



## TRANSFORMATIVE IMAGES IN EDUCATION VIEWS OF IN-SERVICE TEACHERS CONCERNING THEIR USE WHEN TEACHING LESSONS

Rallis Vouloutidis<sup>1</sup>,  
Archontia Foutsitz<sup>2i</sup>

<sup>1</sup>MsC, Economist,  
Democritus University of Thrace,  
Greece

<sup>2</sup>PhD,  
Laboratory Teaching Staff,  
Democritus University of Thrace,  
Greece

### Abstract:

The role and function of images in everyday teaching activity have been highlighted by many researchers, given the contribution which these images make to the process of acquiring and retaining knowledge. This study examines the views of secondary-school teachers on the use of transformative images when teaching lessons. The findings show that teachers use transformative images when teaching since they are aiming at the various benefits provided by these images. However, they have colleagues who do not share this view, whilst providing arguments in support of their opinion.

**Keywords:** transformative images, visual teaching aids, visual representation, pictorial material in education

### 1. Introduction

Improving the teaching process and increasing pupils' interest in the lessons being taught are important factors when examining the parameters for improving performance at school and providing better-quality educational services. Achieving this aim requires the integration and use of support materials when teaching lessons at primary and secondary levels. The materials most often and most extensively used are materials employing images, due to the effect that visual information has on the pupils' minds and on the development of their skills.

The term "image" means any kind of visual representation (Halkia & Theodoridis, 2002). Visual representations, according to Zagota (2016), are figurative creations,

<sup>i</sup> Correspondence: email [afoutsit@led.duth.gr](mailto:afoutsit@led.duth.gr)

photographs, maps, diagrams, graphs or tables, electronic images, television and cinema images and, finally, three-dimensional creations. Transformative images are one of the many kinds of images. However, they cannot be regarded as being representative, meaning that they directly correspond to the verbal information conveyed by a text. Nevertheless, they cannot be regarded as being unrelated and irrelevant to it, since they provide means for the information contained to be understood in the fullest and easiest ways. Transformative images include maps, diagrams or graphs depicting the relationships which exist between variable sizes or which describe structures and processes, depicting their successive sections or stages (Simatos, 1997).

## **2. The importance of visual representations in the teaching of lessons**

Visual representations play an important role in the rapid and concise dissemination of messages or information. In a world overwhelmed by a flood of messages and information, the industry promoting goods and services has had no other choice than to focus on visualising messages and the information contained in them, with people being the main and ultimate target. Education is one of the many sectors to have acknowledged this necessity, having placed particular emphasis on the use of illustrative material, thereby aiming to provide better and more effective teaching and learning.

In the school environment, images are used as teaching aids for the understanding of scientific concepts (Ametller & Pinto, 2002). A visual type of learning promotes the acquisition of knowledge, which cannot be easily obtained from verbal explanations alone (Patrick *et al.*, 2006). However, the role of this type of learning does not just stop there, because it also helps pupils to remember the ideas and information being presented (Mayer *et al.*, 1996).

As a student studies the details of an image, he begins to gain a fuller understanding of the concepts contained within it. According to Lemke (1955), visual discrimination is much better than the linguistic system in describing and understanding the relationships between various sizes or processes. Studies on the impact of visual representations (Harrison & Treagust, 2000) have shown that the degree of understanding and retention of information which they provide is not the same for every recipient. In order to achieve a more targeted acquisition of knowledge and not to question the value of a visual representation, teachers should explore the factors which enhance the readability of illustrations so that the information derived from them can be understood not only by a portion of the pupils, but by all of them (Pozzer-Ardenghi & Roth, 2005).

According to research (Carney & Levin, 2002), the kind of visual representation used will also determine how much impact it will have. Mayer (1993) states that illustrations describing how a process works produce the highest level of cognitive processing. This is not the case with decorative or coloured images, which are aimed at fostering emotional interest; they do, however, form the initial stage for triggering cognitive interest.

