

Full Length Research Paper

The investigation of academicians' learning styles in school of physical education and sports in Turkey

Hakan Salim Çağlayan

Department of Sports Management, School of Physical Education and Sports, Konya, Selcuk University, Turkey.
E-mail: hcaglayan@selcuk.edu.tr

Accepted 2 March 2011

This study was carried out with the purpose of determining the academicians' learning styles in school of physical education and sports and whether there was a relationship between their learning styles and gender, age, appellation and the department they worked or not. In the study survey method that was used. The sample of the study consisted of 206 academicians who were working in public Schools of Physical Education and Sports (n=183) and Schools of Sport Science and Technology (n=23). "The Kolb Learning Styles Inventory" which was developed by Kolb (1985) and adapted to Turkish by Askar and Akkoyunlu (1993) was used as data collection tool. In the analysis of data, frequency and percentages were used, the relationships among variables were investigated with chi square statistical method. The level of significance was accepted as 0.05. The results revealed that, the academicians in the School of Physical Education and Sports had 47.6% converging, 30.1% assimilating, 11.7% diverging, 10.7% accommodating learning styles and there was no significant difference between their learning styles and gender, age, appellation and the department they worked ($P>0.05$).

Key words: Sports, school of physical education and sports, the Kolb learning styles, academician.

INTRODUCTION

"In the period of time we live named as information age, people should learn the ways of receiving information and using it when required instead of a purposeless effort like trying to get all of the information which increases and renews rapidly. Academicians should know that how the students, whom they educate, learn and improve for an effective instruction. They should organize activities which support the students' intellectual, social and personal development and create a concordant environment. They should also apply some teaching strategies to encourage them about critical thinking, problem solving and performance skills" (Besoluk and Onder, 2010). "The concept which has guided academicians in the matter of how students learn has been learning styles. The studies in this subject have showed that, each of the students supposed equal in the classroom environment has different learning skills and individuals adopt different styles in the process of learning" (Ergur, 2006). "Academicians, by taking into consideration the students' different learning styles, should organize various activities that students can participate and use all of the sense organs for an effective teaching" (Jensen, 1996). The

researchers have defined the learning styles in different ways: Dunn (1993) who has worked about learning styles for a long time, has defined it like this: "Learning styles have been each student's application of different and distinctive ways while preparing for learning new and difficult information, learning and remembering" (Boydak, 2006).

Kolb who has developed experimental learning theory based on the learning process and has been a resource to great numbers of studies has defined learning style as "the ways preferred by individual in the process of receiving and processing information" (Jonassen and Grobowski, 1993). According to Kolb, "the reasons of differences in learning style have proceeded from the experiments of past lives and expectations in the environment" (Ulgen, 1995). A large number of theories about learning styles have been suggested by the studies and one of these is Kolb's learning style theory.

According to Kolb's experimental learning theory, carrying the traces of Lewin and Dewey's learning theory; "the learning styles have been determined by a learning cycle. The horizontal and vertical dimensions have not

