PROSPECTIVE TEACHERS’ VIEWS ABOUT THE APPLICATION OF KOLB’S LEARNING CYCLE ON BIOLOGY LESSON

M. Handan GÜNES**

ABSTRACT

Examining the biological structure of humans in line with the recent technological improvements, it becomes apparent that there are various physiological-anatomical differences, which result in individual differences among students. Naturally, there individual differences create an enriched learning environment. However, it is quite difficult for the students with individual differences to benefit from the traditional education process at the same level. Therefore, it is of high importance to be aware of the learning styles of the students, which are due to the individual differences, while arranging the learning-teaching environments. For example, students’ awareness of learning styles could enable them to participate in their own learning processes in an active manner. Again, teachers’ awareness of learning styles could guide them in using various approaches, methods, and techniques while creating learning-teaching environments and activities. Kolb, who is known as the founder of Experiential Learning Theory, suggests that a learning environment should be designed in accordance with the learning characteristics of students with different learning styles. This is because Kolb argues that this could positively affect the learning outcomes. This study has been carried out by implementing Kolb’s learning cycle on biology course. Firstly, the individual learning styles of the prospective teachers have been detected by using Kolb’s Learning Styles Inventory (KLSI). Secondly, the lesson and study plan was created based on Kolb’s Learning Cycle, while teaching the subject of cell division (mitotic and meiosis division), which is included in the General Biology Laboratory I lesson. 38 second grade prospective teachers studying at the Science Teaching Department of the Faculty of Education have participated in

* This study includes one of the results of an experimental study conducted within the scope of a scientific research project supported by Ondokuz Mayıs University

** Doç. Dr. Ondokuz Mayıs Üniversitesi, Eğitim Fakültesi, Matematik ve Fen Bilimleri Eğitimi Bölümü, Biyoloji Eğitimi Anabilim Dalı, El-mek: hgunes@omu.edu.tr
this study. The data of the study were collected by seeking the views of the prospective teachers on the implementation and analyzed through content analysis. By the end of the study, many prospective teachers in the experimental group pointed out the advantages of the implementation and expressed their gratitude. In the recent years, the fact that each students might have a different thinking and learning style and how to reveal the potential skills that are unique to each student has been widely discussed. Hence, more students are being conducted on how to arrange a learning-teaching environment that is suitable for that purpose.

**STRUCTURED ABSTRACT**

**1. Introduction**

Individualization of education is one of the significant subjects of today. It is necessary to detect the learning style of each student by taking into account of their personality, perception, skills, and intellectual differences among them. Learning styles are not the only factor causing learning to occur at different levels, however, it is considered one of the most important components of the process of learning-teaching (Guastello, 1998; Ekici, 2003; Ekici, 2002; O’Banion, 1997). Kolb and Joy defines learning style as one of the individual preferences of people in the process of learning (Joy and Kolb, 2009; Kolb, 1984). In fact, learning style is related to how a person understands and remembers knowledge in general (Cano-Garcia and Hewitt-Huges, 2000). Recognizing the learning style of individuals significantly contributes to many dimensions from evaluations styles to the educational materials as well as designing learning-teaching processes. Moreover, by detecting the variables affecting the learning styles, it could be possible to direct or control those variables (Çakır and Akbaş, 2013).

This study was conducted by focusing on the subject of Cell Division within the scope of General Biology I Laboratory lesson, which is one of the compulsory lessons of the Department of Science Education in the Primary Education department in the Faculty of Education in Turkey, as a part of the scientific research project supported by Ondokuz Mayis University. The lesson plan of the chosen subject was prepared according to Kolb’s learning cycle and the questions, to which answers were sought, are as follows:

1. What are the dominant learning styles of prospective teachers in the study group?
2. What are the views of the prospective teachers in the study group, on the application?

