

Full Length Research Paper

Comparative study of Turkey and Germany Life Science teaching programs

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Comparative education studies within the perspective of globalization are seen as important studies, as they reveal the problems in education and show defective aspects of the systems applied in other countries. This way they improve the available system. The purpose of this research is to study the current curriculum of Life Science lesson within the context of four main elements comparatively. The Life Science lesson, which is assessed in the Social Studies course in many countries, is taught in Germany in a similar way as the content in Turkey. Therefore, Germany was chosen as the country for comparison. The study is a qualitative study and the data was analyzed by document review method. Document review is the examination of a text by the researcher according to various criteria. In other words, it collects records and documents related to a study and encodes and analyzes them according to a certain norm and system. The research is limited to the analysis of the current curriculum of the Life Science lessons in Turkey and Germany. The results obtained in the research will support the understanding of the Life Science Education Program in Turkey and contribute to the new studies to be carried out.

Key words: Life Science course, comparative education, basic elements of the program, Turkey, Germany.

INTRODUCTION

Lessons within the area of Social Sciences, which are closely related to the social reality where students live have taken on the task of improving social participation skills of students, giving them citizenship competence and preparing them for citizenship by making them interact with other people and their environment in and out-of-school learning environments during primary and secondary school periods (Deveci, 2005). Life Science lesson is particularly taught to enable to students observe and examine daily events related to nature, family and social life, and to provide them with the necessary basic

knowledge, skills and values. The Life Science lesson puts individuals who will become actors in shaping the future society with citizenship education for the first time and prepares them for life, by bringing democratic attitudes and values through events on the world of experience. In this regard, it is a strategic lesson in elementary school education.

As it is difficult to give a definite date regarding the beginning of the Life Science lesson, it can be said that the basis of Life Science thinking dates back to Plato, who thinks that "the student should observe and use the

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learning object as much as possible". The founder of the Life Science lesson is considered to be Johann Amos Comenius (1592-1670) who wrote the first illustrated book "Orbis Sensualium Pictus (The World in Pictures)" (1658) for children. With this book, Comenius suggests that life should be considered as a whole at early ages (Tay, 2017).

Thus far, important developments have been in question for the Life Science lesson. With all these changes, the Life Science Lesson which started in Ottoman Empire period for the first time in 1869 has maintained its occurrence in the curriculum of Republic of Turkey. The curriculum which is similar to the Life Science lesson having been applied since 1869 in terms of pattern and content is only taught in Germany with the name "Sachunterricht" (Sachunterricht / Mensch Natur und Kultur in Germany or different names according to the provinces). The Sachunterricht lesson is a social and scientific discipline that is taught to children from the first grade to the end of the fourth grade enabling them to get basic knowledge about life, to recognize the world, and to acquire basic skills to adapt to the society. This lesson has five perspectives consisting of time and history, society and politics, place, nature and technique (Niedersächsisches Kultusministerium, 2006). "Sachunterricht Lesson" started in Germany in the 1920s with the Weimar Primary School Reform. However, the expression of "Sachunterricht" first appeared in the region of "Strukturplan für das deutsche Bildungswesen" (1970) which is important for the German education system (Baysal et al., 2018). The curriculum of "Sachunterricht" lesson, which is the topic of this study, was last updated in 2016 in Baden-Württemberg, Germany.

With the globalization gaining momentum, the interest in program development studies based on technologic and scientific developments is increasing day by day. Comparative education has been a source of inspiration for this study as it helps to understand the educational systems applied in other countries and to improve the current one by showing the defective aspects of the existing system and gives an idea of enriching educational practices. Most of the comparative studies actually attempts to improve education and training. For example, comparative education studies of institutions such as the OECD, the World Bank and UNESCO are the best-known ones of these improvement initiatives.

The purpose of this research is to examine up-to-date curriculums of the Life Science Lesson taught in Baden-Württemberg Germany and Turkey comparatively within the context of four basic elements to be included in the study.