Teaching involving the use of images has an influence on the level of understanding of the concepts being taught because it is more attractive to students (Ametller & Pinto, 2002). The use of colours or arrows to show the flow of events has been shown to positively affect pupils' comprehension (Stylianidou, 2002). In fact, according to research (Winn & Snyder, 1996), the difficulties reported in reading a visual representation come mainly from realistic drawings and photographs, rather than from simplified diagrams. Some pupils, when processing a visual representation, attach more importance to details, thereby making it more difficult for them to distinguish the key concepts (Pozzer-Ardenghi & Roth, 2005) or to focus on the actual meaning indicated therein (Holliday, 1980). Diagrams and graphs are more helpful in the learning process, because their important parts can be more easily identified.

Mayer *et al.* (1996) stated that the wording accompanying an image can be considered to be very important and can influence the processing of illustrations. For this reason, it should not be missing from any type of visual representation. Riding & Douglas (1993) stated that incorporating illustrative material into lesson teaching benefited pupils by helping them to recall, to a greater or lesser extent, their previous knowledge (Cheng *et al.*, 2001). Patrick *et al.* (2006) argued that children tend to focus more on an illustration than on a text, but they are not always able to process them properly.

It should be noted that in a lesson, the way of learning varies according to each pupil's personality. This means that the interpretation of a visual representation is associated with the learner's ability to understand, and this can have conflicting results, because an illustration may include requirements which are only met by some of the pupils. Hannus and Hyona (1999) argued that the level to which the details of an illustration are understood is high in pupils who spend more time studying it or who process it more thoroughly. Reid and Beveridge (1986) stated that teaching with images helped pupils with a lower level of knowledge to understand increasingly detailed information during a lesson.

As the amount of information acquired through a visual medium multiplies, the knowledge and ability to understand created by the visual messages becomes increasingly important in a lesson (Ferk *et al.*, 2001). Due to the impact of visual learning on the understanding of the relationships and processes of an item, particular emphasis should be given to the use of transformative images during a teaching session (Mayer *et al.*, 1996; Ametller & Pinto, 2002; Girwidz *et al.*, 2006). Finally, attention should also be focused on the visual representations contained within school textbooks, given their contribution to the learning process.

### **3. Research methodology**

The aim of this survey was to study the views of secondary-school teachers on the use of illustrative material, of transformative images in particular, in the learning process, since this is a subject which has not been sufficiently studied, at least not in Greece. The

realisation of this fact became the reason for undertaking this survey, in order to enrich, if only slightly, this research field and to come up with further findings.

In order to achieve this goal, a qualitative study was opted for (Creswell & Poth, 2016). It is worth noting that from the outset it was considered important to give particular weight to the opinion of each teacher, because this would help to provide the fullest outline of the subject. A semi-structured interview (Bryan, 2017), which is a common research tool when conducting qualitative research (Iosifidis, 2008; Cohen *et al.*, 2011), was chosen as the technique for collecting the material for the survey. Moreover, qualitative research, and in particular the interview process, provides an opportunity to evaluate the data accruing from it, not just after this has been collected, but throughout the process, thus resulting in a more comprehensive understanding of the views of the participants (Denzin & Lincoln, 2003).

The collection of the research data was carried out in the spring of 2022. The research material consisted of eleven (11) transcribed interviews with secondary-school teachers, six (6) men and five (5) women, teaching Mathematics, Economics, IT and Natural Sciences, who were working at the time in state schools in the Regional Unit of Xanthi. The purposive sampling method was opted for as the method for the sampling because these individuals, with their experience and their knowledge, well served the aims of the survey (Isari & Pourkos, 2015).

The interviews were conducted separately in order to allow the interviewees to express their opinions freely and in an unhindered way (Cohen *et al.*, 2011). The aim of each interview was to collect data strongly characterised by individual experiences and personal attitudes, so that the teachers' opinions and views could be interpreted better (Mason, 2009). The ethical nature of the survey was safeguarded by assuring that the data from the participants would be kept confidential and that each participant's individuality, personality and opinions would be respected in full (Robson, 2010). The teachers were receptive and willing to take part in the survey, considering it as being a matter which directly interested them since, through the resulting findings, they could improve the effectiveness of their teaching. Once the interviews had been carried out, descriptive transcripts were made of everything the interviewees had said, excerpts of which are given below.

