Research Article

THE USE OF SCIENCE CARTOONS IN SCIENCE COURSES FROM SCIENCE TEACHERS' PERSPECTIVES

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ABSTRACT

Turkey Ministry of Education improved Science Teaching curriculum in 2018 which aimed educate students as science literate individuals. In this study, the integration of the curriculum with the science cartoons was examined taking into account the aspects of science literacy which investigating, questioning, deciding with logical reasoning, innovative thinking, problem solving, self-confidence, open to cooperation, self-expression, entrepreneur, sustainable life-long learners with development awareness. A type of humor, the cartoon is a smile-based visual message. In this study, the use of scientific cartoons in the Science course of the teachers of Science lesson in secondary school was taken with questions of fully structured interview. In line with the teachers ' responses, stand-up was the most effective method of humor. In this study, it was determined that teachers had positive ideas about science cartoons in science teaching. Analysis of Science cartoons is a process that contributes to conceptual change. They show that the use of Science cartoons in the education-teaching process will be a useful practice for teachers and students.

Keywords: Science cartoons, conceptual change, science education.

INTRODUCTION

Cartooning is an art form and a powerful visual means of dealing with historical, political, economic, or social issues (Fuller & Pribble, 1982). If students take appropriate course method for example cartoons, brain based learning (Akyürek & Afacan, 2013: 75-98) can also be overcoming difficulties (Akyürek & Afacan, 2018).

In addition using cartoons in the lessons is an important way to increase student motivation (Güven & Bekdaş, 2018). Cartoon is a visual message based on smile. The ability to make humor with lines and to express humor in other forms is the determining factor of cartoon art. Understanding cartoon is possible by understanding the phenomenon of laughter and humor. However, in many studies, humor was tried to be defined and different views were reached on this subject. Cartoon is a visual message based on smile. The ability to make humor in line and to express humor in other ways is the determinant of the art of cartoon. Understanding caricature is possible by understanding the phenomenon of laughter and humor. For centuries, there has still been no agreement on the reason of laughter and humor, which makes artists think (Arik, 1997). At this stage, it is necessary to examine the concepts of laughter, humor and cartoon.

According to Aziz Nesin, 'Humor is everything that can be laughed no matter where the person can hear his voice. According to Rıfat Ilgaz, 'It is not clear where to laugh and where to cry in humor. That's why I do not understand humorous laughing words.' (Özmen, 2002). According to Turhan Selçuk, "humor is not only a laugh. There are some types of thinking, criticizing, inducing, giving some kind of sense of pain, hiccup, covering opposing ideas and presenting ideas in an unexpected, surprising way. So black humor and pink humor have also emerged (Selçuk, 1998).

Much research has been done on humor and it is inevitable to do it after that. Because the very extensive effects of humor constantly engage people's minds. Scientists such us, Joubert (1560), Hobbes (1651), Spencer (1860), Bergson (1899), Sully (1902), Freud (1905), Fry (1963), Tomkins (1950), Berlyne (1972), Rothbart (1973), Apter & Smith (1977), Nerhardt (1976), Wilson (1979), Morreall (1983), Lefcourt & Martin (1986), Haig (1988) have built theories on this field. Despite all these researches, humor is not a very well defined and dynamically explained phenomenon (Özer, 2005).

What does laughing or laughing mean?, What is the ridiculous thing?, What are the common points between a clown's facial wrinkle and a fine comedy scene?, since Aristotle, the greatest thinkers have dealt with this little issue, which does not fit in the hands, flees, resists and defiantly defies all speculation of philosophy (Bergson, 1990). "To explain the smile is like opening a frog with a scalpel. When we're done, we know it's a frog, but it's dead now. "According to Jacques Faizant, it is so difficult to explain laughing (Topuz, 1986).

Laughing is a multi-faceted reflex that is often so sudden that it is not possible to think about human cause. In other words, laughter is a physical event on the spiritual ground (Aşıcıoğlu, 2001). In short, laughter is the reaction to the funny situation, the interpretation of it; comes after criticism (Aşıcıoğlu, 2001).

Cartoon is a kind of humor. The definitions of the cartoons have undergone changes due to the developments in history. In the past, it was only described as exaggerated portraits of people, but today it has started to have very different meanings. It can be said that the cartoonist who took the subject from the events around man and man can't make a definitive definition because of the development he has shown and will show (Hünerli, 1993). The Carracci Brothers are those who bring the cartoon into a specialty (Britanica, 1998).

