# THE LEARNING STYLES OF PRESERVICE TEACHERS AND THE RELATIONSHIP BETWEEN DEMOGRAPHIC CHARACTERISTICS

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## SUMMARY

This research has been carried out in order to define profiles of learning styles of 595 preservice teachers who are studying Science Teaching, Classroom Teaching, Social Studies Teaching at the Department of Elementary in Education Faculty of the Pamukkale University in year 2008-2009 autumn term and to find out if there is any difference in learning styles of preservice teachers regarding demographic characteristics. The related data to achieve the objectives of this research has been collected via two stage method such as "Personal Information" and "Kolb's Learning Styles Inventory". As a result of the research, it has been diagnosed whether there is any difference in learning styles of preservice teachers demographically in terms of gender, type of high schools they graduated, courses they studied, class levels, educational status and income level of their parents.

**Keywords:** Learning Styles, Preservice Teachers.

**Theoretical Framework:** Recently, both in the world and in our country, modern educational methods have been embraced rather than the traditional ones. The importance of learning styles, which is one of the individual differences, has become crucial in the frame of student centred approach in learning and teaching environment, in parallel to this, the number of researches regarding learning styles has also increased. It is quite difficult to define the term "learning style". Cano and others (2000) explained this as; every researcher does their own definition as they interested in one of the dimensions of the learning process, they utilize different instrument of measurement and each theorical bases are very different.

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Should we refer to some of the several definitions of learning styles; Kolb defines learning style as one's preferred methods for perceiving and processing information (Jen vd, 2005:124). According to Stenberg, the term learning style indicates how individuals prefer to learn (Cano vd, 2000:415). With respect to Erden and Altun (2006) learning style can be defined as the total preference of learner during the learning process. As seen in the definitions, learning style is the best way that the learner learns.

For an effective learning and teaching, both teachers and students should be familiar with learning styles. Sarasin (2006) mentions four important steps that the teachers should pay attention to for effective teaching. **The first step**, teachers should realise how they learn themselves. Once teachers start to realise their own learning styles, then they realise how their students learn as well. **The second step**, teachers should think how they teach. When we think how we teach, we usually realize that our teaching style is a combination of our learning style. **The third step**, teachers should focus on how students learn. This knowledge is important for less successful students in education system. **As the last step**, teachers should teach more effectively by utilising different learning styles in learning environment in order to accommodate the learning styles of students. Butler emphasises the importance of gaining more knowledge about learning styles for teachers and also highlights that teachers prefer teaching methods in which they feel most comfortable and they teach in accordance with their own learning styles as they find other learning styles more complicated to understand (Thompson vd, 2002); therefore, if the teachers are familiar with their own and students' learning styles, this will assist teachers to utilise different learning styles in the learning process and provide a rich learning environment, and stand in equal distance to all learning styles when they start teaching.

There are various models and scales in terms of learning styles. One of the widely used instrument is Kolb's Experiential Learning Model. Kolb developed learning style model in 1976 and revised it in 1985 (Hwang and Henson, 2002:6). The model is consisting of two dimensions such as "prehension" and "transformation". Kolb classifies these dimensions as the beginning of learning process, prehension

dimension represents how the learners prefer to receive or grasp information, conversion dimension represents how the learners process the information (Jordanov, 2001:5). Kolb defines learning as a cyclic process which includes concrete experience (CE), reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE) learning abilities. According to this model, the first learners should be open to new experiences without prejudice, reflect and observe their experiences from various perspectives, afterwards should be able to create abstract concepts which explain and generalize the observations, and finally should be able to use these abstract concepts and generalizations in decision making and problem solving (Tamaoka, 1985:14). Concrete experience and abstract conceptualization are the opposing poles on the prehension dimension, reflective observation and active experimentation are the opposing poles on the transformation dimension (Jordanov, 2001: 5). According to Kolb's model each learning style has two dominant learning abilities and these learning styles characterised as follows:

**Diverger:** Concrete experience and reflective observation learning abilities are dominant. These individuals have a strong thinking ability, and they are successful in creating ideas and look over things with different point of view. They are interested in culture and people (Smith, 1996). While they shape the ideas, they also consider their own ideas and emotions. Having problems in quick decision making, not being able to seizing the opportunities and utilising time effectively are the weak side of individuals who have this learning style (Arslan and Babadogan, 2005:38).