Subgoals of the research

- (i) When was the Turkey and Germany Life Science Program updated?
- (ii) How does Turkey and Germany Life Science

curriculums compare in terms of 'target'?

(iii) How does Turkey and Germany Life Science curriculums compare in terms of 'content'?

(iv) How does Turkey and Germany Life Science curriculums compare in terms of 'educational statuses'?

(v) How does Turkey and Germany Life Science curriculums compare in terms of 'assessment and evaluation'?

METHODS

In the research, "descriptive approach" and "horizontal approach" from comparative education approaches and descriptive survey model from qualitative research models were used. In the horizontal approach, all dimensions of the education system are handled separately (Türkoğlu, 1998). In the descriptive approach, similarities and differences are compared by examining the related literature (Ültanır, 2000). According to Taba (1962), a teaching program has 4 items: target, content, educational status (teaching-learning process) and evaluation (Saylan, 1995: 36-37). In this study, the Life Science lesson is compared in terms of similarities and differences of two countries within the context of the Life Science curriculum.

Data collection tools

Primary sources have been examined in the research. "Primary Life Science Courses (1st, 2nd and 3rd grades) Curriculum" (2018) of Turkey and "Bildungsplan Grundschule Sachunterricht Program" (2016) of Germany-Baden Württemberg State were examined as primary sources. Moreover, national and international articles, book chapters and theses were examined and the information given on the official web pages was used; also, these information were presented under related themes.

Data analysis

The data of the study was analyzed with the document analysis method. First of all, the literature was reviewed in order to make an inference regarding under what titles the comparison would be done. It was then checked whether the related documents were official, original and up-to-date sources. Finally, two different researchers analyzed the documents at the point of understanding and translating them into Turkish then they got together and checked them through. Through the data obtained, the admission dates, targets, course content, educational status and evaluation approaches of the current curriculums of both countries were compared. The current curriculum was updated in Jan 2018 in Turkey and in 2016 in Baden-Württemberg Germany.

FINDINGS

The analysis of the qualitative data of the study and the differences in the basic elements of the curriculum are given in the Tables 1 to 5. In addition, comments regarding data are given under each table.

Findings regarding the studies on updating the Life Science curriculum of Turkey and Germany

The Life Science curriculum was updated in January

Table 1. Comparison of Life Science Lesson in terms of 'target'.

Germany	Turkey
Target	
In this lesson, students gain basic knowledge about the social life of people currently and in the past, the place and the region they live in, nature and the World surrounding them.	Purpose of the program is to raise individuals who have basic life skills, who are self-aware, who live a healthy and safe life, who absorb the values of the society they live in, who are sensitive to nature and environment, who research, produce and love their country
Number of Achievements	
Sachunterricht focuses on competence. Students in Sachunterricht acquire qualifications that make the world with natural, technical, political, social and cultural contexts explainable and provide the basis for their future education. -Qualifications within the program 2. Number of qualifications to be gained at the end of the grade: 57 4. Number of qualifications to be gained at the end of the grade: 76	Life Science lesson focuses on achievement. The achievement is defined as the knowledge, skills and values that are expected from students thanks to the planned and organized experiences in the learning process (MEB, 2009). Number of achievement varies by units. -Number of total achievements: 1st grade: 53 2nd grade: 50 3rd grade: 45

Table 2. Comparison of Life Science Curriculums in terms of 'target'.

Germany	Turkey
Skill	
Skills seen in Germany can be summarized as follows: Observation, research, exchange of information, shaping the life together (social participation), understanding disagreements and finding a way round, perceiving the place, learning nature, reviewing predictions, perceiving time and date and making decisions. In addition, the skill of technical comprehension is also given importance: the use of materials, instruments and other tools in a proper and safe manner.	Skills seen in Turkey can be summarized as follows: Research, use of information technology and communication, perceiving change and sustainability, balanced diet, protecting nature, entrepreneurship, observation, communication, cooperation, making decisions, improving career conscious, use of sources, self protection, self-awareness, self-care, complying with rules, perceiving the place, learning national and cultural values, self management, protection of health, solving problems, social participation, time management.
Values	
Tolerance and accepting diversity, living together, showing democratic behaviours, thinking on time and history (sensitivity to cultural heritage, being in charge of nature, places and techniques.	Justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, helpfulness, loyalty, compassion, faithfulness, respect, solidarity, sensitivity to each other's problems, mutual grace, trust and kindness

2018 in Turkey. Starting from 2018-2019 academic year this program will be put into practice gradually. For this reason, in this study, the Life Science curriculum published by the Turkish Ministry of National Education [MEB] in January 2018 is evaluated as data.

