

Full Length Research Paper

Analyzing the relationship between learning styles and basic concept knowledge level of kindergarten children

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Most basic concepts are acquired during preschool period. There are studies indicating that the basic concept knowledge of children is related to language development, cognitive development, academic achievement and intelligence. The relationship between learning behaviors (sometime called learning or cognitive styles) and a child academic success is widely recognized. So, it is supposed that the learning styles can be also influential on the development of children's basic concept knowledge. The purpose of this study is to analyze the relationship between the learning styles of kindergarten children and their level of basic concept knowledge. The sample of the study was selected by using simple random sampling method and it consists of 176 children (76 girls and 100 boys) in kindergarten in Istanbul, Turkey. Learning Styles Scale for 5-6 Year-Old Children (Uyanık et al.) and Boehm Test of Basic Concepts (Boehm) were used to collect data. The results indicate that there is a significant relationship between children's learning styles and their basic concept knowledge. It has been also found that basic concept knowledge is significantly predicted by visual and auditory learning styles in young children.

Key words: Kindergarten, learning styles, basic concept knowledge.

INTRODUCTION

In early childhood, children gain most basic concepts quickly. Concept acquisition has historically been identified as foundational elements of intelligence (Kagan, 1966 in cited Wilson, 2004; Solomon et al., 1999). Boehm (1991) defined basic concepts as "the child's ability to make relational judgments, either among objects, persons, or situations, or in reference to a standard" (p.241).

Basic concepts represent the fundamental, functional vocabulary needed to understand classroom conversation and teacher directions, achievement and administration directions of early childhood tests of intelligence (Boehm

et al., 1986; Bracken, 1986; Cummings and Nelson, 1980; Flannagan et al., 1995). The acquisition of basic concepts has been shown to be interactively related to a preschool child's overall cognitive development (Bracken, 1998; 2000), language production and understanding (Zucker and Riordan, 1988), school readiness and academic achievement and gifted screening outcomes (Bracken and Brown, 2008; Larrabee, 2007; Panter and Bracken, 2009) as a supportive knowledge of literacy development (Booth and Waxman, 2002).

Shumway et al. (1983) noted that the content of all learning in schools can be categorized as behavior

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learning, problem solving learning and concept learning. Learning styles of children are also influential on the process of learning occurring in preschool period. Grasha (1990) defined learning styles as “the preferences students have for thinking, relating to others, and particular types of classroom environments and experiences” (p. 26). Individuals learn through different ways and researches focus on learning styles, personal factors on learning and different learning style for each individual (Borchetta and Dunn, 2010; Calissendorff, 2006; Jenkins, 2008; Kolb and Kolb, 2005).

Jensen (1998) identified three types of learning styles, namely visual learning, auditory learning and kinesthetic learning. Visual learners tend to learn using pictures, charts and writing. Visual learners are those who need a mental model that they can see. Since majority of learners are visual learners, we need to find ways to show them visually how things work (Suppiah et al., 2009 cited in Wan and Chuan, 2014). Auditory learners are people who learn through listening and oral communication. They are more likely to understand something through hearing. They like to listen to music and verbally communicate with others. Auditory learners are those who remember best information that they hear. Information that is auditory is processed and stored in the temporal lobes on the sides of the brain (Jensen, 1998). Kinesthetic learners tend to learn through bodily movement and experiential learning. Kinesthetic information is stored at the top of the brain in the motor cortex until permanently learned then it is stored in the cerebellum, the area below the occipital lobe (Jensen 1998). They need hands-on activity to understand something. Kinesthetic learners learn best through movement and touching. Therefore, providing opportunities for students to work outside the classroom, by being on field trips, to make students move around the classroom, play games and simulations, is the best way to teach kinesthetic learners (Zapalska et al., 1998, Zapalska et al., 1999, Zapalska et al., 2000; Sousa, 1997; 1999). If students can learn using their own learning styles which are compatible with their needs and interests, they will be more effective and efficient in learning. Thus, a student's academic achievement will improve and become more productive (Suppiah et al., 2009 cited in Wan and Chuan, 2014). Statt et al. (1988) show that the correlations found between styles of learning and school attainment were as good as those between IQ and attainment in previous research. The relationship between learning behaviors (sometime called learning or cognitive styles) and a child academic success is widely recognized (Alexander et al., 1993; Hinshow, 1992 cited in Buchanan et al., 1998).