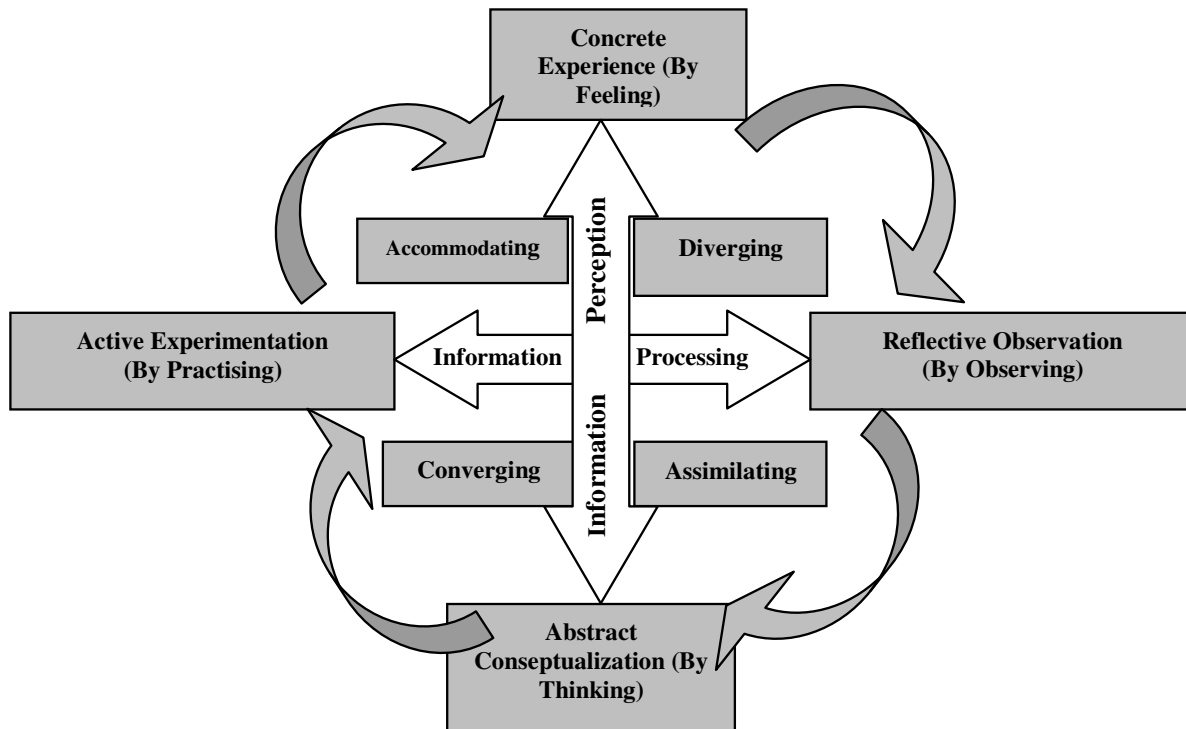


Figure 1. Experiential learning cycle (Joy and Kolb, 2009).

been differentiated precisely in determining styles. The interrelationship of dimensions has lasted continually" (Kolb, 1984). In Kolb's theory, "*the vertical dimension* has represented the preferences in the comprehension and understanding of information. In this dimension, a changing environment from being objectified of the lives by feeling to being conceptualized by thinking has been in issue. *The horizontal dimension* has also represented the preferences aimed at how the comprehended information would be turned into meaning (Figure 1). In this case, active experimentation on one point and reflective observation on the other point have taken part" (Askar and Akkoyunlu, 1993). According to Kolb, there have been four learning styles; "diverging" based on reflective observation and concrete experience, "assimilating" based on reflective observation and abstract conceptualization, "converging" based on abstract conceptualization and active experimentation, also "accommodating" based on active experimentation and concrete experience (Askar and Akkoyunlu, 1993; Joy and Kolb, 2009; 1981; Kolb and Kolb, 2005; Yamazaki, 2005). The features of Kolb's learning styles have been explained in the paragraphs as follows:

1. Diverging learning style: "The capability of dominant learning is concrete experiences (by feeling) and reflective observation (by observing). Information is comprehended through the concrete experience, and also is processed through reflective observation. The

individuals having this learning style are so successful on the subject of looking from different perspectives to concrete situations. They prefer to observe rather than come into action in the face of circumstances. These people are adept at focusing on the ideas and associating them as such in brainstorming. The cultural interest of individuals having diverging learning style is intensive. These people take cognizance of their emotion and thoughts while forming the ideas. The determinative question of these individuals preferring individual practice in learning activities is "Why?". In the case of formal learning, the people having diverging learning style like working in a group by listening to different ideas about the subject curiously and receiving personal feedback" (Askar and Akkoyunlu, 1993; Kolb and Kolb, 2005).

2. Assimilating learning style: "The capability of dominant learning is abstract conceptualization (by thinking) and reflective observation (by observing)" (Kolb and Kolb, 2005). Kolb has stated that, the people having this learning style are highly talented at understanding the exhaustive information and organizing it in a logical format, and also they mostly focus on the ideas rather than the people" (Putintseva, 2006). The question they want to be answered is "What". The people having this style generally think that "the value of a theory in practice is more important than the logical aspect of it. Assimilating learning style is important from the point of effect in information and career in the field of science. In

the case of formal learning, the people having this learning style prefer reading, discovering analytical models and time for thinking something over" (Kolb and Kolb, 2005).

