

# The Effect of Teaching Practices with Real Life Content in Light and Sound Learning Areas<sup>i</sup>

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**Abstract** In this present study, it was aimed to investigate the effect of teaching practices with real life content in light and sound learning areas. With this purpose, it was intended to determine the contribution of teaching practices with real life content (TPRLC) to the levels of pre-service teachers' skills to associate the light and sound learning areas with daily life. The research was designed with an experimental basis and data were collected with the pre-test, post-test pattern. The participants consisted of 30 university students who were in fourth grade in Secondary School Science Teacher Training Department. Data were collected with questionnaires including open-ended questions related to the Use of Learning Areas in Daily Life. With the results, it was found out that the levels of pre-service teachers in associating the learning areas with daily life doubled in light learning areas and trebled in sound learning areas.

**Keywords** Teaching Science, Physics, Real Life, Teaching Practices with Real Life Content, Learning Areas, Pre-service Teachers

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## 1. Introduction

Science is the regular observation of all the events occur in the nature; try to describe them within the frame of a definite necessary knowledge and logic [1]. The students' understanding the science enables them to adapt the environment. For this to happen, it is critical for them to make a very good observation and perceive the ways for solution by setting reason-result relationship between the events. Science education enables students to resolve their sorts of needs and consists of activities for giving the individuals the suggestions, skills and attitudes including scientific processes [2]. These activities provide the students to understand the scientific concepts developing the students' problem solving skills and increasing their interests in cooperation and harmony. The Science Education focuses on helping the students love the Physics Concepts and Course,

which is one of the dimensions of science concepts and difficult for students to understand, drawing the students' interests and making the learned items meaningful [3]. To provide this, it is thought that it can only be achieved by creating learning environments enabling the students associate the physics problems with their real lives. Teaching practice with real life content, takes place in education programs. It is an approach aiming to create interest and excitement related to the living environment and a teaching environment which contributes to its continuity [4]. Thus, it contributes to their positive beliefs on solving the Physics problems, taking their interests to the physics subjects and concepts and better recognition of their surroundings. The students, in these learning environments, not only learn by doing and experiencing, but also their interests and attitudes to the physics lesson are affected positively thanks to the selected contexts in an environment, which is based on the information requirements [5]. It encourages the students to deal with physics. It breaks down the prejudices of students that the physics is only for the academic exams [6] and contributes their perceptions that the lessons should be studied [7]. They will have the opportunity to recognize the physics not only as a lesson in a laboratory, but also is directly related to the life out of the school instead [6]. It achieves that by demonstrating the concepts chosen from the daily life to the students. Thus, the students are provided to recognize the relationship between the events in daily life and concepts [8]. The information gathered in the school gains great significance not only when the students associate them with their daily lives, but also apply them in their lives [9]. That is, the information gathered in the school is directly related to the level of applying them in real cases and the assimilation level of the information [10]. The learning can be expressed to occur when the students are able to describe a case in daily life with the subject and concepts that they learned. It is a concept, which is desired to be taught, the scientific side of the concept should be connected with its place in our lives. Moreover, we should come across with the concept in a context in an embodiment of the real world [11]. To solve an event or a problem encountered, concepts or relationships among the concepts should be used as a tool

[12]. In the curricula with real life content, which take those as a base, "context" can only be effective if it is suitable personally for students and related to their lives apart from their own school environment [13]. Thus, effective learning will come to appearance if the students associate a concept and its applications with the real world including their cultures, families or peers [14]. Therefore, the students, suitable for the age levels of them, should not remove their attentions from the relevant concept and should not be difficult and complicated for them to understand [15], should choose the relevant concepts among the cases familiar.

The real life concept in the literature is used in the same meaning with daily life, real world, realistic, contextual and situated concepts. The teaching practices with real life content come to appearance frequently as context based learning [16]. The basic reason of the increase use of the practices in education [17] in the teaching practices with real life content which is a projection of many areas such as program development to book writing, material development and the use of assessment methods is to make the taught items meaningful in the school [18]. Yet, the teaching practices with real life content do not only make the learning meaningful, but also create more enjoyable and interesting learning environment [19]. It ensures the permanence of the gathered knowledge in the mind [20, 21]. It also increases the interests and wishes of the students to learning [22, 23] and science literacy levels [24, 5] and their cognitive thinking skills as well [25].

