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ADAPTIVE GROWTH PATTERNS IN EARLY ELEMENTARY STUDENTS: EVIDENCE FROM THE BENDER ADAPTIVE BEHAVIOR SCALE (BABS)

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ABSTRACT

The research identified four distinct adaptive profiles, which together explained 61% of the data variance while showing how different students developed during their early elementary school years. The research investigated how students aged 6 and 9 years old develop their adaptive abilities. The research investigated how these patterns relate to age and gender. It showed how children develop their adaptive abilities across seven skill areas: life skills, motor skills, communication skills, academic skills, technological skills, social skills, and independence. The research design employed descriptive-analytic exploration methods to analyze data from 63 students from different places. The research used t-tests, chi-squared tests, Pearson and Spearman correlation analyses, and K-means clustering for statistical data evaluation. The research results demonstrated four distinct patterns that showed how students learn at different rates. The results showed no age or grade-related differences, indicating that adaptive development remains stable during this period. The research data showed that participants' gender differences did not produce any meaningful variations. The evaluation showed independence as the most important domain because children developed it faster than their motor skills and their ability to use technology. The evidence demonstrates that pattern observation enables us to understand developmental adaptation, which, in turn, enables us to create intervention programs to initiate them. The educational staff can use specific methods to manage each pattern that students display. Students in Pattern 1 will achieve their best results through direct life-skill support, including regular practice of fundamental skills such as time organization and personal health maintenance. Pattern 2: Students who achieve average results while demonstrating strong abilities in social and technical competencies will succeed through team-based technology work, which improves their social and technical abilities.

KEYWORDS: Adaptive Behavior; The Bender Adaptive Behavior Scale (BABS); Growth Patterns; Early Elementary School; Independence.

INTRODUCTION

Adaptive behavior is a key indicator of a child's functional competence in meeting the demands of daily life within school and social contexts. It is a multidimensional developmental construct comprising interconnected systems of conceptual, social, and practical skills. Contemporary models in developmental psychology and special education emphasize that adaptive behavior is not merely a general behavioral outcome but rather reflects a dynamic developmental organization shaped by the ongoing interaction among neurological maturation, environmental experiences, and the demands of the educational context (Schalock et al., 2019). The early elementary stage, ages 6 to 9, is particularly important in this context, as it represents a crucial developmental turning point. During this period, children transition from patterns of family dependency to patterns of relative school-based independence and from direct instruction to structured learning based on classroom rules, self-regulation, and institutional social interaction. Developmental literature indicates that this stage involves a qualitative reorganization of adaptive skills, particularly in communication, behavior regulation, social skills, and basic academic functions. These skills are important predictors of subsequent school adjustment and long-term social integration (Papalia & Martorell, 2021). Standardized international scales, including the Vineland Adaptive Behavior Scales and the Adaptive Behavior Assessment System (ABAS-3), provide precise, normative frameworks for assessing adaptive behavior across age groups. These frameworks have also highlighted the multidimensional nature of this structure, confirming that children may exhibit different developmental profiles even within the same age group (Harrison & Oakland, 2015; Sparrow et al., 2020). However, Western cultural and educational contexts developed these instruments, which limit their explanatory validity when applied in culturally diverse educational settings, particularly in dimensions influenced by parenting styles, school requirements, and the level of independence expected of the child in daily life.

The complexity of this issue increases due to the rapid transformations occurring in contemporary educational environments, where technological and digital adaptive skills are now an integral part of the daily functional competence of students in the early grades, whether in terms of using educational platforms, adhering to digital codes of conduct, or engaging in educational interaction through media. Despite this, most traditional adaptive assessments still treat these skills as secondary or underrepresented, creating a gap between what psychometric tools measure and what educators practice in modern schools (Machkour et al., 2025). In the Arab context, a significant gap persists due to the limited availability of local normative measures that correctly capture students' adaptive growth within relevant cultural and pedagogical frameworks. Prior research focuses on Arabized Western instruments or analyses that centered on general levels and group differences, rather than examining the internal structure of adaptive growth or its developmental patterns within the specific age group (Emam et al., 2020; AlMuhairy et al., 2023). This limitation has impeded the development of accurate models using integrated developmental profiles to predict developmental trajectories and design targeted pedagogical interventions. Therefore, the importance of shifting from analyzing general averages of adaptive behavior to analyzing developmental patterns becomes clear. This approach offers a more nuanced understanding of how different adaptive dimensions integrate within a single child, and why some children may excel in certain areas while lagging in other (Aitken et al., 2025). This approach is particularly important in the early elementary years, when the functional foundations of adaptive behavior form, with effects that extend to later educational stages.