3. Converging learning style: "The capability of dominant learning is abstract conceptualization (by thinking) and active experimentation (by practising). They are qualified as practical implementer of ideas" (Kolb, 1999). "Learning by practising is important. They unify theory and application. They are also very good at problem solving. The determinative question of these individuals taking cognizance of details and trying to understand the whole from the parts is "How?". They carry out experiments and put forward an idea on them as well. The people having this learning style are also good at finding practical application of ideas and theories. They prefer to deal with technical problems rather than social and interpersonal problems. In case of formal learning, the people having this style prefer new ideas, similes, laboratory works and practical applications" (Kolb and Kolb, 2005).

4. Accommodating learning style: "The capability of dominant learning is concrete experiences (by feeling) and active experimentation (by practising)". Information is comprehended through the concrete experience, and also is processed through active experimentation. They unify experimentation and application. They learn by trial and error. They like taking risk and also want to know what could be done with objects and formulas. The question they want to be answered is "What happens if?". The strengths of them are planning, carrying out the decisions, taking part in the new experiences. They rely on the people's knowledge rather than their technical analysis in problem solving. In the case of formal learning, the people having this style prefer some learning ways like trying different ways to complete a project, doing field study by searching, discovering and practising" (Kolb and Kolb, 2005). The determination of individual's learning style gives information about how these people would learn and how the education system appropriate for them would be planned. The two key elements of this period in the universities are academicians and students. The academicians' knowledge about their own learning styles would provide them to be well educated about this subject and would also enable them ability to apply in the process of students' enhancement.

MATERIALS AND METHODS

Study method and working group

In this study, survey method was used on the purpose of representing existing condition. The population of the study consisted of the academicians who were working in 43 public Schools of Physical Education and Sports and 3 Schools of Sport Science and Technology in Turkey (OSYS, 2010) and the sample

of it also consisted of 206 academicians, from 30 Schools of Physical Education and Sports ($n=183$) and 2 Schools of Sport Science and Technology ($n=23$), chosen from this population by means of random sampling.

Data collection tools

A questionnaire consisting of 4 questions about the academicians' personal information (age, gender, appellation and the department they worked) and "learning styles inventory" developed by Kolb (1985) in order to determine their learning styles were used as data collection tool. The scale developed by Kolb (1985) and adapted to Turkish by Askar and Akkoyunlu (1993) consisted of 12 items with 4 choices which wanted individuals to prioritize four learning styles defining their own learning styles best. Each of the choices has represented one learning style. These have been seen as follows:

1. Concrete Experience (CE),
2. Reflective Observation (RO),
3. Abstract Conceptualization (AC) and
4. Active Experimentation (AE).

The total point in respect of each choice has varied between 12 and 48 in the consequence of answers given by the subjects. However, there has been a need for combined points in order to determine the learning style of learner. The combined points have been calculated by using the difference between Abstract Conceptualization and Concrete Experience, and also the difference between Active Experimentation and Reflective Observation. In the end of this process, the obtained points have varied between -36 and +36. Among combined points, the positive point obtained from AC-CE has indicated that it has been abstract learning, the negative point has also indicated that it has been concrete learning. In a similar way, the positive point obtained from AE-RO has showed that it has been active learning, the negative point has also showed that it has been reflective learning. The learning styles have been found by determining the junction points of combined points with the help of diagram. In a study by Askar and Akkoyunlu (1993), cronbach-alpha reliability coefficient of the inventory has been calculated as follows: Concrete Experience (CE)=0.58, reflective observation (RO)=0.70, abstract conceptualization (AC)=0.71, active experimentation (AE)=0.65, abstract-concrete (AC-CE)=0.77, active-reflective (AE-RO)=0.76.

Analysis of data

In the analysis of data, frequency and percentages were used, the relationships among variables were investigated with chi square statistical method. In order to use chi-square test, at least 20% of the cells need to have a minimum of 5 data and any of the cells has to have a minimum of 1 data, in the tables having so much cells (Buyukozturk, 2007; Gungor and Bulut, 2008). In the analysis, it was seen that the expected frequency values were less than 5, however; owing to the fact that these cell numbers did not exceed 20% of the total cell numbers and it was confirmed that the requirements were met, the relationships among variables were investigated with chi square statistical method. The level of significance was accepted as 0.05 in the statistical analysis.