**Assimilator:** Abstract conceptualization and reflective observation learning abilities are dominant. Individuals who have this style are strong in creating theoretical models, inductive implications and interested in abstract conceptualizations (Smith, 1996). Kolb points out that these individuals need precise explanations rather than practical opportunities, they are ascendant at comprehending highly comprehensive data and organising this in a logical format and they focus on ideas more than people (Putintseva, 2006). The lack of focusing on people's emotions, personal interests, ability of tendency towards others,

ability of implementation of theories and models and decision making are the weak sides of these individuals (Güven, 2004: 54).

**Converger:** Abstract Conceptualization and active experimentation learning abilities are dominant. The most distinctive features of these individuals are problem solving, decision making, implementation of ideas in practice, analysing ideas logically and systematic planning (Peker, 2003). They are not emotional, and they are interested in objects rather than people (Jardonav, 2001:8). Quick decision making, missing focal point, not testing ideas and having scattered ideas are the weak sides of these style individuals (Demir, 2006:33).

**Accomodator:** Concrete experience and active experimentation learning abilities are dominant. The most distinctive features of individuals who have accommodating learning style are good at solving problems with sense while doing things, reacting instantly in the situations (Smith, 1996). They can adopt themselves quickly to changing circumstances and take more risk compared to other learning styles (Heywood, 1997:5). Not being able to use time effectively and not being able to aim at the target are among the weak sides of these individuals (Demir, 2005: 34-39).

**Aims of the Research:** This research has been carried out in order to define the learning styles of preservice teachers who are studying Science Teaching, Classroom Teaching, Social Studies Teaching at the Department of Elementary in Education Faculty of the Pamukkale University and to find out if there is any difference in learning styles of preservice teachers regarding demographic features. In the frame of this main aim, answers have been sought for the following questions;

1. According to Kolb's model, what type of distribution range do the learning styles of preservice teachers indicate?
2. According to Kolb's model, do the learning styles of preservice teachers vary regarding gender?
3. According to Kolb's model, do the learning styles of preservice teachers vary regarding the high schools they graduated?

4. According to Kolb's model, do the learning styles of preservice teachers vary regarding the educational level of their parents?
5. According to Kolb's model, do the learning styles of preservice teachers vary regarding the income level of their parents?
6. According to Kolb's model, do the learning styles of preservice teachers vary regarding their class levels?
7. According to Kolb's model, do the learning styles of preservice teachers vary regarding the field they studied at the high school?
8. According to Kolb's model, do the learning styles of preservice teachers vary regarding the courses they studied?

**Research Method:** The research is limited with 595 preservice teachers who are studying Science Teaching, Classroom Teaching, Social Studies Teaching at the Department of Elementary in Education Faculty of the Pamukkale University in year 2008 – 2009 autumn term.

**Table 1. Distrubution of preservice teachers regarding departments**

| | Science | Social Studies | Classroom | Total |
|---|---|---|---|---|
| Female | 92 | 80 | 131 | 203 |
| Male | 101 | 90 | 101 | 292 |
| Total | 193 | 170 | 232 | 595 |

In the research general scanning method has been used. The related data for research to achieve aims and objectives have been collected in two stages such as "Personal Information" and "Kolb Learning Styles Inventory". "Personal Information Form" which formed the first part of data collection includes themes to assist familiarizing with preservice teachers used as samples. In this respect, there is one question for each theme and total of five questions in this part to find out about the gender, the school they attended before degree, the level of class they attended, and educational level of preservice teachers' parents and socio – economic levels of families. In the second part of the data collection, "Kolb Learning Style Inventory which was developed by Kolb and proved utilizable in Turkey by Askar and Akkoyunlu (1993) has been used to define the learning styles of preservice teachers. The data obtained from the personal information

form and scale to collect data has been analysed as the answers to the questions asked in the research. The statistical methods below have been prepared by means of SPSS 11.5 for windows package programme. These are; 1. Frequency and Percentages 2. The importance test of differences between averages in independent groups (t – test) 3. Variance Analysis (ANOVA).