**2. Methodology**

**2.1. Research Model:**

In this study, which has been conducted according to the qualitative research method, the learning styles of the prospective teachers taking General Biology Laboratory I course, have been determined; the courses have been constructed and instructed in accordance with Kolb’s learning cycle (Güneş, 2017). Afterwards, the
views of the prospective teachers on the application have been collected and evaluated.

2.2. Study Group:

The study group consists of 38 prospective teachers studying at the second grade of the Science Teaching department of Ondokuz Mayıs University and taking General Biology Laboratory I course. Table 1 and 2 displays the number, gender, and learning styles distribution of the prospective teachers in the study group.

2.3. Data Collection Tools and Data Analysis:

In this study, version 3 of Kolb’s Learning Styles Inventory (KLSI-3), which was developed by David Kolb, has been utilized in order to detect the dominant learning styles of prospective teachers (Gencel 2006).

All of the prospective teachers in the study group were asked to fill in the question form below, without writing their names on it, with the aim of obtaining their views on this application. Moreover, the prospective teachers were also asked for their written views. With this aim, the students were asked questions such as: “What do you think about the application you conducted?”, “Would you explain your views in detail by providing reasons?” The frequency of the data, which were collected from the forms distributed to the prospective teachers in the evaluation phase in order to obtain their views on this application, was calculated. The answers the prospective teachers gave to the open-ended questions were analyzed through content analysis method.

2.4. Experimental Study Plan:

The lesson and study plan developed by Güneş (2017) based on the Learning Cycle of Kolb was used in the teaching of cell division (mitosis and meiosis division) which is included in General Biology Laboratory I course. The content of the lessons and lesson plans were prepared by paying attention to the curriculums of the departments, at which students studied. The students were informed about the experimental study, before the application started. The study group consisted of 38 prospective teachers. The study lasted three weeks, with two hours per week.

3. Findings

Table 3 displays the distribution of the answers the prospective teachers in the study group gave, in the form distributed to them so as to obtain their views on application. The answers given to the first question suggest that 35 prospective teachers were satisfied with the application, while the answers given to the second question indicate that 37 prospective teachers found the application different, and finally the answers the prospective teachers gave to third question suggest that 33 of them were eager for the application to continue. The answers received were consistent to one another. According to these results, it is possible to say that the majority of them were satisfied with the application.

The prospective teachers mentioned some acquisitions, which revealed that the application had a positive effect on the learning of the subject, in their written statements. These were expressed as “the way the lesson was instructed appealing to everyone”, “understanding the subject in detail”, “understanding the subject without memorizing”,
"looking at the subject from different perspectives", "being active during the lesson", "enabling the review of the subject", "reinforcing what was learned", "Directing to do research", "realizing misknowings", and "enabling the proper instruction of lesson in an order".

While some of the prospective teachers put limits on the application by referring it to as "too time consuming" and "the lesson being too intensive"; some of them mentioned some points such as "the teacher having too much to do" and "the student having too much to do".

When they found out they had different learning styles after being informed on the subject, some of the prospective teachers mentioned that it provided them with some advantages by using statements such as "it enables us to take responsibility", "it makes us realize what needs to be done", "helping us to become more tolerant", "promoting us to have confidence".

4. Results and Discussion

In this study, the majority of the prospective teachers in the study group stated that they were satisfied with this application and wish it will continue in future. These results go along with the data obtained from analyzing the written statements of the views of the prospective teachers on the application.

The results of some previously conducted studies on the same subject suggest that when the teaching is carried out based on students' learning styles; the students learn better and more easily, remember what they learn better, display a positive attitude towards the implemented teaching method and learning, and present increase in their motivation and participation, in addition to being academically more successful (Demirkaya 2003; Gencel, 2006; Güneş 2017; Güven, 2004; Johns, 1999; Kaya, 2007; Kılıç, 2002; Mathews, 1994; Nichols, 2003; Özdemir, 2015; Peker 2003; Şimşek, 2002; Tatar 2006). The written statements of the prospective teachers stating their views on the application point out results, which are parallel or have supporting characteristics to the results of those previous studies.