RESULTS AND DISCUSSION

It was determined that, according to the gender of the academicians who participated in the study, 56 (27.2%) of them were female and 150 (72.8%) of them were male.

Table 1. The frequency and percentage distribution of the academicians' learning styles.

Learning styles	n	%
Diverging	24	11.7
Assimilating	62	30.1
Converging	98	47.6
Accommodating	22	10.7
Total	206	100.0

As it is seen in Table 1, it was determined that the academicians had mostly converging (47.6%) learning style. It was respectively followed by assimilating (30.1%), diverging (11.7%) and accommodating (10.7%) learning styles.

According to appellation, 72 (35.0%) of them were professors (professor dr., assoc. prof. dr., assist. prof. dr.), 78 (37.9%) of them were lecturers, 56 (27.2%) of them were research assistants. According to age, 85 (41.3%) of them were 35 and under, 46 (22.3%) of them were 36 to 40, 75 (36.4%) of them were 41 and older. According to the department they worked, 109 (52.9%) of them in the department of physical education and sports teacher, 41 (19.9%) of them were in the department of sports management, 56 (27.2%) of them were in the department of coaching. In the study, it was determined that the academicians had mostly converging learning style (Table 1). According to Kolb's learning style, the people having converging learning style, "abstract conceptualization (by thinking) and active experimentation (by practising) have been basically dominant over them and problem solving, deciding, logical analysis of ideas and systematical planning have been certain features in this learning style. The planning has been systematically done while problem solving. Learning by practising has been important as well" (Kolb and Kolb, 2005). On the basis of the obtained finding; considering the fact that sports has been practice-based rather than theory-based, it could be said that the academicians in the school of physical education and sports would prefer practical studies and learning by practising more.

It was determined by Karakoc (2005) that, the instructors in Military Academy had mostly converging learning style, by Hansen (2000) that the students in school of physical education and sports had respectively converging, assimilating and accommodating learning styles, by Weng (2001) that most of the students from five different departments related to sports in North Colorado University would prefer active experimentation (by practising) as learning style; and also in a study by Harrelsen et al. (2003) with the aim of learning styles of trainers, it was understood that most of them (76%) had converging and assimilating learning styles. Similar conclusions would be found in the studies, which showed parallelism with our findings, from domestic and abroad with different working groups. It was determined that the people had mostly converging learning style in the

studies by Terrel (2002), Oral (2003), Guven (2003), Contessa et al. (2005), Arslan and Babadogan (2005), Demir (2008), Denizoglu (2008), Gurpinar (2009), Kural (2009) and Pehlivan (2010). It was seen that, the learning styles preferred in the first rank by the people had showed a change in the studies (Askar and Akkoyunlu, 1993; Jones et al., 2003; Barmeyer, 2004; Healey et al., 2005) with different working groups. It might be thought that these differences in the findings of the studies about the topic had arisen from the differences of working groups or cultural diversity.

When investigated, the relationship between the academicians' learning styles and gender, it was seen that male and female academicians had mostly converging learning style and their learning styles were not related to the gender variable (Table 2). In other words, the gender of academicians has not been effective in the determination of the learning styles. It was also determined that male and female prospective teachers had mostly converging learning style in the studies by Demir (2006), (2008), Denizoglu (2008), Erdogan (2008), Pehlivan (2010). Besides, it was found that gender was not effective in the determination of the learning styles in the studies (Gusentine and Keim, 1996; Truluck and Courtenay, 1999; Jones et al., 2003; Kayes, 2005; Demir, 2006; Karakis, 2006; Tuna, 2008; Gursoy, 2008; Denizoglu, 2008; Kural, 2009), which showed parallelism with our findings, with different working groups. In the literature, in spite of the fact that there have been a lot of studies supporting our findings, there have also been studies not corresponding to our findings.

In the study named "the learning styles preferences of physical education students and teachers" by Taylor (2001), it was seen that there had been differences between the gender of students and learning styles; in the study named "the investigation of learning style preferences of physical education students and teachers" by Hansen (2000), it was determined that while there was no significant relationship between the learning styles of students and gender, there was a statistically significant relationship between the learning styles of teachers and gender.