The present study utilizes the Bender Adaptive Behavior Scale (BABS) database, a comprehensive Arabic instrument designed for individuals from birth to 21 years. The scale incorporates international framework dimensions alongside contemporary technological components, enabling systematic monitoring of how primary school students develop their skills from childhood to adulthood. Identifying these patterns helps in understanding developmental strengths and risks during the crucial early school years (Al-Otaibi, 2025). Based on the above, the current study aims to analyze the developmental patterns of adaptive behavior among early elementary school students (6–9 years) based on the dimensions of the BABS scale, examine the stability of these patterns across the variables of age and gender, and analyze the correlational structure between the adaptive dimensions. Such analyses enhance knowledge of adaptive growth pathways in the Arab environment and support the development of standard growth curves to enable early detection and informed educational planning.

CONCEPTUAL AND THEORETICAL FRAMEWORK

This study is based on a theoretical conception of adaptive behavior as a multidimensional and developmental construct. Adaptive behavior develops in a nonlinear way and depends on age, experience, and environmental demands (school and social). The theory considers variation in students' adaptive functioning within the same age group, especially in early elementary when skill reorganization takes place.

The American association on intellectual and developmental disabilities (AAIDD) defines adaptive behavior as a cluster of conceptual, social, and practical skills necessary for responding to the environment and to achieve independence (Schalock et al., 2019). Adaptive behavior has related but unique dimensions, with their own developmental trajectories, and may develop unevenly. The Vineland Scales and ABAS-3 global standards substantiate the argument that adaptive behavior comprises multiple components. The scales demonstrate that adolescents can show development in different areas of adaptive functioning at different rates, even at the same age (Harrison & Oakland, 2015; Sparrow et al., 2020). This aligns with the importance of experience over chronological age in the development of adaptive functioning skills. The initial elementary school years (age 6-9) are critical for the development of adaptive behaviors. In this stage, students adapt to the classroom structure, rules, and new social dynamics. Schools expect students to become increasingly independent and accountable. Some adaptive skills are stable prior to school entry, while others, such as independence and social competencies, develop gradually (Papalia & Martorell, 2021). This accounts for why students may exhibit different growth patterns at the same age, unrelated to age alone. Based on this understanding, the current study employs the concept of Adaptive Growth Patterns as an analytical framework that integrates the adaptive dimensions of individual development rather than aggregate performance metrics. Systematic review literature indicates that a profile or pattern approach enables researchers to identify the quality of growth trajectories, such as relative strengths in some dimensions and weaknesses in others, which means binary approaches fail to detect (Hair et al., 2019). This approach proves especially pertinent to the study of adaptive behavior in middle childhood when the developmental structure first forms but has not yet fully integrated.

In the Arab context, there is a need to employ this analytical approach, given the limited local normative standards and the reliance of most previous studies on Arabized Western tools that may not accurately reflect the cultural and educational characteristics of the Arab child (Khweira et al., 2025; Ciwar et al., 2020; Salah El-Din et al., 2026; Abdel-Hamid, 2018; Abu-Alkeshek et al., 2025; Emam et al., 2020; AlMuhairy et al., 2023). Hence, the current study adopts the Bander Adaptive Behavior Scale (BABS) as a comprehensive standard Arabic tool covering ages from birth to 21 years and including seven adaptive dimensions that represent areas of daily functional performance in the child, including life skills, motor skills, communication skills, academic skills, technological skills, social skills, and independence. The conceptual construction of BABS is consistent with global models of adaptive behavior, adding a technological skills dimension that reflects contemporary transformations in the educational environment and is an increasingly vital component of students' daily adaptive competence. This scale also allows examination of interrelationships among dimensions and analysis of their stability or variability across the target age group, supporting the study of adaptive growth as an integrated dynamic structure (Al-Otaibi, 2025).

Because of this conceptual-theoretical framework, the present study aims to demonstrate that the adaptive behavior of early elementary school children does not show linear development but instead follows different developmental trajectories, indicating individual differences in the rates and directions of adaptive development. Furthermore, the framework suggests that such trajectories exhibit relative stability within a specific age range (6–9 years) and that their understanding requires a modular analysis that combines elements of development, psychometrics, and education.

