

A Contribution to Discussions Regarding Learning Style: The Changes Occurring within Three Weeks of Time

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Abstract

This particular research is a contribution to discussions regarding whether teaching and tuition may be exercised with respect to learning style in terms of changes occurring within an assigned period of time. Kolb learning style inventory was applied on teacher candidates for an interval of three weeks within the scope of the research and the obtained results were discussed pursuantly. It was determined that the learning styles may change and vary in terms of durations which can pose a problem with respect to teaching planning's as a consequence of the research. The identified changes made comparison of the learning style with respect to independent variables open to criticism. It is recommended that attention better be paid on selection of data analysis techniques for evaluation of the learning styles based on certain independent variables. Learning styles changes within a short period of time. Yet the question to be replied is which experiences lead the way to change. Remarks and opinions defending necessity of teaching based on learning styles will not be approved before answering this critical question.

Keywords: Learning style, Meshing hypothesis, Learning style change

1. Introduction

Learning style is related to how learning is actualized, what kind of an interaction occurs

between the learner and the surrounding environment and which reactions are given to learning process according to Taşpınar (2014). Shunk (2011) explained this property called cognitive style based on individual disparities such as comprehension and perception of knowledge, processing and recalling. Learning style is a product of experience (Della-Dora & Blanchard, 1979; Claxton & Rolston, 1978; Kolb, 1984) and the learner is ought to concentrate on the knowledge perceived and processed (R. S. Dunn & K. J. Dunn, 1993:2). There are environmental, emotional and sensational, sociological, psychological and physiological aspects and dimensions of learning styles (Boneva & Mihova, 2012). The theories towards learning style are to a great extent affected by Lewin, Jung, Piaget and Guilford's opinions and judgments (Veznedaroğlu & Özgür, 2005).

There is a variety of learning style models in the body of literature. Kolb's, Felder and Silvermen's, Grasha-Reichmann's, Myers and Briggs's and Dunn and Dunn's theories are several of them. According to Kolb learning styles are split into four general types including Diverger, Assimilator, Converger and Accommodator. Felder and Silvermen explain learning styles in terms of four stages including the source of information (sensing and intuitive), channel of information (visual and verbal), processing method of information (active and reflective) and understanding of information (sequential and global). According to Grasha-Reichmann, three categories contrary to each other which are avoidant-participant, competitive-collaborative, dependent-independent which add up to six learning style scales may be mentioned. Myers and Briggs's perspective on learning styles is that there are four main and sixteen diversified learning styles. The most comprehensive classification is actualized by Dunn and Dunn, they have argued that the learning style has five dimensions including physiological, psychological, affective, social and environmental aspects. Students' aural, visual, tactual and kinesthetic requirements are effective on physiological dimension. Social dimension is related to will to work on individual and group basis, tactual dimension on the other hand is related to motivation, steadiness, responsibility and personal background (choices). Environmental dimension includes heat (temperature), lighting, loudness, class environment order, etc. Psychological dimension is related to using left or right side of the brain, analytical, reflective or impulsive teaching skills.

Learning style is referred as an individual discrepancy in the body of literature. However, finding distinctness's of the conducted research based on learning styles cause ambiguity on the idea and practice of teaching according to learning style. Academic success is the leading factor among the variables in terms of correlation between the learning styles. On part of a certain section of the conducted research (Battalio, 2009; Bakır & Mete, 2014; Alizadeh & Heidari, 2015; Fayombo, 2015; Övez & Uyangör, 2016; Sharma, Bhutani & Mangal, 2016; Önder, 2006) academic success is in correlation with learning styles, whereas on another part of the section (Ekici, 2013; Karamustafaoğlu, Yurtyapan, Çoşkun, Divarçı, & Derin, 2015; Kılıç & Karadeniz, 2004; Bahar & Sülün, 2011; Erdoğan & Güzel, 2013; Yenice & Saracaloğlu, 2009; Bahar & Yıldırım, 2017) it is reported that such a correlation is not available. A similar dilemma and contradiction had been observed for the research conducted based on teaching and learning styles According to Shenoy, Kutty, Shankar and Annamalai (2012), and Ergin & Sarıya (2015) a positive impact had been observed while teachers