Students commonly find the field of physics difficult. Therefore, they generally have learning problems. One of the subjects with which they have difficulties is light and sound within a physics discipline [27]. Light and sound are two fundamental concepts in science, and particularly in physics. Students' understanding of these concepts is crucial to meaningful learning of physics [28]. Because the light and sound concepts are the most used concepts placed among the basic concepts of physics and in daily life [29]. Both its most usage in daily life and high use of it in other disciplines necessitate the correct perception of the light and sound concepts [31, 32]. Moreover, understanding these concepts plays a significant role even in understanding some other relevant events [33]. Therefore, what the students think about the light and sound concepts and how they perceive these concepts is a topic which should be investigated [34].

When the literature is reviewed, it is seen that students from each level have inadequate and incomplete knowledge and misconceptions related to the light and sound topics [28, 32, 35, 36, 37, 38, 40, 41]. It is also seen that the teachers and pre-service teachers, who will educate those students, have deficient and inadequate knowledge and even misconceptions about this topic. The study carried out by Reference [31] aimed to determine the conceptual understanding of the university students, who got optical course at higher education level, related to the light and optical topics. The research was carried out with totally 252 university students as participants in 3 different universities

and 5 faculties within these universities. As a result of the analysis of the data gathered in the research, it was found out that the university students had several light and optical problems and the conceptual understanding levels of the students were low. As a result of the research carried out by Reference [33] with 99 pre-service secondary school science teachers, it was determined that a great many of the pre-service teachers had deficient knowledge about light [65%]; [38%] of them had deficient, incorrect and no knowledge and had misconceptions. Totally 62 students from 3rd class Secondary School Science Teacher Trainin Faculty attended the research carried out by Reference [41]. As a result of the research, it was noticed that the students had extremely low understanding levels for the light concept and misconceptions were encountered related to the concept. There are even other studies showing that the pre-service teachers have misconceptions related to the light [29, 30]. When the relevant literature was reviewed, it was noticed that the pre-service teachers even had difficulties related to the sound. In a study carried out by Reference [42] it was determined that the pre-service secondary school Science and Physics teachers had deficient knowledge related to the sound and had misconceptions related to this topic. In the study carried out by Reference [39] with 56 pre-service secondary school science teachers, it was determined that had difficulties in understanding this important topic. In the study by Reference [43] with primary school pre-service teachers and secondary school science teachers, it was determined that the pre-service teachers had misconceptions related to the sound. In the study by Reference [40] secondary school pre-service science teachers, the concepts which the pre-service teachers had were irrelevant in terms of science and they had deficient knowledge and misconceptions.

When it is thought that these incorrect learnings, especially existed in pre-service teachers, may affect their students when they are in-service, [42,44,45,46] it may lead compensable cases [33]. In order to prevent this, the teaching methods and strategies, which enable the pre-service teachers, who will become teachers of future, to learn, interpret and internalize the necessary topics better and overcome misconceptions, are needed. It is difficult to eliminate the misconceptions with traditional methods [47]. There are studies, which show that teaching practices with real life content [TPRLC] are effective in terms of this topic in the literature. In the study by Reference [21], it was noticed that the approach both increased the academic success of the pre-service teachers and affected the attitudes of them positively. Moreover, it was determined that the pre-service teachers were mostly interested with having lessons according to this approach, found it entertaining and it increased their motivations. TPRLC helps the students learn the topics effectively setting contexts from daily life and also helps permanent learning, internalizing the learned items and eliminate misconceptions [48, 49, 50, 51, 52]. The educators' applying this method in their lessons both helps

the pre-service teachers to understand the topics better and facilitates the learning experiences of the pre-service teachers in their in-service lives [53].