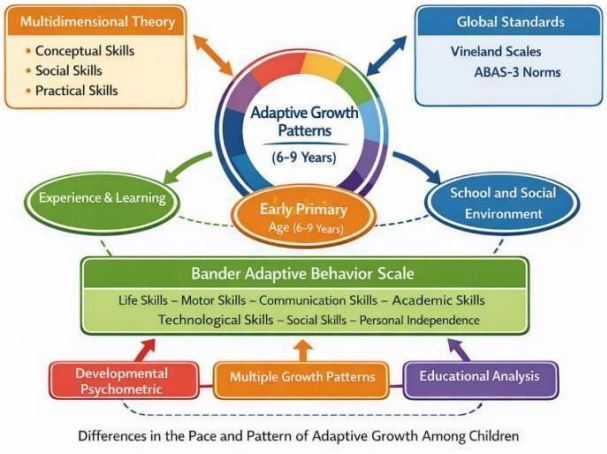

Figure 1: The conceptual–theoretical framework of the study.

The illustration in the figure shows the conceptual–theoretical framework of the study, which views adaptive behavior as a complex developmental system that develops (evolves) over the early elementary school years (ages 6–9), while parameters like age, experience, and requirements of school and social environments influence its development. The framework uses internationally accepted models of adaptive behavior, such as those of the American Association on Intellectual and Developmental Disabilities (AAIDD) and is based on global assessment standards such as the Vineland Adaptive Behavior Scales and the Adaptive Behavior Assessment System–Third Edition (ABAS-3). The different domains of adaptive behavior exhibit nonlinear and individualized development patterns rather than uniform development. BABS acts as a tool for professionals to evaluate Students' functional abilities and identify their patterns of adaptive behavior development to accelerate their adaptation.

REVIEW OF RELATED LITERATURE

The literature on adaptive behavior shows a clear methodological evolution from an adaptive behavior approach as a generic, holistic construct to a multidimensional developmental construct of interrelated functional abilities with developmentally asynchronous trajectories. The successive codification and modernization of international assessment tools, particularly the Vineland Adaptive Behavior Scales and the Adaptive Behavior Assessment System (ABAS-3), reinforce this idea by demonstrating that students can present different developmental profiles at the same chronological age and that adaptive behavior deficits manifest both in the level of performance and in the integration structure of the adaptive dimensions (Harrison & Oakland, 2015; Sparrow et al., 2020). The findings from these studies suggest that certain students may demonstrate a relative advantage in certain areas, for example, in academics or communication, while exhibiting a downturn in other areas, for example, in independence or in life skills. This observation validates the contemporary inclination to study developmental patterns, rather than mere average-based analyses. This literature also confirms that adaptive development does not follow a uniform linear path but instead reflects complex interactions among chronological age, the requirements of the instructional context, and the quality of social experiences in the child's daily environment (Schalock et al., 2019).

This paper presents the idea of developmentally early elementary age as a phase of considerable reorganization of the adaptation of behavior. 'Many essential skills required for the execution of many behaviors are learned before children go to school. In this phase, the developmental process is non-selective and consequently less stable. Hence, the adaptation of children's behavior in this age group requires reorganization. According to the views of Papalia & Martorell (2021), the variations in the skills acquired by the children falling in the critical age group of 6–9 years are more to do with the various educational experiences they acquire and the socialization to different caring practices and less to do with the actual acquisition of the skills due to the difference in the actual age. The developmental skills that are acquired in children are explained in great detail in the scientific literature but these studies do not make a thorough analysis that may be required for the identification of the developmental patterns at the critical age period of a child's development, which can be made possible by the use of the developmental assessment scale as given in the study conducted by Almutairi et al., (2023) for the ages ranging from 1–18 years, a single scale for a lifetime. In recent years, several studies have used multivariate statistical methods, such as cluster analysis and developmental profile analysis, to assess adaptive behavior. Typically, these studies have shown that the use of multivariate techniques provides a more complete portrayal of the patterns of adaptive behavior that are developing in individuals and provides more detailed information about the sources of differences between persons, when compared with traditional binary difference methods (Hair et al., 2019). However, these approaches remain underrepresented in early childhood studies, particularly in non-Western contexts.

In Arabic literature, attention to adaptive behavior has primarily focused on comparing groups, such as typically developing Students and those with disabilities, examining age- or gender-related differences, or evaluating the effectiveness of training and intervention programs. Some studies have identified clear differences in adaptive behavior, particularly in the domains of life and social functioning, between typically developing Students and those with intellectual disabilities, underscoring the construct's value as a distinct indicator of functioning (Abdel- Hamid, 2018; Abu-Alkeshek et al., 2025; Emam et al., 2020). Dakopolos et al. (2024) indicated that developmental changes in cognition and adaptive behavior are associated in Students and young adults with intellectual and developmental disabilities, revealing the potential for cross-domain effects of intervention; furthermore,

international trends indicate the absence of meaningful gender differences in most adaptive dimensions during elementary school and middle childhood.