practice teaching skills according to students' learning styles, whereas Ergin and Sarı (2013) did not obtain affirmative results. On part of certain researches, learning styles and teaching strategies had been addressed in terms of associational and relational perspective. Bilgin and Bahar (2008), Ünal, Alkan, Özdemir and Çakır (2013), and Durukan (2013) reached the result confirming that such a correlation exists. It is also among the aims of a number of researches whether the learning styles differ significantly according to characteristics of the samples such as gender and age. The results obtained in these studies may be summarized as follows:

Variable	Have a relationship	No relationship
Gender	Bakır & Mete (2014); Dikmen, Tuncer, & Şimşek (2018); Çakır & Akbaş (2013)	Bahar & Yıldırım (2017); Arslan & Babadoğan (2005); Uzuntiryaki, Bilgin, & Geban (2004); Biçer & Durukan (2014); Coşkun & Demirtaş (2014); Dikmen, Bahadır, & Akmeççe (2018); Can (2011); Özgür (2013); Güneş & Gökçek (2012); Yenice & Saracaloğlu (2009)
Age	Arslan & Babadoğan (2005)	Can (2011); Özgür (2013); Numanoğlu & Şen (2007)
Department	Şenyuva (2009)	Bahar & Yıldırım (2017); Dikmen, Tuncer & Şimşek (2018); Özgür (2013); Güneş & Gökçek (2012)
Class	Bahar & Yıldırım (2017); Can (2011); Alemdağ & Öncü (2015); Şenyuva (2009); Bakır & Mete (2014)	Özgür (2013)

Such a dilemma and contradiction is at stake for a number of studies which had not been addressed here. Under these circumstances, it is not logical to conduct a research on the independent variables and the dependent variable (Learning style) in terms of correlational and procedural methods. The common sense and understanding to be deduced from these research findings is that there are things going wrong which are actualized beyond knowledge and control of the researchers. In fact, Logan and Thomas (2002), Henson and Hwang (2002), and Shenoy, Kutty, Shankar and Annamalai (2012) designed and planned their research in parallel with this concern and specified that learning styles may vary and change in course of time. Pashler, Daniel, Rohrer and Bjork's (2008) contribution to discussion on learning styles add another dimension, and according to their study that had attracted considerable attention they have concluded that teaching based on learning styles do not actually have a positively scientific impact. This last finding made the research meaningless. Because there is the entire education field willing to take advantage of and utilize the research findings. This education field would like to learn whether learning styles will be taken into consideration or not and if

the learning styles will be taken into consideration they would want to know for how long and in which direction they will be changing. This particular study was planned in accordance with this problem. It had been investigated whether the learning styles have changed in a specified period of time (three weeks), and if they have changed, the findings have been investigated and the findings were discussed in terms of various independent variables.

2. Method

This particular study was conducted with and on 67 teacher candidates who are studying in Firat University, Faculty of Theology. From the students who had participated in the research study, 19 of them are men (28.4%) whereas 48 of them are women (71.6%). Fathers' professionals of the students within the scope of the research study are of heterogeneous structure whereas mothers' professionals are more likely homogeneous (63 mothers are stated to be housewives). Kolb Learning Style Inventory (KLSI-III) developed by Kolb (1999) and adapted by Evin Gencil (2007) had been used for the research study. This data collection tool was applied in advance and in the wake of three weeks long duration, the changes observed had been evaluated.

3. Results

We have tried to determine whether there is a meaningful relation between the specified learning styles as a consequence of Kolb Learning Styles Inventory applied before and after the designated three weeks of duration within the scope of the research study. The results of Chi-Square analysis applied for this purpose are given in Table 1.