The carried researches demonstrate that the teachers have knowledge deficiencies related to the problems with real life content and the practices in the lessons are random [25] and the teachers have difficulties in applying the teaching practices with real life content on exercises [24]. Similar results are encountered when the opinions of the teachers are considered. It was determined that the teachers have not enough knowledge about TPRLC, they recognize their other student-centered practices in the lessons as TPRLC [24]. Furthermore, although the teachers thought that they used the problems with real life content in their lesson, it was determined that none of their problems in the lesson had real life content. In addition, this shows that there is a dilemma in terms of reflecting the teaching practices with real life content for current practices, developed by the teachers, which are embraced by curricula [25].

In order to manage these problems, it is necessary to give the teachers "clearer, pure" information on this topic, more education about TPRLC according to the needs of teachers, students and their parents [54]. That is, in the ongoing or planned in-service applications, it is necessary to take precautions to increase teacher sufficiencies [25]. In order not to come across with such problems for pre-service teachers in their job experiences, it is crucial for university educators to use TPRLC practices in their lessons during the university education [16]. Thus, the pre-service teachers will have the opportunity to learn how this practice is used, what should be focused on, its effect on individuals and the role of the applicant and student in each step of the practice experiencing verbatim thanks to the experienced university educators.

In the research, it was aimed to investigate the effect of teaching practices with real life content in light and sound learning areas. According to this aim, it was tried to find out the contribution of teaching practices with real life content (TPRLC) pre-service teachers' skills levels in associating the light and sound learning areas with daily life

## 2. Method

The research was experimental and the data were collected applying the single group pre-test and post-test pattern [67] in which the experimental procedure is investigated using pre-test, post-test for determining the effect of it on a single group within the scope of weak experimental designs[68]. The independent variable is randomly applied to each of the groups [69]. In this design, the effect of the experimental method has been examined though a study done with only one group. The surveys of subject about dependent variable have been get as a pretesting before practice and post-test after practice on same subject and using same survey tool [70]. Convenient sampling method was used in selecting the

working group. The method provides researcher(s) with opportunity to be more quick and practical, because in the method researcher selects a situation which is easy to access [69].

### 2.1. Study Group

The research consists of 30 fourth-class students as participants in Secondary School Science Teacher Training Department of the Faculty of Education in a university eastern.

### 2.2. Data Collection Tools

Data were collected with Questionnaires with Open-ended Questions Related to Using Learning Areas in Daily Life. These questionnaires were prepared to determine the knowledge and development of pre-service teachers about relationship between physics and real life before and after the procedures. The questionnaire, which was prepared according to the common views of 7 education researchers ( 4 in mathematics education and 3 in science education) experienced in qualitative research, included a question-for each learning area- as ..... *Is there a close relationship between the learning area and the real life? If there is, explain how it is used writing all the use of it you know.*

### 2.3. Procedure

This present research was carried out applying the TPRLC on the pre-service teachers, which was prepared related to two different learning areas. The criteria; such as whether the chosen activities included the learning areas indeed or not, whether they were specialised to discover the relationship between the learning areas and the real life or not, gave the participants the opportunity to find out different relationships between the learning areas and real life or not etc. were evaluated and the practices for each learning area were determined. Pre-service teachers were provided interesting and different situation that would help them link the issues of light and sound with daily life. In addition, they were asked to state the issues of light and sound they had encountered in their daily life and to explain the meaning of them. By this way, it was aimed to enhance participants' awareness of the related issues and to help them understand the place and importance of the issues of light and sound we encounter in our daily life.

The activities were carried out using all kinds of tools and materials, which may be needed by the participants within the scope of TPRLC. Throughout the activities, the pre-service teachers studied in groups consisting of four or five members.

### 2.4. Data Collection and Analysis

The data gathered in this study were collected applying the data collection tool as pre-test and post-test. The participants

were gathered in a classroom to determine the pre-knowledges and prevent the possibility for their benefit from various sources. The participants were applied with open-ended questionnaires related to the learning areas before the activities within the scope of the research. Similarly, the data collection process was completed providing the participants to fill in the questionnaires in two days determined after the activities and the collected data were transferred into the computer to analyze them easily.

The qualitative data gathered through the open-ended questionnaires were analysed with descriptive analysis. The daily life practices expressed by the participants between the learning areas of physics and the daily life practices were determined directly, then they were coded-categorized to

carry out more regular presentation and were described with the determined frequency values.