Humor and Education

Cartoons differ in education in terms of their advantages (Özer, 1994). The use of cartoon in education, one of the important tools of humor, can be associated with social constructivism in theory. Vygotsky argues that cognitive development is the result of the interaction between the child and the surrounding individuals (Koç & Demirel, 2004). According to social constructivism, the language used by the child has a historical and cultural character (Ergün & Özsuer, 2006). Visuals based on humor, especially cartoons, may positively affect attitude as well as academic achievement (Koçoğlu, 2016). In this context, cartoons can be used to engage students in social interaction in order to make meaningful and lasting learning in learning environments. The humor in the cartoon, which is a powerful tool visually, and the criticism of situations or people, are not hard, but critically considered to include the element of humour (Duralp, 2006). With this feature, cartoon enables students to express themselves, freely think and dream, express their feelings and thoughts orally and in writing while developing critical thinking and problem solving skills (Uslu, 2007). But some participants may choose anti-cartoons (Hanckok & Little, 2011).

Teachers can use cartoons in order to reveal students 'prior knowledge of the subject, start the discussion process, attract students' attention, investigate the subject and evaluate the learned (Eulie, 1969; Kleeman, 2006). Students who using cartoons, think more comprehensively, interpret the given messages and establish a link with the topic (Başarmak & Mahiroğlu, 2015). In addition to the ready-made cartoons during the learning-teaching process, students may be asked to draw their own cartoons about a subject. Thus, students can discuss the subject in a way that reflects their own perspectives and sense of humor. In this process, the student can not only think on a ready cartoon but also use his / her high-level thinking skills to express his / her own feelings and thoughts with a creative and humorous fiction. According to Kleeman (2006), drawing cartoons on a social or environmental situation is an effective way for conceptual learning to occur. In this way, it is ensured that students reveal their own value systems, apply their knowledge, use visual symbols, and be original, creative and critical in their thoughts. As a result teachers may encouraged and supported by their administrators to implement classroom strategies aimed at developing students' self-directed learning, collaboration, and problem solving skills (Overbay, Patterson, Vasu, & Grable, 2010)

PURPOSE

The aim of this study is to get the views of science teachers on the use of scientific cartoons for teaching at secondary school level. It is emphasized how teachers understand the use of alternative teaching methods in

line with the new science teaching programs prepared by Turkey Republic Ministry of National Education (MEB, 2018).

METHOD

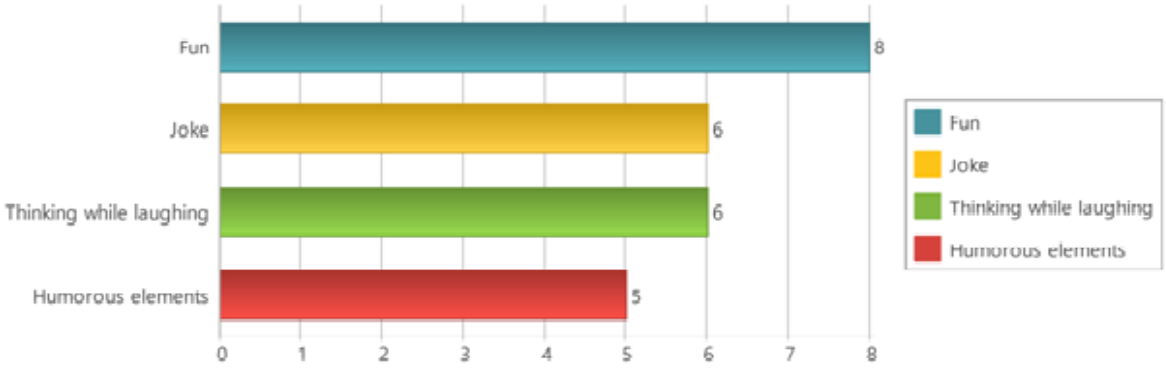
A case study model was used in this study. This model allows for one aspect of the problem investigated to be studied in depth and in a relatively short time. Before this study pilot application was made to 10 science teachers for face validity. The study was conducted with 25 science teachers, including 14 women and 11 men. The majority of the teachers who participated in the study are in the Central Anatolia Region and one of them is in the Mediterranean region. The reason for the selection of Science teachers in the study is that it is accessible, serves the purpose and is suitable for the course content.

