = 0.87$). This suggests that the development of early childhood approaches to learning does not occur at the same level across all dimensions. It is important to note that low scores only indicate a weaker performance in a dimension compared to other dimensions in this study's scale; they do not definitively prove that a single dimension “directly leads” to difficulties adapting to primary school. Therefore, from the perspective of early childhood education transition, kindergartens can prioritize concentration, reflection, and imagination and creativity as key support areas, gradually increasing opportunities for sustained engagement, process review, and open expression in games and real-life tasks. For example, after activities, guiding children to reflect on “what I did—what problems I encountered—how I solved them—how I can improve next time” can help them gradually develop a preliminary sense of self-monitoring.

4.2. Grade-level differences highlight the need for developmentally appropriate, progressive kindergarten–primary school transition programs

This study found significant grade-level differences across all eight ATL dimensions (all $P < 0.001$). The mean scores for all eight dimensions were highest in the third-year kindergarten group, lowest in the first-year

group, and intermediate in the second-year group, indicating a relatively consistent cross-sectional pattern across grade levels. For example, concentration increased from 2.24 ± 0.76 in the first-year kindergarten to 2.76 ± 0.63 in the second-year kindergarten, and then further to 3.09 ± 0.78 in the third-year kindergarten, showing the largest inter-group difference ($F = 59.97, P < 0.001$); independence increased from 2.71 ± 0.70 to 3.08 ± 0.78 and 3.47 ± 0.68 ($F = 47.00, P < 0.001$). However, post-hoc comparisons revealed that not all dimensions showed significant increases between adjacent grade levels: there was no significant difference in goal awareness between the first-year and second-year kindergarten, nor were there significant differences in imagination and creativity, or reflection between the second-year and third-year kindergarten. Therefore, although the results showed a cross-sectional increase in scores across grade levels, some dimensions did not differ significantly between adjacent grade-level groups. Early childhood education should therefore adopt a continuous and progressive approach rather than a “crash course” approach.

Based on the data from this study, the focus of development across different grade levels can be understood as “a phased emphasis based on overall development,” rather than limiting a single dimension entirely to a particular grade level. Preschoolers in the first-year kindergarten scored relatively low on all eight dimensions, with reflection ($M = 2.08$), imagination and creativity ($M = 2.13$), and concentration ($M = 2.24$) being particularly prominent. Therefore, the first step should be to establish experience in active participation and independent task completion through self-care, autonomous choice, and short tasks. Preschoolers in the second-year kindergarten showed improvement in most dimensions compared to the first-year kindergarten, but while imagination and creativity ($M = 2.74$) and reflection ($M = 2.68$) continued to rise, the differences with the third-year kindergarten were no longer significant, suggesting that these abilities may have reached a plateau. Therefore, increasing open-ended questions, peer discussions, and process review could be beneficial. Preschoolers in the third-year kindergarten had the highest overall scores, especially concentration (3.09), independence (3.47), and goal awareness (3.32), which are close to or exceed the midpoint of the scale. Therefore, while maintaining strengths in the other ATL dimensions, efforts should be made to strengthen planning, sustained tasks, reflection, and creative problem-solving to accumulate experience for classroom participation, self-management, and task completion after entering school.

4.3. Gender differences exist in several dimensions, but their practical effects are limited

The gender analysis results of this study reveal that, with the exception of the “Independence” dimension, girls scored significantly higher than boys across the remaining seven dimensions; however, the effect sizes for these dimensions were all small. While there is a statistically significant gender difference, its practical significance is limited. The mean scores for concentration were 2.56 for boys and 2.86 for girls, with a difference of 0.30 points, the largest difference among all dimensions (Cohen’s d : approximately 0.38). The difference in goal awareness was 0.26 points (d : approximately 0.31). The effect sizes for the other significant dimensions ranged from 0.19 to 0.28. This indicates a statistical association between gender and some ATL dimensions, but the actual differences are limited. Therefore, rather than making explicit gender groups based on this, it would be better to maintain universal access to education while conducting individualized observation and support for each child’s performance in concentration, persistence, goal awareness, etc.