**Findings and Results:**

**Table 2. Distribution of preservice teachers' learning styles**

| Learning Styles | Frequency (f) | Percent (%) | Cumulative percent |
|---|---|---|---|
| Accommodator | 54 | 9.1 | 9.1 |
| Diverger | 146 | 24.5 | 33.6 |
| Assimilator | 290 | 48.7 | 82.4 |
| Convenger | 105 | 17.6 | 100.0 |
| Total | 595 | 100.0 | |

As a result of Kolb Learning Style Inventory which was performed on 595 preservice teachers, it has been found out that 48.7% of the preservice teachers are assimilator, 24.5% are diverger, 17.6% are converger and 9.11% are accommodator. Abstract conceptualization and reflective observation learning abilities are dominant in the assimilator learning style. This indicates that participants prefer to learn by way of thinking and observation. The obtained findings are consistent in accordance with the findings of the research carried out by Kılıç (2002), Aşkar and Akkoyunlu (1993) and Hasırcı (2006).

When it is examined whether there is any difference in learning styles regarding demographic characteristics, these findings have been obtained;

**Table 3. Distribution of preservice teachers' learning styles regarding gender**

| Gender | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Female | 22 | 7.3 | 71 | 23.4 | 156 | 51.5 | 54 | 17.8 | 303 | 100.0 |
| Male | 32 | 11.0 | 75 | 25.7 | 134 | 45.9 | 51 | 17.5 | 292 | 100.0 |
| Total | 54 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

In Table 3 distrubution of preservice teachers' learning style regarding gender are given. According to these findings, it can be said that male and female preservice teachers in the faculty of education have similar learning styles. The findings of this research indicate consistency with the research findings carried out by Demir (2006).

**Table 4. t-test results of preservice teachers' learning styles regarding gender**

| Gender | N | X | Ss | t | p |
|---|---|---|---|---|---|
| Female | 303 | 2.80 | .815 | 1.436 | .152 |
| Male | 292 | 2.70 | .884 | | |

Table 4 shows that there is not a significant difference between gender and learning styles of preservice teachers, in other words it is seen that there is not a significant relation between learning styles and gender of the preservices (p>0.05).

**Table 5. ANOVA test results of preservice teachers' learning styles regarding graduated school**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | 1.413 | 3 | .471 | .650 | .583 |
| Within groups | 428.274 | 591 | .725 | | |
| Total | 429.687 | 594 | | | |

Table 5 shows that, there is not a significant difference between preservice teachers learning styles regarding the high schools they graduated (p>0.05).

**Table 6. Distribution of preservice teachers' learning styles regarding graduated school**

| Graduated School | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| General High School | 31 | 11.2 | 64 | 23.0 | 122 | 43.9 | 61 | 21.9 | 278 | 100.0 |
| Anatolian High School | 9 | 7.1 | 24 | 18.9 | 80 | 63.0 | 14 | 11.0 | 127 | 100.0 |
| Foreign | 9 | 6.3 | 41 | 28.5 | 72 | 50.0 | 22 | 15.3 | 144 | 100.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Language Based High School | | | | | | | | | | |
| Others | 5 | 10.9 | 17 | 37.0 | 16 | 34.8 | 8 | 17.4 | 46 | 100.0 |
| Total | 31 | 9.1 | 64 | 24.5 | 122 | 48.7 | 61 | 17.6 | 278 | 100.0 |

When we look at the distribution range of learning styles in terms of graduated school variable it is seen in Table 6, except foreign language based high school graduates, the preservice teachers graduated from other schools have assimilator learning style (general high school 43.9%, Anatolian High School 63.0%, other high schools 34.8%). Furthermore, it is seen that preservice teachers graduated from foreign language based high schools have mostly diverger learning style.

**Table 7. ANOVA test results of preservice teachers' learning styles regarding mother's educational status**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | 1.339 | 2 | .669 | 925 | .397 |
| Within groups | 428.349 | 592 | .724 | | |
| Total | 429.687 | 594 | | | |

Table 7 shows that there is not a significant difference between preservice teachers learning styles regarding mother's educational status (p>0.05).

**Table 8. Distribution of preservice teachers' learning styles regarding mother's educational status**

| Mother's educational status | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Primary education | 41 | 9.0 | 105 | 23.1 | 224 | 49.2 | 85 | 18.7 | 455 | 100.0 |
| Secondary education | 11 | 10.1 | 32 | 29.4 | 49 | 45.0 | 17 | 15.6 | 109 | 100.0 |
| Higher Education | 2 | 6.5 | 9 | 29.0 | 17 | 54.8 | 3 | 9.7 | 31 | 100.0 |
| Total | 54 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

When we look at the distribution range regarding mother's educational status in Table 8, assimilator learning style have the biggest share on the scale . However, it is seen that preservice teachers whose mother have higher education graduates have the highest range (54.8%) among the others.