A person, who is trained in a field, which is not compatible or is only a little suitable with his/her learning style, might display changes in his/her level of confidence, success, and eventually concern. Besides, this might bring together an increase in developing tolerance towards what is different from ourselves, become more disciplined, having a positive attitude towards learning (Güven, 2004). Thomson and Mascazine (1997) argues that the most outstanding benefit of paying regard to the learning styles especially in mathematics and science teaching is enabling students to acquire the responsibility of learning on their own. Furthermore, it is also expressed that if teachers pay attention to the learning styles of their students while determining their teaching strategies; learning will increase and if the individual recognizes the learning style which is most suitable for him/her will help with improving learning ability (Aşkar & Akkoynulu, 1993). In fact, some written statements of prospective teachers, in which they explain their views on the application, show parallelism to those findings.

Biology is the most prone field of science to the human nature. Although from the learning-teaching point of view it is a great opportunity
both for the learner and teacher, in lessons, in which students only listen to the teacher without participating, the students consider biology to be a memorized lesson and display an uninterested and reluctant attitude towards it (Güneş et al. 2006). This causes them to fail and be unable to achieve their goals. Students are directed to learn by memorizing and the lesson becomes boring when teaching is conducted through a teacher-centered, literal teaching method; when tools and materials are rarely used during the lesson; and when the role of the student in the classroom is limited to solely listening and taking notes (Gallagher, 2000; Öztürk 1999; Tobin, 1987). In their written statements, some prospective teachers expressed that the application enabled them to elaborately understand the subject without memorizing it, to review the subject, to evaluate the subject from different perspectives, to be active during the lesson, to reinforce what they learned, and realize their misknowings; as well as direct them to do research on their own. Moreover, some of the prospective teachers mentioned that the way the lesson was instructed appealed to everyone.

In this study, some prospective teachers put limits on the application by referring it to as “too time consuming” and “the lesson being too intensive”; while some of them mentioned some points such as “the teacher having too much to do” and “the student having too much to do”. The reason why some prospective teachers think this way might be due to the fact that they are used to the lesson being instructed by traditional methods and thus being in the position of listening and being passive for most of the time.

The individual differences students have are significant characteristics that enrich the process of teaching. Therefore, by making use of that situation, it is necessary to arrange the learning-teaching environments accordingly. In the recent years, the issue of how to reveal the potential skills that are unique to each student and how to create a learning-teaching environment in accordance with the fact that each student has a different way of thinking and learning, have been in the spotlight. More detailed studies are still being conducted in order to discover new ways for that matter.

Keywords: Kolb’s learning styles, learning cycle, experiential learning theory, biology, cell division.

KOLB’ÜN ÖĞRENME DÖNGÜSÜNÜN BİYOLOJİ DERSİNDE UYGULAMASI İLE İLİGİ ÖĞRETEN ADAYLARININ GÖRÜŞLERİ

ÖZET


Anahtar kelimeler: Kolb öğrenme stilleri, öğrenme döngüsü, deneyimsel öğrenme kuramı, biyoloji, hücre bölünmesi.
challenges and preferences of individuals in the process of obtaining, storing, and processing
knowledge’’ by Felder and Silverman (1988); as ’’the way an individual obtains, processes, and
stores knowledge’’ by Davidson (1990) and DeBello (1990); and as the circumstances under which
learners perceive, process, store, and recall what they aim to learn in the most efficient and effective

In fact, learning style is related to how a person understands and remembers knowledge in
general (Cano-García and Hewitt-Huges, 2000). It also could be described as the way, in which
knowledge is collected, processed, internalized, and remembered. Considering the fact that each
individual has a different character and is under different environmental factors, it becomes clear
why everyone has a different learning style and why learning styles differ according to certain
variables such as age, gender, culture (Shaughnessy, 1998).