Since research is a qualitative study, the data collection tool is composed of structured interviews were conducted with participants in the study and is developed using expert opinions in line with the common opinions of the researchers. In the content of the data collection tool, there is a video about the use of scientific cartoons during the course and 5 open-ended questions and sub-quiestions. Before the presentation of this video, teachers were given a doctoral thesis on the subject, then video was watched and then open-ended questions were answered.

FINDINGS AND INTERPRETING

Qualitative data analysis is an ongoing and repetitive process. The process must be well documented in order to be understood. The analysis of the data as a result of this study was carried out by different researchers and the results of the analysis were investigated in terms of consistency. In response to the question "What is humor?" Asked by teachers, the answers seen in Table 1.

Table 1. The Theme of 'What is Humor?'



Eight of the teachers are looking at humorous to fun. Here are some statements reflecting the views of teachers in this regard.

"It's fun to make jokes out of ordinary events that are common to everyone."

"Everything that makes me laugh."

The frequency of teachers entering into the theme of 'thinking while laughing' is six. Examples of responses given to the same question are as follows:

"Laugh, and thinking while laughing"

"It sounds like an event that is laughing and giving meaningful messages at the same time. "

The results of teachers 'what kind of humor enjoy' and the distrubition of themes were displayed in Table 2.

Table 2. Question "What Kind of Humor Do You Like?'' Themes

1.	Stand-up	6 people
2.	Sitcom	4 people
3.	Telling Joke-story	4 people
4.	Jokes includes irony	4 people
5.	Camera Jokes	3 people
6.	Conudrum	2 people
7.	Humor magazines	1 person
8.	Humor that does not contradict beliefs	1 person

According to the responses from teachers, "stand up" theme is the type of humor that is liked by 6 people at the highest rate. Although given the relatively small number of participants in this study, results are not readily generaliable. In order to verify these results, a larger sample is needed.

The themes obtained from the answers to the question "How and why do you use humor as a teacher in your class?" are listed in Table 3.

Table 3. The Theme of The Question "How And Why Do You Use Humor as a Teacher in Class?"

1.	Focus on attention	8 people
2.	Motivation	6 people
3.	Subject entry	4 people
4.	Participation to course	3 people
5.	Persistence, fun making and intelligibility	1 person

Responses from teachers focused on 'attention'. Here are some sentences that reflect the views of the teacher.

"I use students to focus attention on a class, to motivate students and to break their negative attitudes about a subject."

"Sometimes I start to teach, sometimes trying to attract students' attention during the lesson..."

In another question, "Do you think that the teacher's use of humor in class is effective in education?" and the answers are grouped as positive and negative in Table 4.

Table 4. "Do You Think the Humor That Teacher Uses in Classroom is Effective in Education?" The Themes of the Question

Positive	Negative
17 people	8 people

The answers given by the teachers when asked "What are the positive aspects of teaching you based on science cartoons?" are presented in table 5. "

Table 5. "What are The Positive Aspects of The Aching You Based on Science Cartoons?" The Themes of Question

1.	Attractiveness and attention	9 people
2.	Permanence	7 people
3.	Easy learning	5 people
4.	Thinking and cognition	4 people

In the data line, 9 people entered the "attractiveness and atention" theme, and examples of the opinions about the subject are as follows:

"Children attract attention, increase participation. The persistence of the lesson increases."

"Attention, faster and effective perception of teaching. Faster and persistence learning."

The distrubition of answer 'What kind of problems do you encounter if you think you are teaching a science cartoons?' were given in Table 6.1. and 'how do you overcome them?' were given in Table 6.2.

Table 6.1. "What Kind of Problems Do You Encounter and How Do You Overcome Them If You Think You are Teaching a Science Cartoons?"

1.	Every student may not be interested	8 people
2.	Time inadequacy	6 people
3.	The reaction of family and school management	4 people
4.	Test anxiety and pressure	4 people
5.	Focus only on visual training	2 people
6.	It can be teased with the teacher.	1 person

Table 6.2. Suggestions for Overcoming Problems

1.	Must be used in certain periods	2 people
2.	This training should be taken from kindergarten	1 person
3.	Must be used from the 4th and 5th class	1 person
4.	Appropriate cartoons for ages	1 person
5.	The cartoons must be in accordance with the rules of ethics	1 person

As an example of the answers to this question:

"After a while, the kids may get bored because I'm not always in favor of using it. Same type of lectures can squeeze students. It can happen that the students do not get serious. Better not to use it occasionally. If the lessons are told differently, the problem of squeezing can be overcome. "

"Beginning with the child's level, gradually starting from the kindergarten, this activity should be introduced to the child and I think that the problems that will arise in this way will be overcome."