Regarding the relationship between adaptive behavior and educational variables, some Arab research has found positive correlations between adaptive skills, particularly academic and social skills, and academic achievement among elementary school Students. Intervention studies have also shown that programs aimed at developing daily living or communication skills improve adaptive behavior, confirming the adaptability of this structure through directed educational experiences. However, despite their applied importance, these studies have mostly remained confined to impact measurement or general comparisons, without investigating the internal structure of adaptive growth or examining how different dimensions combine into distinct developmental patterns (Abdel- Hamid, 2018; Abu-Alkeshek et al., 2025; Emam et al., 2020; AlMuhairy et al., 2023). Most Arab studies also rely on Westernized measures to evaluate adaptive behavior, which limits their ability to represent the nuances of local cultural and educational contexts, particularly in dimensions such as individual independence and technological skills. These studies also did not, to the extent of the available literature, examine the speed of adaptive growth across different dimensions in the early elementary stage or the stability of developmental patterns within a narrow age range of 6 to 9 years.

Based on the above, the literature at the international and Arab levels has established the theoretical and normative basis for adaptive behavior. Nevertheless, it still suffers from a research gap: limited studies that examine the internal developmental patterns of adaptive behavior within the same age group, especially in the Arab environment, and that rely on local normative tools. Hence, the current study is a systematic extension of this trend, using data from the Bandar Adaptive Behavior Scale (BABS) to extract the adaptive growth patterns of early elementary school students, examine their stability, and examine the interrelationships among their dimensions, consequently contributing to bridging an existing knowledge gap and supporting the transition from descriptive measurement to interpretive developmental understanding.

Research Questions

Given the research problem of the limited number of Arabic studies addressing adaptive development patterns among early elementary school students based on local normative data, this research seeks to answer the following questions:

1. What are the distinctive developmental patterns of adaptive behavior among early elementary school students (6–9 years old) according to the dimensions of the Bender Adaptive Behavior Scales (BABS)?
2. Do these patterns differ according to chronological age or grade level (first, second, third elementary)?
3. Are there significant differences between males and females in adaptive development levels across the seven dimensions of the scale?
4. What are the correlational relationships between the different adaptive dimensions (such as the relationship between social and technological skills or between communication and independence)?
5. Which dimensions exhibit the most rapid or slow development within the early elementary stage, and how can researchers represent these patterns in standardized development curves that contribute to predicting the student's developmental trajectory?

METHODOLOGY

Research Design and Rationale

The study uses a descriptive-exploratory design consistent with the aim to determine the adaptive development patterns of elementary school students in the early elementary school age group (6–9 years) using data from the Bender Adaptive Behavior Scales (BABS). Descriptive-exploratory design suits the structural development of the individuals under study and helps identify underlying indicators of relationships among adaptive behaviors within a limited number of participants (Field, 2020; Hair et al., 2019).

Participants and Sampling

The study population included all students who received the BABS as part of the original normative sample. The sample included N = 480 participants across all ages and developmental levels. The study then selected an intentional subsample of early school-age students aged 6 to 9 years (72 to 108 months). The sample comprised 63 students from different geographical regions of the Kingdom of Saudi Arabia (Central, Eastern, Western), distributed across the first three grades of elementary school.

Instrument: Bander Adaptive Behavior Scale (BABS)

The BABS used as the elementary data collection tool. The BABS is a valid assessment tool developed in the Arab region. It assesses adaptive behaviors across the life span for individuals from birth through age 21. It helps identify adaptive behaviors and understand their development in a culturally and educationally relevant context. The scale comprises seven adaptive dimensions, each corresponding to the seven dimensions required in his daily life. These dimensions are life skills, motor skills, communication skills, academic skills, technological skills, social skills, and individual independence. The structure of the scale, with the dimensions of adaptive behavior it includes, provides a multidimensional perspective that aligns with the universal standard adopted worldwide, while considering the cultural aspects and the needs of the Arab school. The inclusion of the dimension of technological skills is crucial for a more immediate and functional image of the contemporary adaptation required in the school context, and for reflecting the functional aspect of the daily experience. Al-Otaibi (2025) confirmed the instrument's validity and reliability ($\alpha = 0.89–0.90$, $r = 0.87$).