According to Galloway and Labarca (1990), learning style, which has an impact on physical
and affective needs of individuals, is a whole consisting of environmental and perceptual preferences
and is a personal characteristic; moreover, no learning style is superior to another (op cit., Erden and
Altun, 2006). There are various models about learning styles; those by Kolb, McCarthy, Dunn and
Dunn, Gregor can be given as examples. Furthermore, many different assessment tools have been
developed in order to reveal the differences among the students in the learning process (Felder and
Silverman, 1988; Grasha & Reichmann, 1982; Kolb, 1984; Myers-Briggs, 1980 ). In this study,
Kolb’s learning style, which is based on experiential learning theory, has been used.

In Kolb’s Experiential Learning Theory emphasizes on the role of experience in the process
of experiential learning and teaching, which distinguishes it from other cognitive learning theories.
Therefore, it is expressed that in this theory, learning occurs through the transformation of knowledge
and experience. Furthermore, there are two dimensions in the process of learning including
comprehension and transformation. Kolb’s learning style model is based on this Experiential
Learning Theory of Kolb. Experiential Learning Theory argues that learning is cycle and Kolb’s
learning style model consists of four main categories including Concrete Experience (CE), Reflective
Observation (RO), Abstract Conceptualization (AC), and Active Experience (AE) (Kolb, 1984).

It is possible to detect at which stage of this cycle an individual is through this learning style
inventory. Learning ways representing each learning style is different from one another. These
respectively include ‘by feeling’’ for Concrete Experience, ‘’by watching’’ for Reflective
Observation, ‘’by thinking’’ for Abstract Conceptualization, and ‘’by doing’’ for Active Experience.
However, there is not only one manner that determines the learning of an individual. Learning style
of each individual is a component of these 4 main styles. Thus, various situations are collected and
placed in one learning situation. With the sum of scores of individuals, it is possible to determine
which learning style the individual falls under. These learnings styles are Diverger, Assimilator,
Converger, and Accomodator. One of these four categories may become more prominent for an
individual from time to time (Aşkar and Akkoyunlu, 1993).

Recognizing the learning style of individuals significantly contributes to many dimensions
from evaluations styles to the educational materials as well as designing learning-teaching processes.
Moreover, by detecting the variables affecting the learning styles, it could be possible to direct or
control those variables (Çakır and Akbaş, 2013).

This study was conducted by focusing on the subject of Cell Division within the scope of
General Biology I Laboratory lesson, which is one of the compulsory lessons of the Department of
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answers were sought, are as follows:
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Methodology

Research Model:

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Study Group:

The study group consists of 38 prospective teachers studying at the second grade of the Science Teaching department of Ondokuz Mayıs University and taking General Biology Laboratory I course. Table 1 and 2 displays the number, gender, and learning styles distribution of the prospective teachers in the study group.

| Table 1. Distribution of Students in Study Group Based on Gender |
|---------------------|---------------------|
| Gender             | Study Group |
|                    | N   | %     |
| Male               | 7   | 18.4  |
| Female             | 31  | 81.6  |

| Table 2. Learning Styles of the Students in Study Group |
|---------------------|---------------------|
| Learning Styles     | Study Group |
|                    | N   | %     |
| Diverging           | 6   | 15.8  |
| Assimilating        | 14  | 36.8  |
| Converging          | 12  | 31.6  |
| Accommodating       | 6   | 15.8  |
| Total               | 38  | 100   |

Data Collection Tools and Data Analysis:

In this study, version 3 of Kolb’s Learning Styles Inventory (KLSI-3), which was developed by David Kolb, has been utilized in order to detect the dominant learning styles of prospective teachers (Gencel 2006).

All of the prospective teachers in the study group were asked to fill in the question form below, without writing their names on it, with the aim of obtaining their views on this application.
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Moreover, the prospective teachers were also asked for their written views. With this aim, the students were asked questions such as: "What do you think about the application you conducted?", "Would you explain your views in detail by providing reasons?" The frequency of the data, which were collected from the forms distributed to the prospective teachers in the evaluation phase in order to obtain their views on this application, was calculated. The answers the prospective teachers gave to the open-ended questions were analyzed through content analysis method. Each prospective teacher's paper was numbered, their explanations were examined, main themes were determined within the scope of the research question and finally main themes were created by constantly comparing them to those of the other students. The written experiences were detected by coding, and were eventually gathered under main themes. Those main themes were indicated in a table by taking their prevalence into account.