**Table 9. ANOVA test results of preservice teachers' learning styles regarding father's educational status**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | 6.312 | 2 | 3.656 | .907 | **.004*** |
| Within groups | 423.375 | 592 | .724 | | |
| Total | 429.687 | 594 | | | |

In Table 9, it is seen that there is a significant difference between learning styles of the preservice teachers and fathers' educational level ($p<0.05$). According to the results of Tukey test applied to find out between which groups these differences are, we can state that this difference lies between the group who graduated from higher education and the other three (not reader and writer, primary school, secondary school).

**Table 10. Distribution of preservice teachers' learning styles regarding father's educational status**

| Father's educational status | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Primary education | 29 | 8.8 | 75 | 22.9 | 160 | 48.8 | 64 | 19.5 | 328 | 100.0 |
| Secondary education | 17 | 10.0 | 40 | 23.5 | 87 | 51.2 | 26 | 15.3 | 170 | 100.0 |
| Higher Education | 8 | 8.2 | 41 | 42.0 | 33 | 34.3 | 15 | 15.5 | 97 | 100.0 |
| Total | 54 | 9.1 | 146 | 29.5 | 290 | 43.7 | 105 | 17.6 | 595 | 100.0 |

On the basis of this data, it is seen that the preservice teachers whose father's educational status are higher education have mostly in diverger learning style, preservice teachers in other two groups have assimilator learning style.

**Table 11. ANOVA test results of preservice teachers' learning styles regarding the income level of their parents**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | .447 | 2 | .223 | 308 | .735 |
| Within groups | 429.240 | 592 | .725 | | |
| Total | 429.687 | 594 | | | |

In Table 11, it is seen that there is not a significant difference between preservice teachers learning styles regarding the income level of their parents (p>0.05).

**Table 12. Distribution of preservice teachers' learning styles regarding the income level of their parents**

| Income level | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Low | 9 | 9.4 | 23 | 24.0 | 43 | 44.8 | 21 | 21.9 | 96 | 100.0 |
| Medium | 23 | 8.0 | 69 | 24.0 | 150 | 52.1 | 46 | 16.0 | 288 | 100.0 |
| High | 22 | 10.4 | 54 | 25.6 | 97 | 46.0 | 38 | 18.0 | 211 | 100.0 |
| Total | 54 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

When we look at the ranges of learning styles regarding income level variable in Table 12, it is seen that the preservice teachers in all three income level (low – medium – high) have parallel learning styles; furthermore, the proportions are close to each other. The mostly seen learning style in all three groups are assimilator style, the least seen one is accommodator style.

**Table 13. ANOVA test results of preservice teachers' learning styles regarding class levels**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | .393 | 3 | .131 | .180 | .910 |
| Within groups | 429.294 | 591 | .726 | | |
| Total | 429.687 | 594 | | | |

In Table 13, it is seen that the findings do not indicate a significant difference in learning styles of preservice teachers in accordance with class variable (1., 2., 3., and 4. Class), in other words, it is seen that there is not a significant relation between the class they attended and learning styles of preservice teachers ($p>0.05$). This case can be interpreted as no differentiation occurs during the education process regarding learning styles of preservice teachers.

**Table 14. Distribution of preservice teachers' learning styles regarding class levels**

| Class level | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| 1 | 13 | 8.6 | 34 | 22.4 | 80 | 52.6 | 25 | 16.4 | 152 | 100.0 |
| 2 | 12 | 7.7 | 40 | 25.8 | 77 | 49.7 | 26 | 16.8 | 155 | 100.0 |
| 3 | 15 | 11.5 | 31 | 23.7 | 63 | 48.1 | 22 | 16.8 | 131 | 100.0 |
| 4 | 14 | 8.9 | 41 | 26.1 | 70 | 44.6 | 32 | 20.4 | 157 | 100.0 |
| Total | 54 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

When we look at the Table 14, it seen that distribution of preservice teacher's learning styles regarding grade level shows parallel with general distrubution and learning styles are lined again like this; assimilator, diverger, converger and accomodator.