By considering the literature mentioned above, it was concluded that there can be a relationship between basic concept knowledge and learning styles of kindergarten children and there is not a study that examined this possible relationship. Then, this study was conducted to study the relationship between the learning styles of kindergarten children and their basic concept knowledge.

Also it was aimed to examine the degree that learning styles could predict the basic concept knowledge of kindergarteners.

METHOD

This study that uses relational survey model (Karasar, 2009) aims to determine the existence and extent of covariance between the kindergarteners' basic concepts knowledge level and their learning styles.

Participants

The data of the study were collected from children who attend kindergartens in both Anatolian and European sides of Istanbul city and from their teachers. 8 of the kindergartens are public and 2 of them are private; however all of them function under a primary school. The participants consist of 176 children (76 girls and 100 boys) from 16 different classes. Children's mean age was 66.42 months (Std.Deviation= 4.42). 89 children (50.6%) had one year of kindergarten education experience at the study time and 86 children (48.9%) did not have. There were 54 (30.7%) children from one-child families, 87 children (49.4%) have one sibling and 34 (19.3%) children have two siblings. 66 mothers (37.5%) were primary school graduates followed by 53 (30.1%) high school and 55 (31.3%) university/college graduates; while 2 mothers did not state their education level. 41 of fathers (23.3%) were primary school graduates followed by 76 (43.2%) high school and 57 (32.4%) university/college graduates; while 2 fathers did not state their education level. There were 39 mothers (22.2%) between 25-30 ages, 63 mothers (35.8%) between 31-35, 51 mothers (29.0%) between 36-40 and 20 mothers between 41-45; while 3 mothers did not state their age. There were 5 fathers (2.8%) between 25-30 ages, 60 fathers (34.1%) between 31-35, 60 fathers (34.1%) between 36-40, 44 fathers (25.0%) between 41-45 and 4 fathers (2.3%) were 46 and above; while 3 fathers did not state their age. 16 kindergarten teachers participated in the study and all teacher are females. Of all teachers, 4 (25%) teacher were college graduates, and 12 (75%) were four year university graduates. Concerning their years in the profession, 3 (18.7%) had been working for 1-5 years, 7 (43.7%) for 6-10 years and 6 (37.5%) for 11 years or more. As for age distribution of the teachers in the sample, 5 (31.3%) teachers were aged 25 or younger, 4 (25%) between 26-30 years and 7 (43.7%) were aged 31 and more.

Procedure

The required ethical permissions were obtained from the official institutions before the data collection stage. Boehm Test of Basic Concepts (Boehm-3, 2000) was applied with the participant children individually by the researcher. The learning styles of the children were evaluated by The Learning Styles Scale for 5-6 year Old Children that was filled by the kindergarten teachers. The analysis of the data collected by the scales was evaluated by considering $p < 0.05$ significance level. For data analysis, SPSS 17.0 program was used. To analyze the data, Pearson correlation test and ordinal regression analysis were used.

Instruments

The personal information form

The Personal Information Form was developed by the researcher to

collect data on the demographics of the sample. The form consists of 13 questions regarding the child such as the gender, the attendance year on preschool education etc. and the educational level and age of the parents and teachers etc.

Boehm test of basic concepts (Boehm-3, 2000)

The test was developed by Ann. E. Boehm In this study, E Form of Boehm-3, 2000 revised version was used. *The Boehm Test of Basic Concepts*®, Third Edition, was designed to assess students' understanding of 50 important concepts they need to know to be successful in school. Basic concepts are words that are used to describe qualities of people or objects (pretty, tall, angry, small), spatial relationship (in, or, under, beside), time (before, after) and quantity (more, few, some) (Boehm, 1991, p.241; Boehm, 2001). Test-retest reliability is .879, equity value between E and F forms is .807 and Cronbach Alfa internal consistency value is calculated as .862. The descriptive value of each items was .002 for item 1, .007 for item 14, .003 for item 20, .004 for item 39 and .000 for each other item. Furthermore, there is a significant relationship ($r=.76$, $p<.05$) between the Boehm Test of Basic Concepts (E and F forms) and another reliable test, Bracken Basic Concept Scale (Uyanik, 2003, 2009).