Educational system is directly under the responsibility and authority of the provinces in Germany, where a federal educational and cultural policy is pursued. It reflects the cultural sovereignty of each province and essence of their independent structures. Thus, there are 16 different states, 16 different Ministries of Education and 16 different educational systems. The general purpose of the Germany's educational system is to

provide everyone residing in Germany with equal educational opportunities depending on their interests, demands and abilities (Führ, 1996; Leschinsky and Cortina, 2003).

During the first four grades, Life Science lessons are taught in Germany under the names of 'Sachunterricht, Mensch Natur und Kultur, Heimat-und Sachunterricht and Heimat-und Sachkunde' and there are several differences between provinces. From the 5th grade onwards, such comprehensive courses as History, Geography, Science Education, Ethics and Citizenship Education are included in the curriculum with differences between provinces (Kab and Açıklan, 2016).

Table 3. Comparison of Life Science Curriculums in terms of ‘content’.

Germany	Turkey
<p>Sachunterricht, with its interdisciplinary structure designed according to the collective teaching approach in Baden-Württemberg, Germany, provides students with basic knowledge to contribute to their present and future lives.</p> <p>Unit Names of 2016 Curriculum:</p> <p>1-Democracy and Society</p> <p>2-Nature and Life (Biological Assets and nourishment)</p> <p>3-Working life and techniques (building a house, getting to know artisans, producing vehicle, making scale, etc.)</p> <p>4-Place and mobility (school road, school bus, bicycle, safe road, directions, compass, map etc.)</p> <p>5- Time and change (hour, day, month, seasons, historical subjects, life in the past etc.)</p> <p>The unit called ‘Experiments’ are attributed to all units.</p>	<p>Unit-based understanding has been adopted in the 2018 curriculum. The units are also suitable for the spiral and expanding environmental design.</p> <p>Unit Names of 2018 Curriculum:</p> <p>Life in our School</p> <p>Life in our House</p> <p>Healthy Life</p> <p>Safe Life</p> <p>Life in our Country</p> <p>Life in Nature</p>

Table 4. Comparison of Life Science Curriculums in terms of ‘educational status’.

Germany	Turkey
<ul style="list-style-type: none"> - Lessons are given 3 h a week for 4 years. - In Germany, textbooks are used in lessons and they are not the primary source. Teachers use variety of sources in the educational environment. - In regulating the learning process, the perception-thinking and learning conditions of primary school students are taken into account. Learning through experience forms the basis of the learning process as a learning method based on activities of the students. <p>Primary technics:</p> <p>Painting evaluation, Text evaluation, Studying with a dictionary, Planning and making an experiment, Creating a time chart, Preparing and presenting a presentation, Interviewing and evaluation, drawing and presenting diagrams.</p>	<ul style="list-style-type: none"> - In 1st and 2nd grades, lessons are given 4 h a week and 3 h a week in the 3rd grade. - In- and out-of-school practices should be given importance in the course. Particularly out-of-school practices such as oral history, local history, museum visits, nature education, public institutions and organizations, and private institutions and organizations should be given importance and student-centered activities planned accordingly should be carried out. - When the lesson is being taught in the class, students’ previous experiences should be considered and a connection should be established between them. - Students should be able to use living and non-living things in their surroundings as a teaching material. - Especially in the tasks given to the students for the research achievements, they should be supported with such activities as making presentation with posters, boards, brochures, newspapers, tables, graphics, etc. - Attention to students with special requirements! - In nature-based lessons, they can perform simple experimental activities.