Table 1. Change of learning styles according to measurement time

Learning Style		Inventory Appl.		Total	Chi-Square
		First	Second		
Converger	Observed	19	18	37	$X^2 = 2.143$ Sig. = .543
	Expected	18.5	18.5	37.0	
	% Within Style	51.4	48.6	100.0	
	% Within Appl.	28.4	26.9	27.6	
	% Total	14.2	13.4	27.6	
Diverger	Observed	12	8	20	
	Expected	10.0	10.0	20.0	
	% Within Style	60.0	40.0	100.0	
	% Within Appl.	17.9	11.9	14.9	
	% Total	9.0	6.0	14.9	
Assimilator	Observed	29	29	58	
	Expected	29.0	29.0	58.0	
	% Within Style	50.0	50.0	100.0	
	% Within Appl.	43.3	43.3	43.3	
	% Total	21.6	21.6	43.3	
Accommodator	Observed	7	12	19	
	Expected	9.5	9.5	19.0	
	% Within Style	36.8	63.2	100.0	
	% Within Appl.	10.4	17.9	14.2	
	% Total	5.2	9.0	14.2	
Total	Observed	67	67	134	
	Expected	67.0	67.0	134.0	
	% Within Style	50.0	50.0	100.0	
	% Within Appl.	100.0	100.0	100.0	
	% Total	50.0	50.0	100.0	

Table 1. According to findings showed in Table 1, a meaningful relation between the first and the last inventory application with respect to change of learning styles based on measurement period could not be determined ($p < .05$). In spite of that, number of individuals who are endowed with Diverger learning style in the first round of application decreased from 19 to 18, number of individuals endowed with Converger learning style decreased from 12 to 8, number of individuals endowed with Assimilator learning style did not change in the second round of application. The number of individuals endowed with Accommodator learning style

increased from 7 to 12. A meaningful distinction could not be found and observed in terms of number of individuals in each group based on learning style according to findings in Table 1. However, the conducted analysis has boundedness. It is apparent that the learning styles in the first implementation have considerably changed in the second implementation. The conducted analysis revealed from which groups to which group a change occurred yet as significance test is not sensitive to filling up and emptying of groups, the analysis had been determined weak in terms of objectives of the research. Therefore, it was desired to make an individual evaluation in order to determine how a change has occurred between the two implementations and the results obtained are given in Figure 1.