Data Analysis Strategy

The study used IBM SPSS (v.29) and implemented a sequential analytical. The analysis normalization of the data and transformation of the scores to standard deviations for each class to produce a classroom profile. Identification of developmental patterns and examination of their relationships with specific demographic variables. Examination of the correlation structure and description of patterns of development and growth across the age range of interest. The analysis calculated Z-scores to achieve a uniform measurement scale across the seven dimensions and to exclude scale effects among the individual measurement scales. This is necessary for the multivariate cluster analysis to compare performance profiles and their shape. All analyses employed a two-stage clustering procedure with a hierarchical clustering step followed by K-means clustering. This method ensures the derivation of developmental profiles that maximize internal homogeneity and between-group differences and aims to fully capture the multi-dimensional nature of adaptive behavior beyond what a single linear score describes. The analysis used the Chi-Square Test of Independence to describe the distribution of the obtained patterns across the age and grade variables and to determine whether the patterns of variables changed systematically across the early elementary age range. The analysis also used t-test for two independent samples to compare the average performance of males and females across the seven dimensions, supporting the study's goal of assessing the stability of results across gender.

The analysis computed Pearson correlation coefficients across the seven dimensions to examine the internal structure of relationships among the adaptive dimensions, characterize the degree of interdependence among the areas of adaptive behavior and identify the dimensions most relevant to the remaining components within this age stage. The analysis also used Spearman correlation coefficient to measure the relationship between chronological age (in months) and performance levels in each dimension, allowing it to characterize age-related trends while considering the data's nature and age gradient. Finally, the growth slope for each adaptive dimension was estimated as a descriptive indicator of the speed and direction of developmental change within the stage (6–9 years), allowing identification of the most accelerated and slow-growing dimensions according to the sample data and supporting the study's applied objective of forming a more accurate picture of the adaptive growth trend throughout various fields in the early years of basic education.

RESULTS

Result of first question: This question aims to reveal the main developmental patterns of adaptive behavior among early elementary school students, and to identify the basic structure of the relationships between the seven dimensions of BABS. This approach is based on the premise that Students of the same age group may differ in how they integrate adaptive skills, leading to distinct developmental patterns that represent diverse developmental pathways within the same group. To achieve this, the analysis applied K-Means clustering to the scores of the sample ($n = 63$) across the seven dimensions of the scale. The goal was to classify individuals into internally homogeneous but externally diverse groups based on their adaptive performance patterns, as shown in Table 1.

Table (1): The four developmental patterns of adaptive behavior among early elementary school students (6–9 years)

Patterns	Z-score	Stronger Dimensions	Weaker Dimensions	Developmental Description
1: Low motor-linguistic adaptation	−0.41	Motor skills, communication	Life Skills, Technology	It represents Students who have initial competence in movement and verbalization but are lagging in practical and everyday skills and in the use of technology. Reflects a general adaptive lag with strengths in elementary development areas.
2: Socio-Technical Balance	+0.01	Social Technological Skills	Communication, Kinesthetic	It shows by average ability in social interaction and the use of technical tools, with a relative balance across the remaining dimensions. Expresses Students with intermediate performance who are environmentally adapted without obvious superiority or lag.
3: Academic-Functional	+0.19	Academic, Technological Skills	Social, Autonomy	Represents Students who excel in school learning and functional skills but are less socially mature and independent. Reflects the impact of an educational environment that emphasizes academic achievement over social interaction.
4: Highly independent and connected	+0.43	Independence, communication	Technological, Academy	Expresses the highest adaptive pattern in the sample, combining the ability to communicate effectively with self-control and decision-making. It represents an advanced level of adaptive maturity and a readiness to transition to higher-growth stages.

Table 1 presents the average standard scores for each adaptive dimension across the four extracted patterns. The patterns differ in relative performance across dimensions, with overall pattern means ranging from Z = −0.41 in the first pattern to Z = +0.43 in the fourth. The rankings of the highest- and lowest-performing dimensions vary across the patterns.

Result of second question: This question aims to investigate whether the four adaptive development patterns identified on BABS vary with chronological age or grade level; that is, older Students are more likely to exhibit more mature adaptive patterns than younger Students. To answer this, the analysis categorized the sample (n = 63) into the 6, 7, 8, and 9-year age groups, and evaluated the relationship between these groups and the four patterns using the chi-square test of independence, as shown in Table 2.

Table (2): Distribution of developmental patterns of adaptive behavior by chronological age (6–9 years)

Chronological Age (Years)	Approximate grade	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Total
6 Years	First Elementary	5	4	3	3	15
7 Years	Second Elementary	4	5	4	3	16
8 Years	Third Elementary	3	4	4	5	16
9 Years	Fourth Elementary	4	3	4	5	16
Total	—	16	16	15	16	63

Chi-squared test (χ^2 = 2.07, p = 0.913). There are no statistically significant differences in the distribution of developmental patterns throughout ages.