Experimental Study Plan:

The lesson and study plan developed by Güneş (2017) based on the Learning Cycle of Kolb was used in the teaching of cell division (mitosis and meiosis division) which is included in General Biology Laboratory I course. The content of the lessons and lesson plans were prepared by paying attention to the curriculums of the departments, at which students studied. The students were informed about the experimental study, before the application started. The study group consisted of 38 prospective teachers. The study lasted three weeks, with two hours per week.

Findings

Table 3 displays the distribution of the answers the prospective teachers in the study group gave, in the form distributed to them so as to obtain their views on application. The answers given to the first question suggest that 35 prospective teachers were satisfied with the application, while the answers given to the second question indicate that 37 prospective teachers found the application different, and finally the answers the prospective teachers gave to third question suggest that 33 of them were eager for the application to continue. The answers received were consistent to one another. According to these results, it is possible to say that the majority of them were satisfied with the application.

Table 3. The distribution of the answers the prospective teachers in the study group gave to the questions about the application

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you satisfied with the application you conducted?</td>
<td>35</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Do you find the application you conducted different?</td>
<td>37</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>Would you like for this application to continue to be conducted?</td>
<td>33</td>
<td>5</td>
<td>38</td>
</tr>
</tbody>
</table>
Moreover, the common written views and evaluations of the prospective teachers on the effect the application has on the teaching of the subject.

Table 4. Prospective Teachers' Views on the Application

<table>
<thead>
<tr>
<th>Views</th>
<th>Reasons</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ones considering application to have a positive effect (n=30)</td>
<td>The way the lesson is instructed appeals to everyone</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Making sure the subject is understood in detail</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Enabling students to understand the subject without memorizing it</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Enabling students to look at the subject from different perspectives</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Enabling students to be active during the lesson</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Enabling the review of the subject</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Reinforcing what is learned</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Directing them to do research</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enabling them to realize their misknowings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Making sure the lesson is instructed in an order</td>
<td></td>
</tr>
<tr>
<td>The ones who limited the usability of the application (n=15)</td>
<td>Having an intensive hour of lesson</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Too time-consuming</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>The teacher having too much to do</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>The student having too much to do</td>
<td>11</td>
</tr>
<tr>
<td>The ones considering knowing your own learning style to be advantageous (n=23)</td>
<td>Enabling them to take responsibility</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Enabling them to realize what needs to be done</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Enabling them to be more tolerant</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Enabling them to have confidence in themselves</td>
<td>19</td>
</tr>
</tbody>
</table>

Prospective Teachers' Views on the Application

1-Evaluations of Prospective Teachers Considering the Application to Have Positive Effects: The prospective teachers mentioned some acquisitions, which revealed that the application had a positive effect on the learning of the subject, in their written statements (Table 4). These were expressed as "the way the lesson was instructed appealing to everyone", "understanding the subject in detail", "understanding the subject without memorizing", "looking at the subject from different perspectives", "being active during the lesson", "enabling the review of the subject", "reinforcing what was learned", "Directing to do research", "realizing misknowings", and "enabling the proper instruction of lesson in an order".