Table 5. Comparison of the Life Science curriculum in terms of ‘assessment and evaluation’.

Germany	Turkey
<ul style="list-style-type: none"> - Teachers do not call the roll in the first 2 years of the primary school. Marks are not written on report cards. A development certificate is issued - Also, the first grade does not start with running hand; the running hand is taught as of the second grade and is meticulously used throughout the primary school. There is no obligation to use it in secondary school. - From the third year, student working files, worksheets and process-result-oriented assessment methods are used. In this respect there is no difference from Turkey. 	<ul style="list-style-type: none"> - Written examination is not done during the first 3 years of the school. - For evaluation and assessment, it is based on multiple evaluation providing the use of recognition, process and result oriented approach together. <p>Such methods and techniques as written examinations, short answer tests, multiple choice tests, true false tests and oral examinations can be used within the scope of result and product focused traditional approaches. According to traditional approaches, more students’ centered and realistic (authentic) methods and techniques can be used. And within the scope of evaluation and assessment approaches observation, interview, diagnostic tree, structured grid, self and peer assessment, student working file, grading key, worksheets, mind maps are used.</p>

The State Institution for Development (Landesinstitut für Schulentwicklung) affiliated to the Ministry of Culture, Youth and Sports (Landesinstitut für Schulentwicklung) is responsible for the development of the curriculum of this lesson in the State of Baden-Württemberg, Germany; also, the relevant institution was updated and the curriculum put into practice in March 2016 (Source: <http://www.bildungsplaene-bw.de>). In addition, the Association called Gesellschaft (2013) für Didactik des Sachunterrichts (<http://www.gdsu.de>) conducts academic studies on the content of the Life Science Lesson.

Findings regarding the 'target' (knowledge, skill and other values to be provided to students) of the Turkey and Germany Life Science Lesson Curriculum

The "target", which is the first item in a teaching program, includes characteristics such as knowledge, skills, attitudes and behaviors to be brought in students. While each teaching program primarily includes objectives of that lesson, there are also a number of specific goals or achievements for each unit / topic in line with the based learning approach of the curriculum. Table 1 provides information on the "target" of the Life Science lessons of both countries.

The targets of primary schools in Turkey have been determined to be "bringing every Turkish child in basic knowledge, skill, behaviour and habits required to become a good citizen; raising them in accordance with national moral understanding and preparing them for life and upper education by improving their interest, ability and capability" (MEB, 1973). In Germany, primary school targets are to improve children's learning ability and performance, to socialize them, and to prepare them for secondary education.

When Table 1 is examined, it can be said that the number of achievements/gainings in the Life Science curriculum of Turkey is more. In Turkey, the target of this lesson is to raise individuals who have basic life skills; who are self-aware; who live a healthy and safe life; who absorb the values of the society they live in; who are sensitive to nature and environment; who research, produce and love their country (MEB-Life Science Curriculum, 2018). The target of the Sachunterricht course in Germany is to help students understand the bases of the social and natural environment they live in. This process is carried out with an approach based on student experiences (Sachunterricht Grundschule, 2016).

When targets of these two programs are compared, it was seen that there are more competences for science, natural sciences and technology in Germany. In Turkey, while targets especially on Sciences are given Life Science lesson, subjects of Sciences were removed from the content of this lesson in 2013, and began being taught in a separate lesson. This may be contrary to the historical development of the Life Science course, but it is

applied with this content today. Moreover, such a difference might be caused due to the fact that this lesson is given in the first 3 grades in Turkey and in the first 4 grades in Germany. Despite this, it can be said that majority of the targets are similar. In addition, the lesson is given in the first three grades in Turkey, while in Germany it is given in the first four classes, which creates such an important difference. A comparison table of the skills and values included in the "target" is given in Table 2.

It can be said that Life Science information skills and values are similar in Germany and Turkey. It is understood from Table 2 that skills teaching is more intensive and practical in Germany. However, in Turkey it can be said that it is focused more on value teaching. This may indicate the existence of other courses in value teaching in Germany. It can be said that the most important lesson on value teaching in Turkey in the first three grades is Life Science.