### 3. Findings

Within the scope of the study, it was aimed to determine the contribution of the practices with real life content (TPRLC) to the light and sound learning areas of the pre-service teachers and their levels of skills to associate the daily life. Analysing the answers of the pre-service teachers before and after the practice, the constituted codes and frequencies are indicated in the table below.

**Table 1.** The light learning area qualitative data analysis

The Light Learning Area Categories	Codes	Pre-interview Frequency	Post-interview Frequency	
Light Types	Radiation	1	2	
	X-rays	4	2	
	Infrared	1	2	
	Lazer	1	3	
	Ultraviolet	2	1	
Light events	Light Sources	14	1	
	Reflection	1	1	
	Creating Colours	1	1	
	Refraction	1	7	
	Lighting	5	14	
	Reflection	-	5	
	Sorption	-	1	
	Shadow	-	1	
	Rainbow	-	4	
	Mirage	-	1	
	Light Speed	-	1	
	Energy	-	5	
	Usage areas	Embroidery	1	-
		Military	1	-
		Medicine	-	2
Industry		-	2	
Science		-	1	
Used places	Optic	8	13	
	Road lighting	1	-	
	Heat	18	15	
	Obtaining a food source	8	11	
	Space systems	-	2	
	The discovery of the invention	-	1	
	Recognition of living things	-	1	
	Sensors	3	2	
	Radar systems	-	4	
	Senkronization systems	-	1	
	Reading	-	1	
	Communication	-	1	
	Measuring	-	3	
	Lighting	1	22	
	Hospital tools and equipments	8	9	
	Human health	3	12	
	Technological equipments	1	33	
Life source	4	7		

As the Table 1 analysed, it is seen that the pre-interview and post-interview data of the pre-service teachers in light learning area are in 4 categories. These categories are light types, light events, usage areas and used places.

The category of light types includes 7 codes in the pre-interview. These are radiation, X-rays, infrared, lazer, ultraviolet, natural light sources, ultraviolet rays artificial light sources. Moreover, pre-interview data include 24 frequencies within this category. The last interview data includes 6 codes in this category. These are radiation, infrared, X-rays, light sources and ultraviolet. The post-interview includes totally 11 frequencies in this category.

While the light events category in pre-interview includes the codes as reflection, creating colors, refraction and lighting, it includes reflection, lighting, refraction, sorption, shadow, creating colors, rainbow, mirage, light speed and energy in the post-interview. While the pre-interview data includes totally 9 frequencies in this category, post-interview data consists of totally 41 frequencies. The participants were observed to stress specifically on the light events within the scope of the light topic which they come across in daily life. They claimed that the events as; rainbow, reflection, lighting, shadow, mirage etc. were among the light events they came across in daily life. Moreover, they claimed that the light was a quantity, which had a speed and energy.

While the used places category consists of the embroidery and military codes in pre-interview, it includes medicine, industry and science codes in post-interview. Pre-interview data includes totally 2 frequencies and post-interview data consists of totally 5 frequencies. The participants expressed their thoughts as *"Its use in daily life is that it is used in factories for production machines."*, *"In medicine, for visualizing and for machines"*, *" Again in medicine, in determining the illness and curing methods."*, *"For the sake of the light, it helps the recovery, with X-rays the illnesses in bones are determined"*, etc.

The category of used places includes totally 10 codes and 55 frequencies in pre-interview. These are seeing, showing

road, heat, sensors, lighting, hospital equipments, human health, technological equipments and life source. The post-interview data consists of 17 codes and 138 frequencies. The participants described this category as showing roads to the ships, lighting the entertainment places, gathering energy, solar systems, curing the illnesses, determining the illnesses, obtaining food source, obtaining heat, life source, heating the meals, hair dryer, wifi connection, remote control, heating, producing vehicles, identifying the creatures, making operations, photosynthesis and energy source. Moreover, the participants expressed their thoughts as follows: *"The light is crucial for the photosynthesis at the same time."*, *"It is used for preserving food at home."*, *"We can easily heat our meals with microvawe."*, *"With infrared lights and hair dryer, we can dry our hair."*, *"We can drive cars and change channels with wifi and remote controls."*, *"So, we can obtain food."*, *"Again, with lights from the Sun, we can heat ourselves."*, *"Unless there was light, we could not study lesson, the doctors could not operate on their patients, we could not watch TV."*, *" These lights are used in MR and in Stone reduction units."*