Some statements reflecting the common views on the subject are indicated below:

"I felt like the subject was privately taught to me in the lab. I would not understand most of the subjects in biology. However, I could understand it in this lesson. This subject was difficult for me in high school, I was upset when I found out we were going to study this subject. But when the lesson started, I slowly started to understand. We dealt with various materials. We did various activities. Some of them were really appealing to me, there was no such thing as not understanding the subject,........ " (S4)

"I felt like the lesson was appealing to everyone, because it was enriched with various kinds of materials and activities. It was too intense and exhausting, but there was something that could attract everybody's interest and all of them were about the same subject. And it enabled the review of the subject for multiple times....."(S31)
"Lab was so hectic and intensive that it was not possible to be distracted from the lesson. We reviewed every stage of mitosis and meiosis a lot, and supported it with materials. I think there was something for everyone’s learning style. Instructing the lesson that way was intensive but also correct. I understood every stage of the divisions in a detailed way......” (S23)

"Biology is a memorized lesson. That’s why most of us do not like it or succeeds as we wish. But after seeing the lesson being instructed like that I have realized that it is possible to learn the subject without memorizing it. There was no need to memorize. We all were active during the lesson, everyone thought, tried, listened, did something, listened again, discussed, and finally located something in their brain, in their own way....” (S12)

"We all learn in a different way. Therefore, when the lesson is instructed in the same way, only a few people can understand the lesson by listening. That is even worse when the lesson is biology. Most of us pass this lesson by memorizing things. I mean we do not understand them. Whereas instructing the lesson by making different activities is quite different and entertaining, because we think and look at the subject or events from different perspectives. We think differently and we are faced with different stimulants.....(S1).

"I was very active during the lesson; I had no time to be distracted or think of something else. I am sure that my other friends would agree with me. Step by step, we constantly and regularly watched, did, drew, discussed, thought of, listened to something......S(29).

"During the lesson we firstly watched, looked and thought, ten we discussed, listened, watched, looked, thought again and realized our misknowings. Then we examined, discussed, drew, looked, and watched, the once again we drew, wrote, discussed and thought etc going over them for multiple times like this enables you to learn and comprehend the subject in a detailed way. The more you review, the more you reinforce what you learn and the more permanent it is.” (S7)

"The group assignments about cell division promoted us to do research, which was beneficial for us, in terms of making us think over it outside the classroom and review what we learned....” (S33)

"I was taught cell division subject in elementary school and high school. Now I realize that I could not understand that subject at all then. Working in the laboratory like this helped me elaborately understand what, where, and why we did it that way without memorizing anything. I do not think that I am the only one who thinks so. I am sure that most of my friends will agree with me, because lately, we often talk about it in our conversations....."(S18)

"I have never seen a lesson or a laboratory lesson being instructed like that in my student life. It was awesome. I can explain the way lesson was instructed by making reference to a food presentation, so that, I believe, I will be able to better tell you about my thoughts. When we went into the laboratory, there was the same food on the table but it was presented with different flavors as if it was differently cooked and presented. The same food was differently presented according to everyone’s taste and visual pleasure. So, everyone, including the ones who liked it or did not like it before, found something in it to love....(S20)

"The lesson was very intensive. There were too many activities and materials, but there was an order. Even though it was a laboratory lesson, it was somehow made possible to instruct the lesson in an order. There is no confusion when everything is an order. The subject is comprehended better. Nothing is missed meanwhile. I believe having an order and doing things in an order are very important....” (S6)

2-The Views of Prospective Teachers Putting a Limit on the Usability of the Method:
While some of the prospective teachers put limits on the application by referring it to as “too time consuming” and “the lesson being too intensive”; some of them mentioned some points such as “the teacher having too much to do” and “the student having too much to do". 
Some views on the subject are stated below:

"Laboratory lesson would be more comforting and easier most of the time. But we did so many things in this lesson and it was so intensive, which made it exhausting... "(S2)

"If the lesson is so intensively instructed and so many activities are conducted and so many materials are demonstrated; of course the subject will be understood by everyone... "(S3)

"Instructing the lesson in an enriched way like this was very beneficial for us, however, they took too much time, the lesson was planned according to it minute by minute, there was always a rush. But it was necessary, otherwise we couldn’t have complete it...."(S37)

"We worked in the laboratory so intensively that we were exhausted, we had to constantly focus, there was too much to do for both the teacher and us. We worked a lot...."(S30)

"Instructing the lesson like this is good but there is too much to do both for the teacher and us. Thus, it can be exhausting. We need a lot time for everything..." (S9)