Findings regarding content (scope, approach and other subjects involved) of Life Science curriculums of Turkey and Germany

Table 3 gives information regarding content (scope, approach and subjects involved) which is the second element of the program.

This course in Germany does not include just one topic; it also covers social, socio-cultural, economics, biology, sexual education, history, geography, and security education. In other words, it is seen that many different disciplines in addition to Social Sciences and Sciences are also emphasized. The content of Sachunterricht is built on the basis of domain-specific units. They are neither hierarchically organized, nor should they be processed one after the other. Accordingly, it can be said that the Life Science lesson in Germany continues to be a course consisting of many different disciplines. In Turkey, the content of science has been given up since 2013, and science lessons began to be taught in a separate lesson. As seen in the units, the content mostly focuses on life skills and social rules. Only the "Life in Nature" unit is different from this content, it provides teaching of nature subjects (plants, animals, seasons, recycling and astronomy). The fact that Turkey gives this lesson only in the first 3 grades causes Turkey to be more limited comparing to Germany in terms of subject distribution.

Findings regarding the educational status (learning-teaching process) of Life Science lessons in Turkey and Germany

Table 4 gives information regarding educational status (learning-teaching process) which is the third element

of the program.

When Table 4 is examined, it attracts attention to the student-centered programs. In both countries, it is seen that there are no teacher-centered methods, and out-of-class/school learning environments are intensely used. In Germany it is seen that students study independently and collaboratively, they conduct group study, verbal studies (verbal presentations, presenting their own solutions, etc.), and the education system also involves applications (preparing model and poster, drawing, mathematical travel diaries, portfolio, independent research) and finally written studies (written exercises, research books, workbooks, portfolios). Museums, historical sites, historic streets, monuments, laboratories, natural parks, zoos, forests, science centers, business premises, working places, government institutions, etc. are at the top of the places which can be used as an out-of-school learning environment.

Also, in Turkey, such out-of-school activities as oral history, local history, museum visits, nature education, recognition of governmental agencies and private institutions and organizations are given importance and accordingly it is suggested that student centered activities planned beforehand should be carried out. Again, in studies where students are expected to conduct research, they should be encouraged to share results of their research with their classmates using poster, board, brochures, newspaper, table, graphics, and so on (MEB, 2018).

Findings regarding the assessment and evaluation of Turkey and Germany Life Science lessons

Table 5 shows results of the analysis assessment and evaluation, the final element of the program.

It can be said that there are similar applications between the two countries in terms of evaluation and assessment in primary school. In Turkey, 1st, 2nd and 3rd grades students are assessed as "very good", "good" and "to be developed"; in the 4th grade written and oral examinations are done. In Germany, there is no grading in the first and second grades, oral and written evaluations and guidance start in the 3rd and 4th grades. In addition, branch teachers start teaching in Germany from the third year (Ikizer, 2004). Therefore, children are given marks only through observational evaluation in the 1st and 2nd grade, and through written and oral evaluation in 3rd and 4th grades.

DISCUSSION

It is seen that comparative studies under different titles have been carried out, although these kind of studies are limited in this field where Life Science course is compared. In the study carried out by Pamuk and Pamuk

(2016) on the comparison of Life Science textbooks of Turkey and Germany, it was put forward that visuals materializing the knowledge are used more intensely in Germany. Again, in the study of Tural et al. (2017) called "*Comparison of Life Science Textbooks of Turkey and Germany in terms of Image Text Use and Relations*", results supporting the previous study have been reached. Finally, in the research of Baysal et al. (2018), Life Science curriculum of the State of Germany-Hamburg and Turkey was compared. Baysal et al. (2018) indicate that in Turkey's Life Science course being a good Turkish citizen is emphasized; in Germany- Hamburg Life Science course puts more emphasis on improving learning ability and socializing students. They also indicate that there are similarities between two countries in terms of assessment and evaluation and that many different disciplines have been emphasized in this course rather than emphasizing only Life Sciences or Science. These findings show similarity to the results of this study.