When investigated, the relationship between the academicians' learning styles and age, it was understood that the academicians in the group of 35 and under, 36 to 40, 41 and older had mostly converging learning style and their learning styles were not related to the age variable (Table 3). According to these results, it has been possible to say that, the preferred learning style among all groups has been the same and also the academicians' learning styles have not changed in the subject of the age, younger or older. It has also been thought that the preferences of academicians' learning style have not been affected by the age because of the same profession they have worked in. In the study by Ergur (1998), it was found that the relationship between the academicians' learning styles and age was unimportant. In another study conducted with the aim of "the determination of

Table 2. The relationship between the academicians' learning styles and gender.

Gender		Learning styles				Total
		Diverging	Assimilating	Converging	Accommodating	
Female	n	8	16	28	4	56
	%	14.3	28.6	50.0	7.1	100.0
Male	n	16	46	70	18	150
	%	10.7	30.7	46.7	12.0	100.0
Total	n	24	62	98	22	206
	%	11.7	30.1	47.6	10.7	100.0

$\chi^2=1.514$; $df=3$; $P=0.679$; $P>0.05$. When looked at the Table 2, it was seen that female academicians had mostly converging (50.0%) learning style and it was followed by assimilating (28.6%), diverging (14.3%) and accommodating (7.1%) learning styles; male academicians also had mostly converging (46.7%) learning style and it was followed by assimilating (30.7%), accommodating (12%) and diverging (10.7%) learning styles. As a result of the chi-square test, there was no relationship between the academicians' learning styles and gender variables ($\chi^2(3)=1.514$; $P>0.05$).

Table 3. The relationship between the academicians' learning styles and age.

Age		Learning styles				Total
		Diverging	Assimilating	Converging	Accommodating	
35 and under	n	13	24	43	5	85
	%	15.3	28.2	50.6	5.9	100.0
36-40	n	5	11	22	8	46
	%	10.9	23.9	47.8	17.4	100.0
41 and older	n	6	27	33	9	75
	%	8.0	36.0	44.0	12.0	100.0
Total	n	24	62	98	22	206
	%	11.7	30.1	47.6	10.7	100.0

$\chi^2=7.660$; $df=6$; $P=0.264$; $P>0.05$. In Table 3, it was determined that the academicians in the group of 35 and under had mostly converging (50.6%) learning style and it was followed by assimilating (28.2%), diverging (15.3%) and accommodating (5.9%) learning styles; the academicians in the group of 36 to 40 had mostly converging (47.8%) learning style and it was followed by assimilating (23.9%), accommodating (17.4%) and diverging (10.9%) learning styles; the academicians in the group of 41 and older had mostly converging (44.0%) learning style and it was followed by assimilating (36.0%), accommodating (12.0%) and diverging (8.0%) learning styles. As a result of the chi-square test, there was no relationship between the academicians' learning styles and age variables ($\chi^2(6)=7.660$; $P>0.05$).

physical education students and teachers' learning styles" by Taylor (2001), it was also determined that there was no difference according to the age. It had reached similar conclusions in the other studies (Truluck and Courtenay, 1999; Ilhan, 2002), which showed parallelism with our findings.

In the determination of relationship between the academicians' learning styles and appellation, it was found that lecturers and research assistants had mostly converging learning style and appellation was not effective in the determination of the learning styles which they had (Table 4). In these premises, it has been possible to say that the academicians in the school of physical education and sports without taking into account their appellations,

have been good in the field of practical application of ideas and theories, have preferred dealing with technical problems rather than social and interpersonal problems, and have applied to new ideas, similes and practical applications in case of formal learning (Kolb and Kolb, 2005). In the study by Ergur (1998), which was thought not to correspond to our findings, since the academicians defined it as the working group which worked for different faculties; it was determined that 43.3% of professors and 50.0% of assoc. prof. dr. had assimilating, 26.9% of assist. prof. dr. had accommodating, 25.9% of lecturers had diverging, assimilating, converging, 29% of research assistants had diverging learning style.