Learning styles scale for 5-6 year-old children

The Learning Styles Scale for 5-6 year Old Children was developed by Uyanik et al. (2012). The scale consists of 27 items under three subcategories, namely visual, auditory and kinesthetic learning style. The variance ratio that these dimensions explained is 64%. The scale's structure validity analysis was tested by using Kaiser Mayer Olkin = 0.94 test and Barlett's Test of Sphericity (Chi Square = 5.753 $p<.001$) and its conformity factor analysis has been determined. According to the results of the analysis, the first factor "Visual Learning Style" consists of 13 items and its loading value varies between .57 and .83. The second factor, named as "Auditory Learning Style", consists of 9 items and its loading value varies between .48 and .79. And the third factor consists of 5 items, named as "Kinesthetic Learning Style" and its loading value varies between .48 and .83.

Between the lower dimension of the scale and total score it has been found that correlation values vary between .703 and .921. For the test-retest reliability of the scale, Pearson Moment Correlation Coefficient formula has been used and the reliability coefficient was $r = .85$ ($p< 0.01$). Also independent groups t-test results, which have been performed between items' means of upper 27% and lower 27% of the group points, have shown that there is a significant difference for all items ($p<.05$). It has been found that the item-total correlation values vary between .386 and .835. But in this study, in order to increase reliability, items under .35 loading value have been excluded from the scale. In the reliability analysis results of the "Learning Style Scale for 5-6 Year-Old Children", coefficient of internal consistency Croanbach Alfa Value calculated for entire scale is .95. Coefficient of internal consistency calculated for the lower dimensions of the scale is .95 for Visual Learning Style, .91 for Auditory Learning Style and .82 for Kinesthetic Learning Style. Also for the first and second half of the scale, Spearman Brown Values are .85. The test-retest reliability coefficient has been calculated as .85. The scale 5-point Likert-type scale (1 Disagree, 5 Agree) was employed.

The lowest possible score of "Visual Learning Style" subscale is 13 and the highest possible score is 65. The lowest possible score of "Auditory Learning Style" subscale is 9 and the highest possible score is 45.

The lowest possible score of "Kinesthetic Learning Style" subscale is 5 and the highest possible score is 25.

Table 1. The results of Pearson correlation, Kendall's Tau and Spearman's Rho related to Boehm Test of Basic Concepts and Learning Styles Scale

		Pearson correlation		
		Visual	Audi.	Kines
Boehm	r	.183*	.267*	-.090
Total	P	.015	.000	.234
	n	176	176	176

RESULTS

The purpose of this study is to analyze the relationship between the learning styles of kindergarten children and their level of basic concept knowledge. The analyses related to participants' basic concept knowledge and learning styles are represented in Tables 1 and 2.

Table 1 indicates that there is a significant positive relationship between participants' basic concept knowledge and visual ($r=.183$, $p=0.015$) and auditory learning style ($r=.267$, $p=0.001$).

As can be seen from Tables 1 and 2, it has been founded that kindergarten children's scores of Visual Learning Style subscale have significantly predicted 3.4% of the changes in their total score of Boehm Test of Basic Concepts ($R= .183$, $R^2 = .034$, $F= 6.037$, $p<.01$). In addition, it has been also found that kindergarten children's scores of Auditory Learning Style subscale have significantly predicted 7.2% of the changes in their total score of Boehm Test of Basic Concepts ($R=.267$, $R^2 =.072$, $F = 13.410$, $p>.01$). However, kindergarten children's scores of Kinesthetic Learning Style subscale have not predicted any changes in their total score of Boehm Test of Basic Concepts. In addition to all these results, when looking at t-test results related to the question whether regression coefficient was significant or not, it has been found that values of Boehm Test of Basic Concepts have significantly predicted the values of Auditory and Visual Learning Style subscales.

By considering these results, it can be concluded that there is a significant positive relationship between participants' basic concept knowledge and, visual and auditory learning styles. Visual and auditory learning styles explain 10.6% of basic concept knowledge of the kindergarten children.

DISCUSSION AND CONCLUSION

Every child is born with an innate ability to learn and it is a prerequisite for survival development (Knoop, 2002). Barnett (2008) stated that kindergarten education has significant lasting effects on cognitive abilities, social behavior and further schooling history (grade repetition, special education placement, and high school graduation). In early years of the life, responsive and cognitively

Table 2. The results of simple linear regression analysis between Boehm Test of Basic Concepts and Learning Styles Scale's subscales

Variables	β	T
BOHEM total	.183	9.379 **
Visual		
R= .183 R ² = .034 F = 6.037 *		
BOHEM Total	.267	16.054 **
Auditory		
R= .267 R ² = .072 F = 13.410 **		
BOHEM Total	-.090	15.812 **
Kinesthetic		
R= .090 R ² = .008 F = 1.428		

stimulating care fosters language and cognitive skills that facilitate learning (Shonkoff and Phillips, 2000).