In the research of Keskin (2017), it was found that the acquisition groups in Germany focus on technical perception and solving of the problems, describing the use of simple materials, having basic knowledge about transportation of wastes, having knowledge about the assembly, being well-informed about the effects of technical inventions, and becoming familiar with the energy and water supply. When the related gains were examined, the gains in the production area were observed to remain superficial in the Life Sciences program according to the Sachunterricht program. The students in the Life Sciences program only have a role to observe production, while the students are performing the production itself in the Sachunterricht program. And, results supporting the previous study have been reached.

As a result, although the course names are similar between two countries, Life Science lesson is strained to be conveyed in different conditions and contents. Ideally, the content of a course which prepares people for life, such as Life Sciences course, should be directly based on active participation in life besides text books and knowledge-based learning experiences. This way, they can become aware of social and political situations they face and get influenced by their ability to understand processes improves and acquire social participation skills.

Suggestions

Similarities and differences were revealed under the titles determined by the researchers. Accordingly, the following suggestions can be made:

i) In Turkey, Life Science lesson should be planned again considering the wide range of design and spiral principle and in a way to cover the contents of Science and Social Sciences lessons.

ii) In Turkey, "Life in Nature" unit should be revised to increase sensitivity to the natural environment. A section like the 'Technical' unit in Germany (such as building houses, knowing craftsmen, making vehicles, scales, etc.) can be added to the 'life in nature' unit.

In general, it can be stated as a researcher's observation that designs of curriculums of both countries are similar, but the contents of textbooks in Turkey are not sufficient to meet the achievements of the curriculum. Accordingly, it is considered that the textbooks used in other researches should also be compared.

Conclusion

The reasons underlying the urge to prepare a new curriculum in education system are the hardships encountered within the present curriculum, the opinions mentioned in the national or international meetings to solve the mentioned hardships, demands of new generation students and teachers, changes in the social structure and developments in various branches of science School curricula are like dynamic organic bodies that are constantly developing. Thus, it would be more meaningful to consider the fact that the new curricula reflect the previous ones and as a result of societal improvements, some innovations will eventually emerge (Sahin, 2017). Curriculums should be in constant development like organic structure, and they should be dynamic. Therefore, it is a right approach to think that the programs to be created are based on previous ones and to expect some innovations according to the developments in the society.

Program development is a process. Within this process, curriculums can be developed with evaluations based on quantitative and qualitative data. The purpose of this research is to improve curriculums applied by comparing Life Science courses taught in Turkey and Germany. Today, the content of the Life Science courses in other countries, except Turkey and Germany, is given with different named course or courses; in America it is taught in 2 separate courses as Life Science and Science; in France as exploring the World and citizenship education. In the UK, there is a single discipline such as history, geography, citizenship and psychology (Tay, 2017).

In this study, curriculums are examined according to the elements of target, content, educational status and evaluation. In conclusion, it is seen that the equivalent of the Life Science lesson taught in Turkey during the first three years of primary school is Sachunterricht, taught in the state of Baden-Württemberg; while in Germany it's the first four years of the primary school. In addition, similarities and differences between the curriculums of the Life Science lessons taught in both countries have been addressed in the study.

As a result of the analyses made according to the

criteria, it is determined that the educational status and evaluation approaches of the programs are almost the same and the target and contents are more interdisciplinary in Germany. It is seen that, in Germany, it is much more comprehensive in particular in terms of nature, living things, sexual education, time and change, science and technique (designing and developing various materials). Moreover, the lessons in German schools are not only taught didactically and in classrooms; museums, historical places, historical streets-roads, monuments, laboratories, natural parks, zoos, forests, science centers, workplaces, governmental institutions, etc. are indicated to be main places to be used as out-of-school learning environments (Höpken, 2003). There is also similar understanding within curriculum of Turkey; however it is said that this is not applied (Tay, 2017).

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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