The results show that the number of Students in each pattern was similar across age groups. The chi-squared test did not reveal statistically significant differences in the distribution of developmental patterns by chronological age (χ^2 = 2.07, p = 0.913).

Result of third question: This question examines whether gender (male/female) is an explanatory factor in variation in adaptive performance levels among Students in early elementary school. To evaluate this hypothesis using BABS data, the analysis used an independent-samples t-test to compare the mean scores of males and females across the seven dimensions of the scale, with α = 0.05., as shown in Table 3.

Table (3): Differences between males and females in the seven dimensions of adaptive behavior (t-test)

Dimension	Means of males	Means of females	t value	p	significance
Practical Life Skills:	10.8	10.6	0.21	0.834	Nonsignificant
Motor Skills	13.5	13.8	−0.19	0.850	Nonsignificant
Communicate	9.7	10.2	−0.38	0.703	Nonsignificant
Academic Skills	10.9	11.4	−0.47	0.639	Nonsignificant
Technological Skills	11.8	12.0	−0.12	0.905	Nonsignificant
Social Skills	9.5	9.8	−0.24	0.812	Nonsignificant
Independence	11.2	11.6	−0.29	0.770	Nonsignificant

All values of 0.05 < (p)

The results show that the means for males and females converged across all adaptive dimensions, with t values ranging from −0.47 to 0.21, and none of the differences reached statistical significance ($p > 0.05$).

Result of fourth question: This question aims to reveal the interrelationships among the seven dimensions of adaptive behavior to clarify how strongly the components of adaptive development interconnect in the early elementary stage. The analysis used Pearson's correlation coefficient (r) to determine the degree of correlation among the study's dimensions (n = 63). and interpreted the coefficients according to the following statistical criteria (Cohen, 1988): (0.10–0.29): weak correlation, (0.30–0.49): moderate correlation, and (0.50 and above): strong correlation, as shown in Table 4.

Table (4): Pearson correlation coefficients between the seven dimensions of adaptive behavior in early elementary students (n = 63)

Dimensions	Life Skills	Motor Skills	Communicate	Academic Skills	Technological Skills	Social Skills	Independence
Life Skills	1.00	0.14	0.18	0.11	0.10	0.19	0.22
Motor Skills	—	1.00	0.09	0.15	0.12	0.10	0.16
Communicate	—	—	1.00	0.09	0.14	0.15	0.26
Academic Skills	—	—	—	1.00	0.08	0.12	0.09
Technological Skills	—	—	—	—	1.00	0.11	0.10
Social Skills	—	—	—	—	—	1.00	0.22
Independence	—	—	—	—	—	—	1.00

Table 4 shows that all correlation coefficients are positive, ranging from r = 0.08 to r = 0.26, indicating weak to moderate relationships among the dimensions, with the highest correlations noted between the independence dimension and the other dimensions

Result of fifth question: The question aims to determine the speed and direction of developmental change for each of the seven dimensions of BABS with increasing age within the age group (6–9 years). To achieve this, the analysis used Spearman's correlation coefficient to measure the relationship between chronological age (in months) and performance scores in each dimension. Additionally, the analysis calculated the linear growth slope for each dimension, representing the expected increase in score per month of age, as shown in Table 5.

Table(5): Correlation coefficients (Spearman) andgrowth slope foreach dimensionof adaptivebehavior(n= 63)

dimension	Spearman's ϱ	(p)	Monthly growth slope	developmental interpretation
Motor Skills	+0.032	0.041	0.259	Developmentally significant acceleration – performance increases with age.
Social Skills	+0.021	0.162	0.172	Non-significant weak acceleration - projected gradual growth.
Life Skills	+0.018	0.209	0.155	Simple non-significant acceleration – relative stability.
Independence	+0.016	0.238	0.147	Slight acceleration – slow improvement in responsibility.
Communicate	+0.012	0.334	0.116	Relative stability – limited language development within the stage.
Academic Skills	+0.009	0.425	0.095	Mild deceleration – irregular development.
Technological Skills	−0.015	0.277	−0.139	Slight non-significant deceleration – slow growth or negative stability.

Highest Acceleration: Motor Skills ($\rho = 0.259$, $p = 0.041$)
Slower /Slow: Technological Skills ($\rho = -0.139$, $p = 0.277$)

The results show that Spearman coefficients ranged from 0.139 to 0.259. Only the correlation between chronological age and the motor skills dimension was statistically significant ($p = 0.041$), whereas the remaining relationships were not. Growth slope values also demonstrated variation in the speed and direction of developmental change across dimensions.