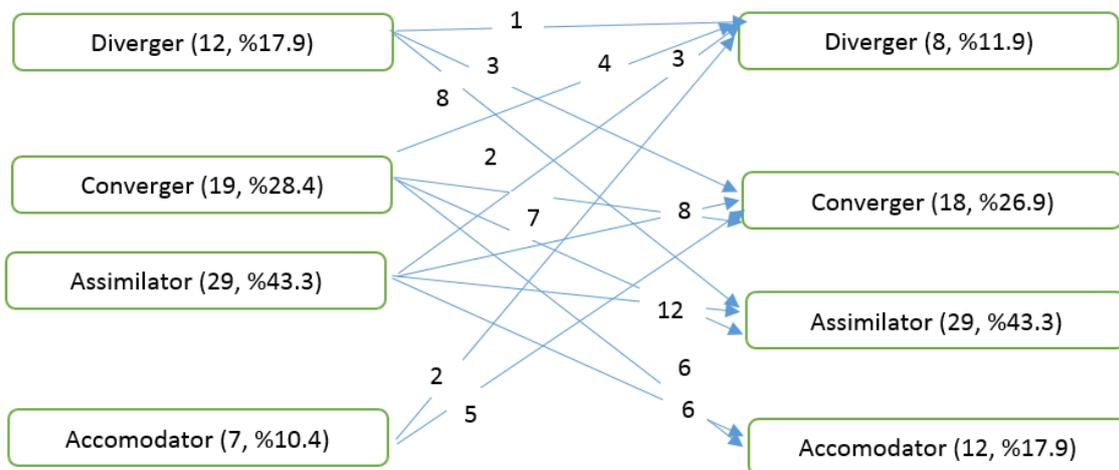


Figure 1. Change between implementations of learning style inventory

As can be seen in Figure 1, it was determined that 12 individuals were endowed with Converger learning style in the first inventory implementation and only 1 of them passed on to Converger group, 3 of them passed on to Diverger group, 8 of them passed on to Assimilator group in the second implementation. Of 19 individuals endowed with Diverger learning style in the first implementation, 4 of them passed on to Converger, 2 of them passed on to Diverger, 7 of them passed on to Assimilator and 6 of them passed on to Accomodator learning style groups. The most crowded group in the first implementation is Assimilator learning style group comprised of 29 individuals and 3 of them passed on to Converger learning style group, 8 individuals passed on to Diverger learning style group, 6 individuals passed on to Accomodator learning style group whereas 12 individuals remained in the first implementation group. It had been determined that all of the individuals endowed with Accomodator learning style passed on to other groups (2 of them passed on to Converger and 5 of them passed on to Diverger). Based on a general evaluation, the group most prone to transition and change is Accomodator whereas the most resistant group is Assimilator.

Another factor investigated in the study is whether the students' grade point average varies significantly according to the learning style. 26 students were excluded from the analysis

because they did not specify/not state the average GPA and 41 students were compared according to the Kruskal Wallis H (KWH) test to see whether grade point average significantly varies with respect to learning styles. Table 2 shows the comparison of the learning styles obtained in both implementations according to the grade point average.

Table 2. Comparison of learning style according to score

First Application		KWH.		Second Application		KWH	
Styles	N	Chi-Square	Sig.	Styles	N	Chi-Square	Sig.
1.Assimilator	19	1.902	.593	1.Assimilator	19	8.128	.043*
2.Coverger	11			2.Coverger	9		
3.Diverger	7			3.Diverger	5		
4.Accomodator	4			4.Accomodator	8		
Total	41	Diff.	-	Total	41	Diff.	1 > 2

Table 2. Results of comparison of learning styles in terms of grade point average as shown in Table 2 reveal that grade point average do not significantly differentiate based on learning styles obtained in the first implementation of the inventory ($X^2 = 1.902$, $p = .593 > .05$). Yet by implementing the inventory in the second round, it was determined that the learning styles significantly differentiate ($X^2 = 8.128$, $p = .043 < .05$). The significant distinction which had been determined is in favor of assimilating students among the students endowed with assimilator and diverger learning styles ($p < .05$).

Another evaluation was desired and planned on certain characteristics of the group on which data collection tool had been applied, distribution and range of certain demographic information in terms of learning styles are shown in Figure 2.