"When I occasionally think of its practical usability, I perceive it as problematic. Because it gives the teacher a lot of work to do, and it increases the workload of the teacher. It does not only increase the teachers' workload but also students' workload. Everybody has to constantly work. Besides, it is too time consuming and requires constant planning...." (S15)

3-The Views of Prospective Teachers Considering Knowing their own Learning Styles to Be Advantageous in the Application: When they found out they had different learning styles after being informed on the subject, some of the prospective teachers mentioned that it provided them with some advantages by using statements such as "it enables us to take responsibility", "it makes us realize what needs to be done", "helping us to become more tolerant", "promoting us to have confidence".

Some views on the subject are as follows:

"Recognizing my learning style and instructing a lesson in a way that is compatible with all of these learning styles caused me to take responsibility to learn by myself during the lesson. Because I followed the lesson more carefully. I paid more attention to listening to the ones that were more suitable for me and I made an effort, which positively affects learning..... "(S3)

"Recognizing our learning styles helped us see what we could uniquely do while learning a subject. In other words, we realized what we should do for our learning...."(S10)

"I felt so relieved when I found out everyone had a different learning style and the lesson was going to be instructed accordingly, and I realized that I was more successful. Besides, everybody worked hard and treated one other with more tolerance during the lesson. While we were sharing work, we were more tolerant towards each other." (S19)

"Furthermore, recognizing our own learning styles has also provided us with many opportunities. First of all, knowing that we all have a different way of learning relieved me. I would feel guilty when I failed, but I have seen that I can be more successful when the lesson is instructed or when I study according to my learning style. I feel more confident, and also everybody was nicer towards one another...." (25).

Results and Discussion

In this study, the majority of the prospective teachers in the study group stated that they were satisfied with this application and wish it will continue in future (Table 3). These results go along with the data obtained from analyzing the written statements of the views of the prospective teachers on the application (Table 4).

Given (1996) discusses that learning accelerates when learning facilities match with individual's natural tendencies such as playing, examining, and discovering; and adds that when learning styles are taught to students, the amount of what students learn and the time extent to which
students remember what they learn increase in a short period of time. Furthermore, when students are taught and trained by using their preferred learning styles, accepting what is different from them and positive attitudes towards education display a statistically significant increase. Also, their in-class behaviors and discipline present a positive development while they display more internal discipline in completing their assignments. As long as students’ learning styles are recognized; throughout the learning-teaching process teaching strategies, methods, techniques and necessary materials will be more easily and accurately chosen and used in direction of students’ interest (Akkoyunlu, 1995; Peker, 2003; Thomson & Mascazine, 1997). If the process of learning-teaching is designed by taking students’ learning styles into consideration, all students will not only be successful but also will achieve the objectives they set to the most extent. The results of some previously conducted studies on the same subject suggest that when the teaching is carried out based on students’ learning styles; the students learn better and more easily, remember what they learn better, display a positive attitude towards the implemented teaching method and learning, and present increase in their motivation and participation, in addition to being academically more successful (Demirkaya 2003; Gencel, 2006; Güneş 2017; Güven, 2004; Johns, 1999; Kaya, 2007; Kılıç, 2002; Mathews, 1994; Nichols, 2003; Özdemir, 2015; Peker 2003; Şimşek, 2002; Tatar 2006). The written statements of the prospective teachers stating their views on the application point out results, which are parallel or have supporting characteristics to the results of those previous studies (Tablo 3, Table 4), (S33, S7, S29, S1, S12, S23, S31, S4, S18, S20, S6).