In the determination of relationship between the

Table 4. The relationship between the academicians' learning styles and appellation.

Appellation		Learning Styles				Total
		Diverging	Assimilating	Converging	Accommodating	
Professors (Professor Dr., Assoc. Prof. Dr., Assist. Prof. Dr.)	n	9	20	36	7	72
	%	12.5	27.8	50.0	9.7	100.0
Lecturer	n	8	27	34	9	78
	%	10.3	34.6	43.6	11.5	100.0
Research Assistant	n	7	15	28	6	56
	%	12.5	26.8	50.0	10.7	100.0
Total	n	24	62	98	22	206
	%	11.7	30.1	47.6	10.7	100.0

$\chi^2=1.606$; $df=6$; $P=0.952$; $P>0.05$. In Table 4, it was determined that the professors had mostly converging (50.0%) learning style and it was followed by assimilating (27.8%), diverging (12.5%) and accommodating (9.7%) learning styles; the lecturers had mostly converging (43.6%) learning style and it was followed by assimilating (34.6%), accommodating (11.5%) and diverging (10.3%) learning styles; the research assistants had mostly converging (50.0%) learning style and it was followed by assimilating (26.8%), diverging (12.5%) and accommodating (10.7%) learning styles. As a result of the chi-square test, there was no relationship between the academicians' learning styles and appellation variables ($\chi^2(6)=1.606$; $P>0.05$).

Table 5. The relationship between the academicians' learning styles and their departments.

Department		Learning styles				Total
		Diverging	Assimilating	Converging	Accommodating	
Physical education and sports teacher	n	15	32	49	13	109
	%	13.8	29.4	45.0	11.9	100.0
Sports management	n	3	14	20	4	41
	%	7.3	34.1	48.8	9.8	100.0
Coaching	n	6	16	29	5	56
	%	10.7	28.6	51.8	8.9	100.0
Total	n	24	62	98	22	206
	%	11.7	30.1	47.6	10.7	100.0

$\chi^2=2.137$; $df=6$; $P=0.907$; $P>0.05$. As it is seen in Table 5, it was determined that the academicians in department of physical education and sports teacher had mostly converging (45.0%) learning style and it was followed by assimilating (29.4%), diverging (13.8%) and accommodating (11.9%) learning styles; the academicians in department of sports management had mostly converging (48.8%) learning style and it was followed by assimilating (34.1%), accommodating (9.8%) and diverging (7.3%) learning styles; the academicians in department of coaching had mostly converging (51.8%) learning style and it was followed by assimilating (28.6%), diverging (10.7%) and accommodating (8.9%) learning styles. As a result of the chi-square test, there was no relationship between the academicians' learning styles and the department they worked variables ($\chi^2(6)=2.137$; $P>0.05$).

academicians' learning styles and the department they worked; the academicians in the departments of physical education and sports teacher, sports management and coaching had mostly converging learning style and there was no relationship between their learning styles and the department they worked variables (Table 5). In the literature, there have been a lot of studies which show parallelism with our findings. In the study by Pehlivan (2010), it was seen that the prospective teachers (science teaching, preschool teaching, classroom

teaching) receiving education in the different departments had mostly converging learning style; in the study by Weng (2001), it was determined that there had been no difference in the learning styles between the students from five different departments related to sports in North Colorado University and their departments; in the study by Caglayan (2007) on the university students from the departments of physical education and sports teacher, sports management and coaching of the schools of physical education and sports, it was understood that

there had been no difference in the learning styles, according to the departments of students and also in the other studies (Gursoy, 2008; Erdogan, 2008; Metallidou and Platsidou, 2008; Pehlivan, 2010) with different working groups, it was found that there had been no difference in the learning styles of people in terms of the departments.

Conclusion

Consequently, it was understood that the academicians in the school of physical education and sports had converging learning style based upon abstract conceptualization (by thinking) and active experimentation (by doing) as the capability of dominant learning; in other words, according to Kolb and Kolb (2005) it has been possible to say that these people have taken cognizance of the details in the learning environment, have tried to understand the whole from the parts, have been good at finding practical application of ideas and theories, have preferred to deal with technical problems rather than social and interpersonal problems, have also preferred new ideas, similes, laboratory works and practical applications in case of formal learning. In addition to these, it was determined that the academicians secondarily had preferred assimilating learning style based upon abstract conceptualization and reflective observation, and there had been no relationship between the learning style they had and their gender, age, appellation and department variables.