DISCUSSION

The study used structural analysis to investigate students' adaptive behavior development from age 6 to 9 using data from the BABS assessment results of elementary school students. The study investigated how adaptive behavior develops over time, how these patterns remain consistent across age groups and genders, how different adaptive skills relate to one another, and how they change throughout the specified age period.

Firstly, by interpreting developmental patterns of adaptive behavior, the research achieved its first objective: identifying adaptive behavior development patterns in early elementary students through cluster analysis, which revealed four distinct

patterns. Research evidence supports the present theoretical framework, which posits that adaptive behavior comprises components that progress at individual rates in human development (Schalock et al., 2019; AlMuhairy et al., 2023). The research shows that an analysis of overall performance levels may be insufficient to understand the nature of adaptive growth, and that the "form" of inter-dimensional integration provides more accurate information than the "level" of performance alone. Pattern (1) demonstrated superior performance in motor and communication abilities, but other skills showed decreased performance, while life and technological abilities deteriorated. The pattern shows how Students learn basic developmental skills, such as movement and expression skills, yet these skills do not help them perform daily tasks or classroom work. This is consistent with child development research, which indicates that the transition from possessing a skill to its independent, adaptive use requires structured educational and pedagogical experiences and does not necessarily occur spontaneously with age (Papalia & Martorell, 2021). Pattern (2) showed students who achieved near-average overall performance, but their social abilities and technological skills made them stand out from their classmates. The observed pattern indicates that the child shows a stable developmental pattern, as they interact appropriately with others and can use school tools and media resources. This result is consistent with recent studies that have revealed overlaps between social and technical experience in daily school practice, even at early schooling stages, without necessarily implying the attainment of adaptive maturity in the other fields (Harrison & Oakland, 2015). Pattern (3) shows academic-functional characteristics, as people demonstrate outstanding skills in academic work and technological operations, and a relative decline in social skills and Independence. The research findings hold exceptional value because studies indicate that students develop their skills more rapidly when they engage in structured classroom activities, sometimes to the detriment of other aspects of functional adaptation, such as self-regulation and social interaction (Papalia & Martorell, 2021). The research results validate the theory that academic success at school does not guarantee overall adaptive maturity, so school adaptive assessment should assess students beyond their academic achievements. In contrast, pattern (4) displayed the highest level of adaptive maturity in the sample, as participants achieved greater independence and communication across both dimensions. The research results confirm that independence emerges from the combination of multiple adaptive skills, including communication, behavior regulation, and life skills (Schalock et al., 2019). This pattern is closer to the reference file for effective school adaptation at this stage, in terms of the ability to interact, make decisions, and take responsibility within the limits set by age-related developmental characteristics.

Second, the consistency of developmental patterns and their relationship to age and grade, which the results showed no statistically significant differences in the distribution of patterns by chronological age or grade within the age range (6–9 years). This finding is explained by the developmental nature of this stage, characterized by a narrow age range and the formation of many basic adaptive skills before entering school. At the same time, subsequent development takes on a more stable and organized character rather than a rapid qualitative transformation (Papalia & Martorell, 2021). This finding is also consistent with reports in the codification of global standards, such as Vineland-3, which indicate that differences within this age group often appear in the adaptive profile rather than in levels related to chronological age (Sparrow et al., 2020). Third, the findings reveal no statistically significant differences between males and females across the seven dimensions of adaptive behavior. These findings are consistent with Dib (2023) and Kridla (2021), as well as foreign studies Nishimura (2022) ; gender differences in adaptive behavior remain invisible during middle childhood but become noticeable as social roles become more complex in later developmental stages. The research results confirm that the BABS scale contains no gender-related biases because its design ensures it is gender-neutral, which makes it suitable for adaptive behavior assessment in accordance with modern psychometric requirements (Harrison & Oakland, 2015).

Fourth, the findings of the correlational analysis demonstrated that the adaptive dimensions showed weak to moderate positive correlations among themselves, while the independence dimension demonstrated the strongest relationship with all other dimensions. This finding supports that independence is not a discrete skill but a cumulative product of integrating communication, life, and social skills (Schalock et al., 2019). The weak correlation between academic skills and other dimensions also revealed that academic development at this stage may proceed partially independently of some components of social or independent adaptation, consistent with the

academic-functional pattern extracted in the study. Fifth, the findings showed that motor skills increased most rapidly during the early elementary years, whereas technological skills increased least rapidly. The observed pattern aligns with typical developmental features of middle childhood when they achieve better control of their body movements and improved muscle accuracy. Students have restricted access to working with technology independently when they start their school education (Papalia & Martorell, 2021). The findings show that educational environmental characteristics, together with curriculum needs, determine the slow technological development instead of student developmental issues, which supports the authors' support for the study's recommendations to integrate adaptive technological skills gradually and thoughtfully.