There are two distinction to how we learn information, first of which is how we perceive the information, and the second of which is how we process the information we perceived. Each of us perceive facts and place them in our minds in a different manner. Some of us realize facts by feeling; while some people do so by watching, and some of us realize them by thinking while some others of realize the facts by doing (McCarthy, 1987; Morris ve McCarthy, 1990). Thus, if the individual recognizes his/her learning style, which constitutes an important place in our lives, he/she will activate this style during the process of learning. Thereby, the individual will learn more easily and quickly and most likely be successful throughout the process of learning (Biggs, 2001). Reiff (1992) states that if teachers are informed of students’ learning styles, different types of learners in class could work in harmony; versatility, which has a vital significance for learning, will be constituted; the communication between teacher and student will improve; student will have more confidence in themselves; and the communication among administrators, parents, guide teachers and other teaching staff will increase. Being trained in a field suitable for one’s own learning style is an effective factor for increasing his/her productivity. A person, who is trained in a field, which is not compatible or is only a little suitable with his/her learning style, might display changes in his/her level of confidence, success, and eventually concern. Besides, this might bring together an increase in developing tolerance towards what is different from ourselves, become more disciplined, having a positive attitude towards learning (Güven, 2004). Thomson and Mascazine (1997) argues that the most outstanding benefit of paying regard to the learning styles especially in mathematics and science teaching is enabling students to acquire the responsibility of learning on their own. Furthermore, it is also expressed that if teachers pay attention to the learning styles of their students while determining their teaching strategies; learning will increase and if the individual recognizes the learning style which is most suitable for him/her will help with improving learning ability (Aşkar & Akkoyunlu, 1993:). In fact, some written statements of prospective teachers, in which they explain their views on the application, show parallelism to those findings (Table 3,4), (S3, S10, S19, S25, S4, S31, S12, S33).

Biology is the most prone field of science to the human nature. Although from the learning-teaching point of view it is a great opportunity both for the learner and teacher, in lessons, in which students only listen to the teacher without participating, the students consider biology to be a memorized lesson and display an uninterested and reluctant attitude towards it (Güneş et al. 2006).
This causes them to fail and be unable to achieve their goals. Students are directed to learn by memorizing and the lesson becomes boring when teaching is conducted through a teacher-centered, literal teaching method; when tools and materials are rarely used during the lesson; and when the role of the student in the classroom is limited to solely listening and taking notes (Gallagher, 2000; Öztürk 1999; Tobin, 1987). In their written statements, some prospective teachers expressed that the application enabled them to elaborate on the subject without memorizing it, to review the subject, to evaluate the subject from different perspectives, to be active during the lesson, to reinforce what they learned, and realize their misknowings; as well as direct them to do research on their own. Moreover, some of the prospective teachers mentioned that the way the lesson was instructed appealed to everyone (S33, S7, S29, S1, S12, S23, S31, S4, S18, S20, S6).

In this study, some prospective teachers put limits on the application by referring to it as "too time consuming" and "the lesson being too intensive"; while some of them mentioned some points such as "the teacher having too much to do" and "the student having too much to do" (S2, S5, S37, S30, S9, S15). The reason why some prospective teachers think this way might be due to the fact that they are used to the lesson being instructed by traditional methods and thus being in the position of listening and being passive for most of the time. When the individuals, who are used to usually being passive throughout their education lives, are expected to suddenly become quite active, they might take a while to get accustomed to and adapt to it. As a matter of fact, some of them might reject it. Considering the fact that it will not be easy for either learners and teachers to change their habits; although many newly developed applications in education-training aims at creating enriched learning settings and increasing the productivity of students in various ways, it is observed that contrary to this, majority of teachers continue teaching through traditional methods and insist on doing so (McDonald, 2003; Penick, 1995).

The individual differences students have are significant characteristics that enrich the process of teaching. Therefore, by making use of that situation, it is necessary to arrange the learning-teaching environments accordingly. In the recent years, the issue of how to reveal the potential skills that are unique to each student and how to create a learning-teaching environment in accordance with the fact that each student has a different way of thinking and learning, have been in the spotlight. More detailed studies are still being conducted in order to discover new ways for that matter.

REFERENCES


Kolb‘ün Öğrenme Döngüsünün Biyoloji Dersinde Uygulaması İle İlgili Öğretmen...