Kindergarten children show a very rapid development and they acquire many basic concepts. Solomon et al.' (1999) study which explains the importance of basic concepts in child development, concepts were defined as the stepping stones of the mind. The formation, use and growth of basic concepts are accepted as a major issue in cognitive development. Concepts, named mental constructs, are the critical components of a maturing individual's continuously changing, enlarging cognitive structure (Klausmeir, 2013; p.94).

In this study, it was found that there is a significant positive relationship between kindergarten children's basic concept acquisition and their learning styles. Furthermore, it was found that visual and auditory learning styles explain 10.6% of the basic concept knowledge level. Any other study that analyzes the relationship between basic concept knowledge and learning styles in early childhood is not available in the literature.

According to Dunn (1982; 1986; 1990), each individual has his or her own learning style just like he/she has a distinct fingerprint. Learning style can be defined as unique ways of learning taken from cognitive style and experiences in the form of learning-teaching. Furthermore, learning styles can change over time as a result of maturation (Dunn, 1982; 1986; 1990). This view points out the importance of identifying learning styles. Learning behavior or learning styles have been described as keystone or learning to learn skills foundational to school success (Barnett et.al., 1996; Stott, 1981) because they are relatively mutable and because their improvement tends to transfer to similar behaviors and to generalize more readily to collateral phenomena, such as academic achievement, social adjustment, and potentially even to cognitive ability (Brown. 1982; Ceci. 1981 cited in McDermott et al., 2002). Basic concept acquisition is strongly correlated with overall vocabulary development and language development, cognitive development and intelligence, school readiness and academic achievement

(Booth and Waxman, 2002; Bracken, 2000; Bracken and Brown, 2008; Breen, 1985; McIntosh et al., 1995; Solomon et al., 1999; Zucker, 1988).

By considering the previous studies on basic concept knowledge and learning styles, it can be said that both children's basic concept knowledge and learning styles affect academic success. The most important result of this study is that the basic concept knowledge of the child is predicted by their learning styles. The significant relationship between the children's basic concept knowledge and their learning styles, only for visual and auditory learners, might be a result of teaching styles of Turkish kindergarten teachers. It is observed that many of the kindergarten teachers prefer to use verbal teaching and visual materials. According to Felder and Henriques (1995), as visual and auditory learning styles are related to perception stage of learning process, kinesthetic learning is related to information processing stage (moving, interaction, active action while learning) as well as perception stage (touching, tasting, smelling etc.). The results of this study did not find a significant relationship between kinesthetic learning style and the level of basic concept knowledge. This result could be related to limited physical conditions of the classrooms and insufficient playgrounds. Pallapu (2007) noted that programs in line with learning styles and arrangement of the environment are important.

Basic concepts knowledge acquisition process of the children can be supported and improved by the help of education environment and materials that are selected by considering the learners' needs. Labatut et al. (2011) claim that identifying the dominant style in the early years gives teachers the possibility to support children with other learning styles as well. This can play in a significant role in the students' academic achievement. It is known that during schools years, children will contact with different teachers who have different learning and also teaching styles. The identification of predominant learning style in the early childhood education stage allows students to reinforce the other styles in different learning situations, to achieve more meaningful learning. Some

researchers said that a match between learning and teaching styles has been correlated with older students' achievement rates (Dunn and Griggs, 1995; Ellis, 1989) Children acquire concepts through active participation. Learning experiences may be grouped into three categories as natural, unstructured and structured. A natural learning experience occurs when selection and action are controlled by the child. Where the child selects and starts an action but is intruded on by an adult at certain times, this learning is named as unstructured learning. Structured learning experience occurs when experiences are selected by adults and instructions are given to children about when or how to start an action. According to Piaget, children internalize knowledge through such interaction with the environment (Charlesworth and Rodeloff, 1991).

In conclusion, the importance of determining the dominant learning style of kindergarten children is clear. Making appropriate regulations in education environments, materials and programs by considering children's learning styles could contribute to the development of basic concepts knowledge that help children to understand and make sense of life. Basic concepts have certain effect on children's intelligence, academic achievement and motivation. It can be suggested that educators and other individuals work on early child care and education field, to find out children's learning styles and design learning environments accordingly.

Conflict of Interests

The author has not declared any conflict of interests.

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