When the answers about the light learning area by the pre-service teachers before the practice were analysed, it was noticed that it consisted of 4 categories, 23 codes and 92 frequencies. The post-interviews included 4 categories, 37 codes and 195 frequencies. The frequencies generated by the answers of the pre-service teachers are double of the frequencies before the practice. This increase in codes and frequencies of pre-service teachers after the practice may show that they have associated the light topic with daily life, become aware of the light topic in daily events and understood the practice of the learned topics in daily life better. Thus, they have understood and internalized the topics better.

Analysing the answers of the pre-service teachers in pre/post-interview related to the sound learning area, the codes, categories and frequencies are indicated in table below.

**Table 2.** The sound learning area qualitative data analysis

The Sound Learning Area Categories	Codes	Pre-interview Frequency	Post-interview Frequency	
Used tools and equipments	Stethoscope	2	-	
	Tools	8	33	
	Hearing aid	-	1	
	Radar	-	3	
	Elevator	-	1	
	Sensors	-	3	
Used places	Control	3	-	
	Sending message	1	-	
	Structure of Matter	1	1	
	Repair	1	1	
	Construction of musical instruments	-	1	
	Understanding full or blank	-	1	
	Measuring of distance	-	1	
	Demolition	-	7	
	Simplifying our lives	-	5	
	Insulation	-	4	
	Having fun	-	3	
	Alarm	-	1	
	Gun	-	4	
	Animals	Communication	-	2
		Determining direction	-	2
		Finding hunt	-	2
Cognitive events	Motivation	1	-	
	Communication	29	27	
	Information transfer Culture transfer	4	2	
	Recognition	-	1	
	Perception	-	1	
	Discrimination	-	2	
Usage areas	Marine	1	-	
	Transportation	2	1	
	Industry	2	3	
	Education	1	-	
	Health	3	6	
	Sport branches	-	2	
	Music	-	4	
	Physics terms	Echo	3	9
Volume		-	2	
Energy source		-	8	
Rhythm		-	1	
Resonance		-	8	
Infinite release		-	1	

As the Table 2 is analysed, the data gathered pre-interview in sound learning area are grouped in 5 categories; on the other hand, the data gathered post-interview are grouped in 6 categories. Pre-interview categories are the tools and equipments in which it is used, the used places, cognitive events and physics terms. The post-interview categories are used tools and equipments, used places, animals, cognitive events, usage areas and physics terms. When the pre-interview and post-interview categories are considered in general, it is observed that the post-interview data are more in number.

The stethoscope and tools codes exist in pre-interview in the category of “used tools and equipments” and in the post-interview, hearing aid, radar, elevator and sensors exist. Totally 2 codes and 10 frequencies exist in this category in pre-interview; on the other hand, there are 5 codes and totally 41 frequencies in the post-interview. The sample answers by the participants were: *“All the technological tools and equipments have sound items.”*, *“As TV and computer.”*, *“The topic sound connected with the technological tools and had a great importance in our lives.”*, *“For example, in modern washing machines, sound sensors are used.”*, *“When the mission completed, it makes warning with sound signals.”*

While the pre-interview data in “used places” has 5 codes, post-interview data includes 11 codes. Pre-interview codes are control, sending message, the structure of matter, repair and the structure of the matter. Post-interview codes are, constructing musical instruments, understand full or blank, the structure of the matter, measuring the distances, demolition, make our lives easy, insulation etc. When the pre/post-interview data are compared in this category, there are totally 6 frequencies in pre-interview and 29 frequencies in post-interview. It was observed that the post-interview data of the students were more detailed than the data gathered in pre-interview. The sample answers by the participants are: *“The stone reduction case is through sound waves.”*, *“when an insulator put in front of it, it cannot pass through, so insulating materials are used in the buildings.”*, *“For example, if there was not the referee’s sound in football or any other sports games, gong sound, ring tones, it would be difficult and even impossible to play these games or sports.”*, *“Or, if the vehicles did not have their sound or horn sound during the travel, we could not aware of these vehicles and this case would result in many accidents.”*, *“...medicine, sound is used in ultrasound.”*, *“Thanks to the ultra sound, ultra sound speed measuring tools, submarines use ultra sound radars to control their surroundings. Ultrasound drills are used to ream and handle the hard materials.”*