REFERENCES

- Arslan B, Babadogan C (2005). Relationships between learning style preferences and gender, age and success level at 7th and 8th Grade. *Eurasian J. Educ. Res.*, 21: 35-48.
- Askar P, Akkoyunlu B (1993). Kolb öğrenme stili envanteri. *Eğitim ve Bilim*. 87(17): 37-47.
- Barmeyer CI (2004). Learning styles and their impact on cross-cultural training: an international comparison in France, Germany and Quebec. *Int. J. Intercult Rel.*, 28: 577-594.
- Besoluk S, Onder I (2010). Investigation of teacher candidates' learning approaches, learning styles and critical thinking disposition. *Elementary Education Online*, 9(2): 679-693.
- Boydak HA (2006). Learning styles. (Seventh Edition). Istanbul: White Publications.
- Buyukozturk S (2007). Manual data analysis for the Social Sciences (Seventh Edition). Ankara: Pegem A Publications.
- Caglayan HS (2007). Investigating the relationship between learning modality and problem solving skills of physical education and sports students. Published PhD Thesis. Gazi University Institute of Education Sciences, Department of Physical Education and Sport, Ankara, Turkey.
- Contessa J, Ciardiello KA, Perlman S (2005). Surgery resident learning styles and academic achievement. *Curr. Surg.*, 62(3): 344-347.
- Demir MK (2006). The candidates of classroom teachers' learning styles and social studies education. *Eurasian J. Educ. Res. (EJER)*, 23: 28-37.
- Demir T (2008). Learning styles of the Turkish teaching students (The case of Gazi University). *J. Int. Soc. Res.*, 1(4): 129-148.
- Denizoglu P (2008). The assessment of the relation between self-efficacy belief levels, learning styles of science teacher candidates towards science teaching and their attitudes towards science teaching. Unpublished MA Thesis. Çukurova University Institute of Social Sciences, Department of Primary Education, Adana, Turkey.
- Erdogan S (2008). Comparison of the successful and unsuccessful students' learning and thinking styles in physics lessons. Unpublished MA Thesis. Selcuk University Institute of Science and Technology, Department of Physics Education, Konya, Turkey.
- Ergur DO (1998). Comparison of the learning styles of the lecturers and the senior students at Hacettepe University. Published PhD Thesis. Hacettepe University Institute of Social Sciences, Department of Educational Sciences, Ankara, Turkey.
- Ergür DO (2006). 4 - Mat program development model and example of a lesson plan. 15th National Congress Education Sciences. Sep. 13-15. Mugla University, Faculty of Education, Mugla.
- Gungor M, Bulut Y (2008). On the chi-square test. *Research of Eastern Anatolia Region*. 7(1): 84-89.
- Gurpinar E (2009). The satisfaction and examination success of medical school students with traditional education and problem based learning in view of their learning styles. Unpublished MA Thesis. Akdeniz University, Institute of Health Sciences, Department of Medical Education, Antalya, Turkey.
- Gursoy T (2008). The investigation of teacher candidates' learning styles in terms of various variables. Unpublished MA Thesis. Adnan Menderes University Institute of Social Sciences, Department of Educational Sciences, Aydın, Turkey.
- Gusentine SD, Keim MC (1996). The learning styles of community college art students. *Community College Rev.*, 24(3): 17-26.
- Güven GA (2003). An investigation of learning styles for interns in physics education. Unpublished MA Thesis. Marmara University Institute of Social Sciences, Department of Secondary Science and Mathematics Education, İstanbul, Turkey.
- Hansen PJ (2000). The preferred learning styles of student athletic trainers and certified athletic trainers in nata district IV and district V. Ph.D Thesis. University of South Dakota.
- Harrelsen GL, Deidre DL, Malissa M (2003). Learning styles of athletic training educators. *Human Kinetics*, 8(4): 62-64.
- Healey M, Kneale P, Bradbeer J (2005). Learning styles among geography undergraduates: an international comparison. *Area*, 37(1): 30-42.
- Ilhan A (2002). Learning styles of the students in private English courses. Unpublished MA Thesis. Hacettepe University Institute of Social Sciences, Department of Educational Sciences, Ankara, Turkey.
- Jensen E (1996). Brain-based learning. Del Mar, CA: Turning Point Publishing.
- Jonassen DH, Grobowski BL (1993). Handbook of individual differences, learning and instruction. New Jersey: Lawrence Erlbaum Associates.
- Jones C, Reichard C, Mokhtari K (2003). Are students' learning styles discipline specific? *Community College J. Res. Pract.*, 27(5): 363-375.
- Joy S, Kolb DA (2009). Are there cultural differences in learning style? *Int. J. Intercult Rel.*, 33: 69-85.
- Karakis O (2006). The usage level of general learning strategies of students' having different learning styles at some of the higher studies institutions. Unpublished MA Thesis. Abant İzzet Baysal University, Institute of Social Sciences, Department of Curriculum and Instruction, Bolu, Turkey.
- Karakoc I (2005). Comparing learning styles of cadets and academicians in Turkish military academy. Unpublished MA Thesis. Ankara University Institute of Education Sciences, Department of Educational Sciences, Ankara, Turkey.
- Kayes DC (2005). Internal validity and reliability of Kolb's learning style inventory version 3 (1999). *J. Bus. Psychol.*, 20(2): 249-257.
- Kolb DA (1981). Experiential learning theory and the learning style inventory: a reply to freedman and stumpf. *Acad. Manage. Rev.*, 6(2): 289-296.
- Kolb DA (1984). Experiential learning: experience as the source of learning and development. Prentice-Hall, New Jersey.
- Kolb DA (1985). Learning style inventory, revised edition. Boston, MA: Hay Group, Hay Resources Direct.
- Kolb DA (1999). The Kolb learning style inventory. Hay Resources