The distribution and cause of the answers given to teachers "Would you like to add science cartoons to your own teaching program? Why?" were shown in Table 7, which is realized in the form of " yes "(24 people) and " No " (1 person).

Table 7. "Would You Like to Add Science Cartoons to Your Own Teaching Program? Why?" The Themes of The Question

1.	Effectiveness	6 people	Yes
2.	Permanence	5 people	Yes
3.	New teaching style	3 people	Yes
4.	Time savings	3 people	Yes
5.	As an exercise	2 people	Yes
6.	Improve interpreting ability	2 people	Yes
7.	To remove the negative attitude towards science	2 people	Yes
8.	Interesting	1 person	Yes
9.	Understanding and interpreting different	1 person	No

The question was asked 'How often would you use it (teachers who wanted science cartoons to be added to teaching programs)?' and the distribution of the answers were given in Table 8. According to the theme of the lesson, as its place comes 14 people, twice a week 5 people, 1 time a week 2 people, once a month 1 person, twice a month 1 person, 1-2 times a person in each science unit has been in the form of.

Table 8. "So How Often Do You Prefer to Use It?" The Themes of the Question

1.	According to the theme of the lesson, as its place comes	14 people
2.	Twice per week	5 people
3.	1 time per week	2 people
4.	Once a month	1 person
5.	Twice a month	1 person
6.	Each science lesson unit 1-2 times	1 person

As a result; In this study, it was determined that teachers had a positive opinion on science cartoons in science education. Concerns about teachers' use of science cartoons can be met with understanding; but in order for them to be overcome, the teacher must be open to innovations and have sufficient knowledge of the pedagogical domain. Science cartoons are an alternative to traditional teaching methods.

Teachers can work to reveal the preliminary knowledge of the cartoon students' topic, to start the discussion process, to attract attention to the subject, to investigate the subject, and to evaluate the learning (Eulie, 1969; Kleeman, 2006). The evidence supporting this hypothesis was reached at the end of the study.

Republic of Turkey Ministry of Education since 2017 changed in science teaching program is based on research rather than making inquiry-based approach education with traditional methods. Science cartoons are also a method that serves this process (Kılınç, 2008). Scientific cartoons analysis is a process that contributes to conceptual change. As a result, the use of science cartoons in the educational process will be beneficial for teachers and students.

DISCUSSION

In this study, examined among the teachers that using cartoons, as well as their perceptions of the barriers impacting their practices. Findings show that, in general, teachers were able to use science cartoons and they beliefs cartoons being positive effects to course. This finding, however, is in contrast to what other have reported in the past (Hancock & Little, 2011). If students take appropriate course method for example cartoons, brain based learning (Akyürek & Afacan, 2013: 75-98) can also be overcoming difficulties (Akyürek & Afacan, 2018).

It is possible that observed in this study relates to the current teachers' perspectives to prepare our students for future. Turkey Republic Ministry of National Education (MEB, 2018), new curricula aims explaned and called to grow science literacy person. This situation not surprising, schools are responding by including this goal in their revised strategic plans. This study show that still some barriers current (see. Table 6.1.). As a result, teachers may encouraged and supported by their administrators to implement classroom strategies aimed at developing students' self-directed learning, collaboration, and problem solving skills (Overbay, Patterson, Vasu, & Grable, 2010), all of which will support a student-centered pedagogy.

IMPLICATIONS

In this study, every teacher perception was evaluated. They may devote extra time and effort to succeed in the study of science cartoons. But, using cartoons in the lessons will an important way to increase student motivation. This is similar to the results Güven and Bekdaş (2018) reported after their study. For teachers, barriers such as lack of administrative support, new teaching style problems, and tests are still considered issues by teachers. From this study that development should focus, first, on increasing teachers' perspectives, which can then help increase their confidence and reduce the fear associated with using science cartoons. Finally, the results of this study suggest we should be utilizing the different teaching tools for professional development that teachers are able to use in their classrooms. And it shows that it would be useful for Science cartoons to be involved in the National Program.

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