While the “cognitive events” include 3 codes and 34 frequencies in pre-interview, it consists of 6 codes and 34 frequencies in post-test. It was observed that the participants focused mostly on “cognitive events” in pre-interview. While the total frequency of the communication code of cognitive events category is 29 in pre-interview, its frequency in post-interview was 27. The sample answer by

the participants was: *“We come across with it in communication, perception, to make the presence different in our lives.”*

The pre-interview codes of the data in the category of “usage areas” are marine, transportation, industry, education and health. The codes of the post-interview data are industry, medicine, sport branches and music. Although the code numbers are same, the codes are different in content and their total frequencies are different (9 pre-interview and 16 post-interview) from each other. The sample answers by the participants were: *“The usage areas are in medicine, machines, in roads, music and science education.”*

There are 1 code and totally 3 frequencies in pre-interview data in the “physics terms” category among the categories; on the other hand, there are 6 codes and totally 29 frequencies in the post-interview. Although it is this category in both interview data, it can be claimed that the participants stressed on it more in post-interview. The sample answer by the participants was *“The sound occurs with the resonance event”*.

The post-interview data consists of the animal category unlike the pre-interview data. The participants claimed that the animals use sound in communicating with each other, determining their directions and hunting.

When the answers related to the sound learning area by the pre-service teachers are analyzed before the practice, it can be claimed that they include 5 categories, 15 codes and 62 frequencies. The interviews after the practice consist of 6 categories, 35 codes and 154 frequencies. The frequencies of the pre-service teachers’ answers after the practice are three times, compared with the frequencies before the practice. It can be claimed that as a result of the lessons with real life content by the pre-service teachers, they understood the lessons more effectively, interpret and make relations with the events nearby.

## 4. Result

As a result of the practice within the scope of the associating the light learning areas with daily life, it was determined that the pre-service teachers became aware of the usage areas of it and gave sample examples. Specifically in the topic of usage areas, it was determined that the sample numbers and frequencies of the pre-service teachers increased. In general, the codes and frequencies, which the pre-service teachers generated as a result of the practice, doubled compared with the codes and frequencies before the practice. When the association of the sound learning area by the pre-service teachers was investigated, the examples they gave after the practice were three times more compared with the examples they gave before the practice. The pre-service teachers stressed that the sound is used constructing the musical instruments, measuring the distances, testing the sturdiness of constructions, making our lives easier, destroying the buildings, entertaining, the animals’

determining their directions and in army industry at the end of the practice. Although there were many participants, who did not give an opinion related to the usage of this learning area in daily life at the beginning of the practice, almost all of them gave opinion at the end of the practice. At the end of the study, in general, it can be expressed that the pre-service teachers were able to make better connections between the light - sound topics, which are significant in curricula and our daily life, and daily life and they were able to make new context between the real life and topics in their minds. Moreover, it can be claimed that they became aware of the light and sound topics during their observing the events and facts in their surroundings. Thus, they were able to recognize the topics better, internalize and understand effectively. Furthermore, it can be expressed that they were able to perceive its place, importance and usage in daily life. Therefore, giving an answer to the question "When I will use this in my professional life, is it useful?" easily, they will overcome the students' biases and constitute the contexts, which enable their motivations related to the topics easily. Moreover, they experienced how the TPRLC is applied during the lessons, how it is arranged to the topics, what and how should be carried out during the practice. This case will help them overcome the difficulties, which they may encounter during their professional experiences enabling them to benefit from their own experiences applying this approach. Furthermore, that they are students during the application of this study will help them much in their professions when they use this approach. Thus, they can empathy with their students related to the cases they may encounter, estimate the cases and problem, which they encountered or may encounter. Even taking precautions in order not to make their students encounter such problems, create new situations, and generate ways of solutions. The study is significant in terms of not to encounter with such cases and supports the results of the former studies. Reference [55] refer that the subject matter of teachers is crucial during the teaching-learning process. Because, it is stressed that the teachers' not understanding the science content of the topics they teach and having contradictory concepts which they think it is adequate cause deficient and incorrect teaching and even misconceptions critically. Reference [56] referred that teachers' inadequate awareness or unclear understanding of the facts and topics will cause them to cool down from this area, may become hated, and avoided topics. In the study by Reference [21], it was pointed out that the material prepared suitable for the TPRLC was effective in transferring the alternative views of the pre-service teachers into scientific understanding. Moreover, it was found out that this approach increased the permanence and contributed to the configuration process of learned items in minds even after the teaching process. It was determined that it contributed positively both to the success and the attitudes of the pre-service teachers. It was also determined that it was recognised as entertaining by the pre-service teachers, they became interested, and it increased their