- Direct.
- Kolb AY, Kolb DA (2005). *The Kolb learning style inventory 3.1: 2005 Technical Specifications*. Boston, MA: Hay Resources Direct.
- Kural H (2009). Investigating students' learning styles according to the academic success in science and technology lesson and social-demographic variables. Unpublished MA Thesis. Adnan Menderes University Institute of Social Sciences Department of Primary Education, Aydin, Turkey.
- Metallidou P, Platsidou M (2008). Kolb's Learning Style Inventory-1985: validity issues and relations with metacognitive knowledge about problem-solving strategies. *Learn. Individ. Differ.* 18: 114–119.
- Oral B (2003). An investigation of the learning styles of secondary school students. *Educational Sciences, Theory&Practice*. 35: 418-435.
- OSYS (2010). The student selection and placement system, higher education programs and quotas guide (Table 5). ftp://dokuman.osym.gov.tr/2010/2010_OSYS_TERCIH_KILAVUZU/2010_OSYS_Tablo5.pdf
- Pehlivan KB (2010). A study on prospective teachers' learning styles and their attitudes toward teaching profession. *Elementary Education Online*. 9(2): 749-763.
- Putintseva T (2006). The importance of learning styles in ESL/EFL. *The Internet TESL J.* 12:3. <http://iteslj.org/Articles/Putintseva-LearningStyles.html>.
- Taylor L (2001). Learning styles preferences of athletic training students and athletic training educators: similarities, differences and impact on academic performance. Ph.D Thesis. Texas Tech University.
- Terrel SR (2002). The effect of learning styles on doctoral course completion in a web-based learning environment. *Internet Higher Educ.*, 5: 345–352.
- Truluck JE, Courtenay BC (1999). Learning style preferences among older adults. *Educ. Gerontol.*, 25(3): 221-236.
- Tuna S (2008). The learning styles of art education students. *Elect. J. Soc. Sci.*, 7(25): 252-261.
- Ulgen G (1995). *Individual and learning*. Ankara: Scientific Publications.
- Weng CY (2001). The relationship between learning style preferences and teaching style preferences in college students. Ph.D Thesis. University of Northern Colorado.
- Yamazaki Y (2005). Learning styles and typologies of cultural differences: A theoretical and empirical comparison. *Int. J. Intercult Rel.*, 29: 521-548.