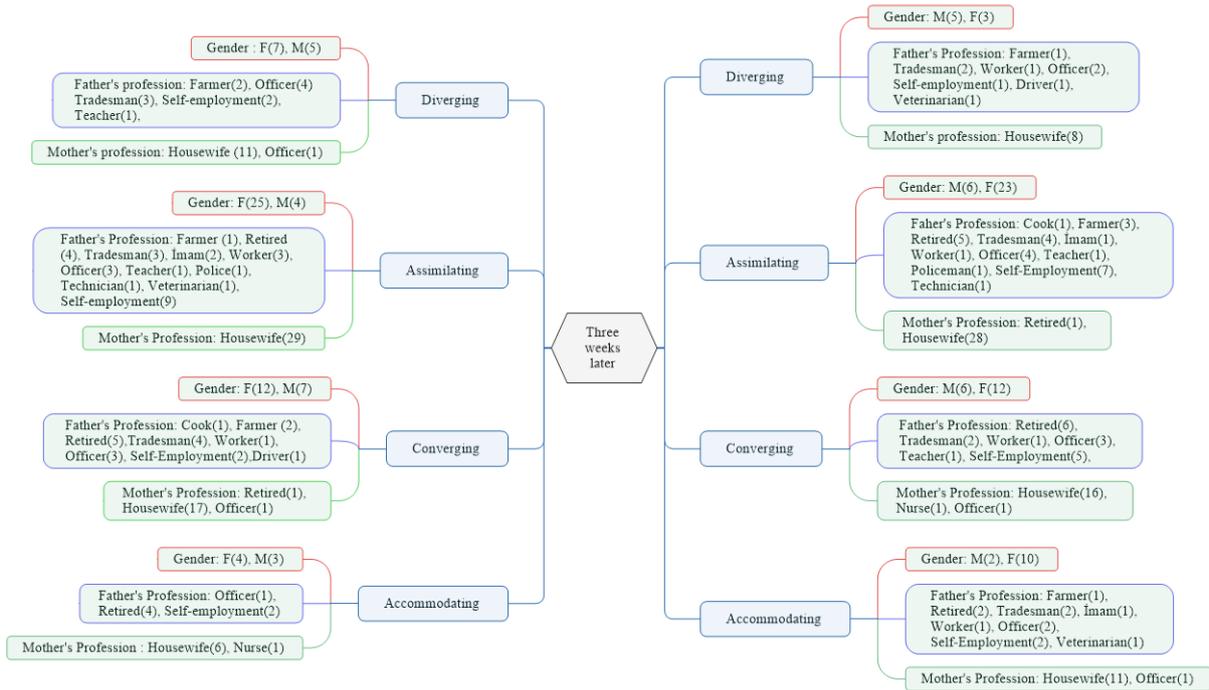


Figure 2. Position of learning styles based on certain demographic information

A striking and remarkable finding in terms of gender (sex) had been obtained in the first implementation as shown in Figure 1. While instability and unbalance is not observed in terms of sex for the other learning styles, the majority of students endowed with assimilator learning style is women. In the meantime, assimilator learning style had been observed to be the most frequent style in the theology program on which the research is conducted. In terms of mothers' professions, assimilator learning style is of a homogeneous structure (all of the mothers are housewives). On the other hand, the learning styles are of a dispersed structure in terms of fathers' professions. During implementation of the learning style inventory after three weeks, it had been observed that the most frequency (29 individuals) is concentrated on assimilator learning style. During the second round of inventory implementation, the frequency of accommodating learning style increased from seven to twelve and the dispersed structure of fathers' professions was observed to be prevalent similar to the first implementation.

4. Discussion

Within the scope of the research, no significant relationship was found between the first and last implementations of KLSI data collection tool. However, there were significant changes in terms of the learning styles between the first and last implementation of the inventory. We may say that the group most prone to transition and change is Accommodator whereas the most resistant group is Assimilator. Results of comparison of learning styles in terms of grade point average reveal that grade point average do not significantly differentiate based on learning styles obtained in the first implementation of the inventory yet by implementing the inventory in the second round, it was determined that the learning styles significantly

differentiate. The significant distinction which had been determined is in favor of assimilating students among the students endowed with assimilator and diverger learning styles. While instability and unbalance is not observed in terms of sex for the other learning styles, the majority of students endowed with assimilator learning style is women. In the meantime, assimilator learning style had been observed to be the most frequent style in the theology program on which the research is conducted. In terms of mothers' professions, assimilator learning style is of a homogeneous structure (all of the mothers are housewives). On the other hand, the learning styles are of a dispersed structure in terms of fathers' professions.

The most important finding of the research is that learning styles may change in durations which may pose a problem for teaching planning. This particular research study showed that transition and change may be realized within a short period of time, namely three weeks. It had been determined that there are several research studies coinciding with these particular research study's findings in certain aspects in body of literature. Henson and Hwang (2002) reported that there were significant fluctuations in internal consistency and test-retest scores in their research conducted by collecting data using Kolb learning style inventory which had been used for this particular research as well. Shenoy, Kutty, Shankar, and Annamalai (2012) determined that learning styles differentiate in their research and they have referred to the applied teaching method during the lessons. Taking into consideration that learning style is the output of experience (Della-Dora & Blanchard, 1979; Claxton & Rolston, 1978; Kolb, 1984) the probability of new experiences' changing effect on learning styles appear before us as a reasonable outcome. However, the changes of learning styles may be sudden and may be realized within a short period of time such that they pose a problem for planning of teaching thus desire and idea of teaching according to learning styles is therefore challenged. To plan a structured learning experience based on learning styles within such short periods of time is difficult. Idea which purports that inclusion of learning style in education would improve learning is known as Meshing Hypothesis. However, Rogowsky, Calhoun, and Tallal (2015) were not able to obtain proofs that would verify this hypothesis in their research.