motivations. In the study by Reference [57], he used TPRLC for the university students. As a result of the study, it was found out that TPRLC enabled hopeful results especially in learning performances of the students. Reference [58] used TPRLC during the physiotherapy lessons in 1st year physics lessons. TPRLC was both effective in the students' perceptions and on the depth of learning outcomes, interests and academic achievements. Even the motivation and satisfaction levels were extremely high in the lessons. It was determined that presentation of physics subjects in TPRLC enabled the students to develop interest and courage in practising some of their ideas in daily life. Moreover, it was found out that some new applications as TPRLC affected both the teachers and university educators as well, and made the teaching practice lesson entertaining. Reference [54] carried out his study in Australia with 11 teachers and a university educator. In the study on TPRLC practice in chemistry education, it was aimed to determine the beliefs and limitations of teachers. As a result of the study, as the teaching with TPRLC connected with daily life, it was found out that it increased the interests of the students in teaching the subjects. It was determined that TPRLC was effective in teaching the subjects effectively. Considering these results, it is thought that the students' misconceptions related to the optical and sound can be eliminated with TPRLC. Because, the misconceptions of the students related to the optical and sound topics originate from incorrect interpretations of events in daily life as they cannot fully cite them. Therefore, teachers making connections with daily life during teaching the optical and sound topics will contribute to better perception of these topics and eliminate misconceptions [31,59]. In the professional lives of the pre-service teachers, as they will teach the students with their existing knowledge, the education that the pre-service teachers have in their university life plays a significant role in order to understand, internalize and make connection with daily life. In this case, the faculties of education and the educators have vital effect in teaching the pre-service teachers who are educated both as a students for their subject matter and as a teacher of future to know how to transfer this knowledge to the students. The university educators should use the teaching methods and techniques as TPRLC in their lessons, so the pre-service teachers may learn their subject matter better and associate their knowledge with daily life.

Reference [60], in his study, aimed to determine the teacher experiences in situations suitable for the "TPRLC learning and Teaching" As a result of the study, it was found out that this approach changed the learning environment positively. Moreover, it was determined that there is a relationship between the teacher plans and practices, hesitations and obstacles, experiences and practices in both the current learning environments and the environments with real life content. In the study, it was found out that the teachers sometimes demonstrated traditional attitudes and had difficulties in terms of time during the lessons with TPRLC. In this case, they have a significant role and should



effectively know the relationship between the real life and topics and apply the activities effectively [16, 61, 62]. Most of the problems, which the teachers encountered, originate from that the approach is entirely new. Therefore, in order to be applied such a new approach by teachers, it is necessary for teachers to be eager for the practice, well-educated and have strong beliefs to deal with the difficulties of the approach [54, 63]. In order to provide this, the teachers should have in-service education; make connections with lesson TPRLC and daily life. Or, the faculties of education should give proper education before the pre-service teachers start their professions [64, 65, 66]. In this context, it is thought that the topics, which are thought to be given to the pre-service teachers, should be supported by similar activities stated in this study to help them gain the needed skills and knowledge before and during their professions. Moreover, the university educators' having their lessons with this approach not only supports the subject matter of pre-service teachers, but also helps them during their professional lives. As the pre-service teachers may apply this approach by doing and experiencing.

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