4.4. Approaches to learning form an interrelated whole, and an integrated support framework should be adopted to facilitate continuity

The correlation analysis in this study showed that all eight dimensions of early childhood approaches to

learning were significantly positively correlated, with correlation coefficients ranging from 0.418 to 0.703. Initiative and independence showed the highest correlation ($r = 0.703$), followed by imagination, creativity, and reflection ($r = 0.687$), while goal awareness and persistence showed a correlation of 0.672. Curiosity and concentration showed the lowest correlation ($r = 0.418$), but were still significantly positive. These results indicate a clear interrelatedness among different approaches to learning. However, correlation analysis can only explain shared changes and cannot directly prove a causal relationship where the development of one ATL dimension leads to improvement in another. Therefore, a more reliable explanation is that when children perform well in one ATL dimension, they are often more likely to perform well in other related ATL dimensions. Kindergartens can therefore adopt an integrated approach to development, rather than completely separating the dimensions.

From a structural perspective, initiative and independence are highly correlated ($r = 0.703$), indicating that children who are willing to actively participate in activities often also exhibit a strong tendency to complete tasks independently. Goal awareness and persistence are highly correlated ($r = 0.672$), reflecting a close connection between a clear task direction and sustained task completion. Imagination and creativity are correlated with reflection at 0.687, suggesting a strong link between open-minded thinking and reviewing the process. Meanwhile, curiosity and concentration have the lowest correlation ($r = 0.418$), indicating that interest in something does not necessarily mean sustained attention. Based on these data, the transition from kindergarten to primary school can be viewed as an integrated and interconnected process of learning, characterized by four mutually reinforcing dimensions: active participation, clear goals, sustained engagement, and review and adjustment. However, in the interpretation of this research, it should be considered an integrated framework for educational practice, rather than a causal path derived from the relevant results.

Based on the holistic nature of education, kindergartens should abandon the “single-dimensional training” and “fragmented cultivation” frameworks in practice, and instead shift to a path of holistic and integrated development. This involves integrating approaches to learning into all aspects of daily life, including play activities, activity areas, outdoor independent play, and home-school collaboration, allowing children to develop holistically in authentic, natural, and continuous contexts. Simultaneously, adhering to the principle of “holistic construction with a focus on key areas,” kindergartens should emphasize development across different grade levels while also considering all-round development, forming an educational framework of “key breakthroughs and overall improvement.” This integrated approach may contribute to the systematic and long-term cultivation of approaches to learning and may support children’s transition to primary school.

5. Recommendations

Based on the findings of this survey, which reveal the current state of the development of children’s approaches to learning, grade-level differences, gender characteristics, and the intrinsic relationships among various dimensions, and grounded in the core needs of the transition from kindergarten to primary school, this study proposes the following integrated education recommendations (as shown in **Figure 1**).

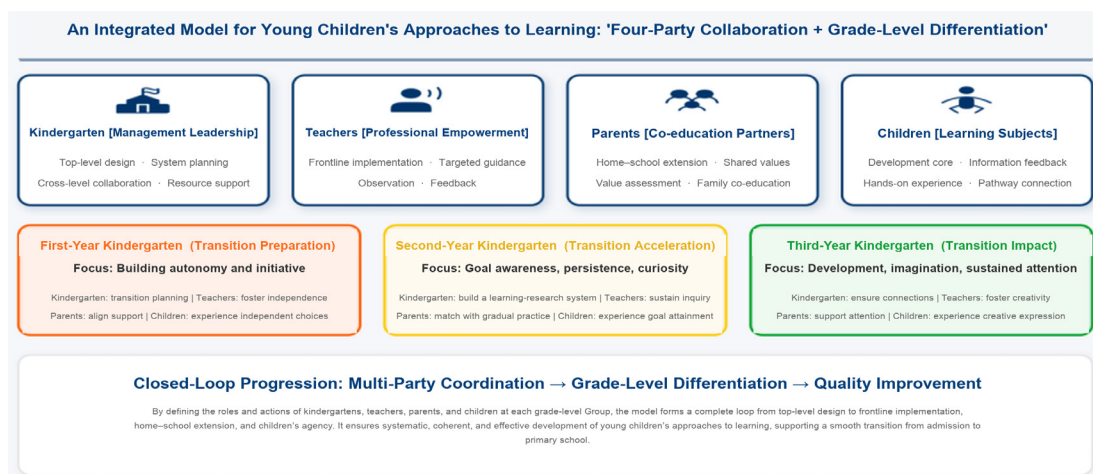


Figure 1. Three-tiered, four-dimensional integrated cultivation framework for early childhood approaches to learning