Another finding of the study is whether the learning style is related to general academic achievement. In the first implementation of the inventory, it was determined that the general academic achievement grade did not differ according to the learning styles, whereas in the implementation realized three weeks later it was significantly differentiated. There are quite a number of researches in the literature to determine the relationship between academic achievement and learning styles. Among all those research studies, the researchers conducted by Battalio (2009), Bakır and Mete (2014), Alizadeh and Heidari (2015), Fayombo (2015), Övez and Uyangör (2016), and Sharma, Bhutani, and Mangal (2016) determined that there is a relationship between academic achievement and learning styles. Nevertheless, Ekici (2013), Karamustafaoğlu, Yurtyapan, Çoşkun, Divarcı, and Derin (2015), Kılıç and Karadeniz (2004), Bahar and Sülün (2011), Erdoğan and Güzel (2013), Yenice and Saracaloğlu (2009) reported that there is no significant relationship between the two variables.

The reason of determined finding differences in this particular research study to a certain extent and in the body of literature focused on learning styles is thought to be originated from data collection tools. Two important studies may be mentioned. One of the studies had been

conducted by Tuncer, Berkant, and Dikmen (2017), three different data collection tools developed to measure the same variable with the same sampling had been applied as the reason of finding differences is generally explained by sampling. As a result of the study, data collection tools were reported to give different results, and the validity problem of data collection tools was highlighted. Supporting this research, another study was conducted by Logan and Thomas (2002), and it was observed that different data collection tools developed in terms of learning styles gave different results. Tuncer (2017) drew attention on items including abstract meaning in his evaluation based on data collected in written form and online, he then emphasized that such a data collection format cannot be relied on setting forth from the obtained different findings. It is considered that these data collection tools may be demonstrated as the cause of finding differences taking item expressions and answering forms of data collection tools into consideration which had been developed based on learning styles. These data collection tools mainly measure the respondent's current perception. Perceptions can change quickly due to an external or an internal variable. In scientific studies, it is impossible to keep all these variables under control, so the results differ from each other.

When the researches about the learning styles are examined, the other attention-grabbing difference is the data analysis approaches. Researchers should evaluate the data using the most appropriate data analysis technique. Although the structure and content are the same in the researches about the learning styles, it is seen that it is tried to give meaning to a problem with different analysis techniques. In this study, significant changes were observed between different applications of data collection tool but this situation could not be determined by means of analysis techniques based on mean. The groups known to us based on learning styles (like Diverger, Assimilator, Converger and Accommodator in Kolb's theory) may be emptied and then filled again in each implementation. Therefore, the techniques that analyze the averages and means do not appear to be a good choice. In such a case, for the current comparison of the results obtained with the inventory of the Kolb learning styles used in this study, independent of the parametric tests, t test and anova analysis, non-parametric tests such as Mann Whitney U and Kruskal Wallis H and Chi-Square analysis techniques can be used, whereas it is considered that these analysis techniques should not be used in the comparison of repetitive measurements.

Despite determination of occurrence of significant changes in short periods of time based on learning styles as a consequence of all of these findings and evaluations, the idea of education activities to be implemented based on learning styles had not been entirely refuted. At this point, it is the experience effect accepted by the theories of learning style which has to be explained. Which experiences change learning styles? Remarks and opinions defending education to be realized based on learning styles will not be approved unless this critical question is answered.

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