STUDY LIMITATIONS

Several limitations of this study should be acknowledged. First, the small sample size (n = 63) limits the statistical power of our analysis and the generalizability of the findings. The exploratory nature of the cluster analysis means that the identified patterns remain preliminary and require validation in larger, more diverse samples. Second, a cross-sectional design provides a clear picture of adaptive behaviors at a specific time. It does not allow investigating the developmental sequences of variables and adaptive behaviors. Thus, using a longitudinal design may provide a clear picture of the developmental sequences of adaptive behaviors and their predictive validity for academic and social achievements. Third, the current sample draws from multiple geographic regions, but it may not represent all early elementary school students in the wider Arab context. In addition, adaptive behaviors may vary across cultural, social, and educational contexts. Thus, the current findings may not be generalizable. Finally, the study relied exclusively on the BABS as the measurement instrument. BABS, as with the other scales, has shown good reliability and validity. However, the parent or teacher report is a sole source of data that may be subject to bias. Thus, assessing children's behaviors by using multiple methods and sources, such as behavioral observations and children's reports, may provide more detailed information and hence may be more dependable.

CONCLUSION AND IMPLICATIONS

The study found that adaptive behavior in early elementary school Students is a multi-dimensional and non-linear construct. Thus, researchers cannot conceptualize it as a unidimensional construct or along a unidimensional developmental continuum. The multiple patterns of development represent qualitative differences in the combinations of adaptive dimensions possessed by individual students. The empirical analysis of the BABS clearly indicates that the patterns differ not only in the level of students' performance but also in the structure of performance. The structure of performance of students' adaptive behavior refers to the pattern of strengths and weaknesses in the students' adaptive behavior system. The use of averages to condense information about the structure of Students' adaptive behavior can mask significant developmental differences that are particularly important for diagnosis and education. The results confirmed the stability of the adaptive developmental patterns of 6–9-year-old children, with chronological age or grade not appearing to be a decisive factor in reshaping these patterns. This indicates that the early elementary stage is a period of functional organization and consolidation of the adaptive skills initially formed in the preschool stage. This variation in adaptive behavior during this stage is more closely related to the quality of the educational and pedagogical experiences the child encounters than to age alone. The results demonstrate the gender neutrality of adaptive behavior, with independence as the common denominator of maturity. Adaptive skills observe varying growth rates, with the fastest growth rate in the motor skill area and the slowest in the technology area, due to limited educational opportunities.

The findings of the study imply a change in thinking for the pedagogical approach to adaptive behavior assessment. Instead of presenting assessment scores, focus on presenting a developmental profile. This way, educators can provide targeted intervention for children at the developmental level most appropriate for their age in the early elementary years of schooling. A core recommendation is that schools provide children with opportunities for independent learning through activities such as independent hours and peer-to-peer problem-solving. Through these activities, children can learn to regulate their own learning, develop learning strategies, and in this way become more independent learners. The classroom can then become a place for integrative adaptive learning for the children.

The study also highlights the need to reconsider how early curricula position adaptive technological skills, so educators gradually and deliberately integrate them in ways that align with students'

developmental characteristics and use them as functional tools that support learning and development rather than as technical skills separate from the educational context. The results also support the use of the Bandar Adaptive Behavior Scale (BABS) as an effective diagnostic and educational tool in the Arab context and show that educators can use it to develop standardized indicators for early detection of developmental delays or acceleration.

At the research level, the study's results open opportunities for subsequent studies adopting long-term designs to track students' transitions across developmental patterns across various stages of education and to examine the extent to which these patterns persist or shift over time. The study also highlights the need to use representative samples that reflect the variety of educational settings in which children learn across the Arab region. This includes extending the BABS database to include a more representative sample of children from various educational and social settings. This will be necessary to ensure the validity of the interpretations of the results and to enable the comparative study of developmental processes at different time points, both within and across cultures in the Arab region. Furthermore, it is necessary to employ more advanced models to shed more light on the structural relationships among the identified pathways and on adaptive behavior.

Overall, the study shows that the investment in understanding adaptive behavior in the early years of elementary education is important for the purpose of an entry point for improving school adaptation, guiding early educational interventions that lead to balanced development, hence, to achieve the desired achievements in the educational and social fields in the future.

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