**Table 15. ANOVA test results of preservice teachers' learning styles regarding the field they studied at the high school**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | 3.525 | 2 | 1.262 | 2.049 | **.035*** |
| Within groups | 426.163 | 592 | .722 | | |
| Total | 429.687 | 594 | | | |

In Table 15, it is seen that there is a significant difference between the variable of the field of study at the high school and learning style of preservice teachers ($p<0.05$). According to the results of Tukey test applied to find out between which groups the difference lies, there is a significant difference between TM graduate group and other two groups (science and social). TM graduated preservice teachers completely focus on assimilator style (66.5%), although Science and Social graduated preservice teachers have assimilator style (39.4%; 43.7%), comparatively, it is seen that they exhibit a more homogenous distribution. As TM graduated preservice teachers have especially accommodator (6.0%) and converger (7.3%) learning styles, this distribution range caused difference to appear.

**Table 16. Distribution of preservice teachers' learning styles regarding the field they studied at the high school**

| Field | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Science | 23 | 11.3 | 44 | 21.7 | 80 | 39.4 | 56 | 27.6 | 203 | 100.0 |
| TM | 13 | 6.0 | 45 | 20.2 | 144 | 66.5 | 16 | 7.3 | 218 | 100.0 |
| Social | 18 | 10.3 | 35 | 20.1 | 76 | 43.7 | 45 | 25.9 | 174 | 100.0 |
| Total | 54 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

**Table 17. ANOVA test results of preservice teachers' learning styles regarding the courses they studied**

| Variance source | Sum of Square | df | Mean Square | F | P |
|---|---|---|---|---|---|
| Between groups | 4.491 | 2 | 2.246 | 3.127 | **.045*** |
| Within groups | 425.196 | 592 | .718 | | |
| Total | 429.687 | 594 | | | |

According to Table 17, it is seen that there is a significant difference between the variable of the field they studied in and learning styles of preservice teachers ($p<0.05$). According to the findings of Tukey HSD test applied to find out between which groups this difference obtained lies, it has been diagnosed there is a significant difference between the preservice teachers studying Social Studies Teaching and the ones studying Classroom Teaching.

**Table 18. Distribution of preservice teachers' learning styles regarding the courses they studied**

| Preservice teachers' courses they studied | Learning Styles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Accomodator | | Diverger | | Assimilator | | Convenger | | Total | |
| | f | % | f | % | f | % | f | % | f | % |
| Science | 23 | 11.9 | 50 | 25.9 | 77 | 39.9 | 43 | 22.3 | 193 | 100.0 |
| Classroom | 15 | 6.6 | 66 | 28.4 | 137 | 59.1 | 14 | 5.9 | 232 | 100.0 |
| Social Studies | 18 | 10.6 | 30 | 17.6 | 76 | 44.7 | 46 | 27.1 | 170 | 100.0 |
| Total | 23 | 9.1 | 146 | 24.5 | 290 | 48.7 | 105 | 17.6 | 595 | 100.0 |

We can state that this difference occurred especially according as converger learning style. Because in both groups (Classroom Teaching 59.1%, Social Studies Teaching 44.7%), the assimilator learning style is the most preferred learning style; however, although Converger learning style is the second most preferred style in Social Studies Teaching (27.1%), this style is the least preferred learning style in Classroom Teaching (5.9%). At the same time, it is seen that the

distribution of learning styles regarding the variable of the field the preservice teachers study have a parallel distribution to the general distribution; and again the learning styles are ranged like assimilator, diverger, converger and accommodator.

**Suggestions:** As it is seen from the results, not only can there be individuals who have the same learning styles but also there can be individuals who have different learning styles in a classroom environment. As this case is possible in preservice teachers, it is also same in the classrooms the preservice teachers are going to perform. Just as the preservice teachers learning in different styles, students also learn in different styles. In this direction, the preservice teachers should also provide an education and tuition environment in their class for the students who have a different learning style to their own in order to address to all the students in the classroom in the following years. When individuals study the fields which are compatible with their learning styles, it will increase their efficiency. Especially, recently it is often emphasized that the needs of students who have different learning styles should be fulfilled. Most of the time, meeting of these needs can result in failure. One of the most important reasons for this failure is neglecting the fact that students have different learning styles. As a result of this, students who are compatible with the learning style of teacher are successful, the others may not. Consequently, in order to achieve an effective teaching, teachers must know what the learning styles of students. Teachers can consider learning styles of students in planning their activities, organising education environment, choosing materials and equipments to be used in the education environment, arranging workshop groups, supervising the activities.

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