5.1. Focusing on weak areas and strengthening the daily integration of reflection and concentration skills

To address the weaknesses of young children in reflection and concentration, kindergartens should normalize and integrate the cultivation of reflection and concentration into daily life. Specifically, this can be achieved by setting short, developmentally appropriate activities in the morning, conducting brief, play-based concentration activities before group activities, and emphasizing the completeness and continuity of tasks during area activities. Simultaneously, short periods after meals or before leaving kindergarten should be used to guide children in a structured review process: “What I did—What I did well—How I can do it next time.” This, combined with specific activity contexts, encourages children to reflect on problems and solutions, gradually improving metacognitive abilities through daily integration and narrowing the gap between their current concentration and reflective habits required for primary school learning.

5.2. Implementing developmentally appropriate, progressive, and targeted support based on grade-level differences

Based on the cross-sectional differences across grade levels, a three-tiered transition framework comprising first-, second-, and third-year kindergarten groups is proposed, following the principle of developmentally appropriate education. The first-year kindergarten focuses on activities emphasizing initiative and independence, including self-care and self-selection activities. Using illustrated steps, children are supported in completing tasks within their capabilities and are encouraged to actively express themselves and participate, thus solidifying their foundation for primary school life. The second-year kindergarten focuses on goal awareness, persistence, and curiosity, using task cards, mini-challenges, and question walls to conduct exploration and check-in activities, helping children clarify their goals, overcome difficulties, maintain their interest in exploration, and strengthen their skills for primary school transition. The third-year kindergarten closely follows the needs of primary school transition, using activities such as planning-work-review, story creation, and activities requiring gradually sustained engagement to enhance imagination, creativity, reflection, and concentration, supporting a developmentally appropriate transition to primary school.

5.3. Based on overall connections, promoting integrated and collaborative training across the entire domain

Given the holistic nature of the highly interrelated dimensions of approaches to learning, kindergartens should abandon single-dimensional training frameworks and adopt an integrated approach. All approaches to learning should be fully integrated into all scenarios, including arrival at kindergarten, meals, naps, play areas, outdoor activities, and home-school collaboration. This approach could provide opportunities for children to develop multiple approaches to learning in continuous and natural life and play contexts. Simultaneously, through concise and consistent home-school guidance, parents can be helped to reinforce behaviors such as autonomy, persistence, and reflection at home, creating a consistent educational atmosphere. This home-school collaboration and comprehensive integration may support continuity across the transition from kindergarten to primary school.

5.4. Providing universal, equitable, and individualized support

Although statistically significant gender differences were found in several dimensions, the effect sizes were small. Therefore, gender should not be used as a basis for differentiated instruction. At the same time, close attention should be paid to individual differences, providing personalized support such as reducing environmental distractions and providing clear task cues, segmented tasks, appropriately reduced difficulty, and process-based encouragement to children who are easily distracted, show limited initiative, or have difficulty persisting with tasks. This combination of uniform requirements and individualized guidance may support the full, balanced, and sustainable development of each child based on their existing level.

6. Limitations

This study has several limitations. First, children's approaches to learning were rated by teachers and may therefore have been influenced by rater expectations, differences in observation opportunities, or common-method bias. The data were also nested within classes, teachers, and kindergartens, but these potential clustering effects were not explicitly modeled. Furthermore, the study did not include potentially relevant contextual variables, such as family socioeconomic status, parental education, classroom quality, or prior learning experiences. Future research should combine teacher ratings with direct observation and reports from parents, assess inter-rater reliability where multiple raters are involved, and use multilevel or other appropriate analytical approaches to account for clustering and potential confounding factors.

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Disclosure statement

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