#### 4. Presentation of the findings

An analysis of the research material showed that the interviewees recognised the role of visual representations in learning and that they used transformative images when teaching their pupils according to what they wanted to achieve. The most important aims being pursued through these means were: arousing the pupils' attention and interest, achieving immediacy, actively engaging the pupils in the learning process, making the lesson attractive, facilitating the comprehension of the concepts, and highlighting the connection with reality. In particular, the respondents stated the following in their replies: T1: *"My aim is to get my pupils more involved and for the lessons to flow more smoothly.*

*We're trying to capture the children's attention; after all, one image is worth a thousand words". T2: "Basically, to make the lesson easy to understand". T3: "Apart from arousing the pupil's interest, using transformative images in a lesson helps to break up the monotony of the lesson and create a variety of stimuli". T4: "I often use transformative images to help the pupils assimilate new information better but, mainly to gain their interest in the lesson". T5: "Better understanding of the lesson being taught, more attention during the lesson and differentiated learning experiences. In addition, presenting new knowledge in a way which is easy to understand". T6: "I think that images are a key tool in the hands of teachers for stimulating and motivating pupils to get involved in the learning process". T7: "They are useful, especially in a subject which is difficult to teach... they facilitate the connection with reality. Transformative images help in drawing the pupils' attention and in making difficult concepts easier to understand". T8: "They enrich a lesson by providing new ways to think critically. However, the visual material used by teachers should give a good illustration of the subject and fully meet the pupils' needs". T9: "By visualising the data, the text is turned into an image. This makes it easier to assimilate new knowledge and definitely makes lessons more attractive and interesting". T10: "Transformative images are a modern teaching tool which can diversify the way a lesson is taught, with the active involvement of all the pupils. Apart from the information they provide, they allow us to compare prices and sizes, make analyses, correlations etc". T11: "Primarily, the aim is to arouse the pupils' interest so that the knowledge provided can be more enjoyable and accessible for them. But improving the quality of the lesson is just as important".*

Regarding the role and use of transformative images in reading and understanding a text, most of the teachers taking part in the survey thought that these tools made a very important contribution in this respect, as they visualise the information contained in the text and make it easier to understand. They did stress that through using these the lesson became more interesting because the pupils were able to expand their cognitive skills and grasp new concepts more rapidly. This increases their interest in the learning process and the teaching becomes more attractive and enjoyable. In particular, they stated the following in their replies: T2: "Particularly useful because they visualise and bring the text to life, cultivate the pupils' critical thinking and push the boundaries of their knowledge". T3: "They have an important role because representing data and information visually helps a group of pupils to work together and contributes greatly to their retrieving and extracting information and conclusions in a very short time". T4: "Images nowadays are a powerful form of communication. They help pupils to concentrate and focus on difficult texts... the visualisation makes them easier and more understandable". T7: "Visual media help pupils to develop cognitive skills and improve speech production". T8: "The lesson becomes easier to understand and the pupils have a more active and creative role in it". T9: "Transformative images help the pupil to 'read' a text from another perspective". T11: "They are very important; you can describe a concept in many different ways. The pupils get the chance to 'see' the information in a different way, to understand it better and to memorise it more easily".

There were, however, four (4) teachers who said that the use of transformative images in a lesson cannot provide anything substantial in reading or understanding a text. They also pointed out that in such cases, the contribution made by these tools was

minimal to zero, since the pupils find it difficult to identify the information which they provide and to correlate prices and sizes. This results in their use being limited. More specifically, they stated the following in their replies: T1: "*Transformative images might have a helpful role to play, but their contribution to reading and understanding a text is insignificant*". T5: "*I think that their contribution is minimal*". T6: "*Transformative images offer very little for the reading and understanding of a text. The best thing would be to highlight the key concepts in the text in bold type*". T10: "*Very little, because they are hard to understand and are shown in a small size, making it difficult for the pupils*".

The teachers were asked to suggest ways of more effectively using transformative images in the learning process. They laid particular emphasis on the schools' digital equipment, frequent renewal of visual teaching aids, regular checks to see if these aids were functioning properly and finally, the training of teachers in New Technologies. They thought that it was necessary, beneficial and important to train teachers so that they themselves could design and create transformative images which would help to improve the quality of their lessons. They stated, in particular, the following in their replies: T1: "*Fuller information on what the potential provided by digital equipment is, because technology is advancing rapidly and new products and options are coming onto the market. Also, the availability of more computers for more immediate, creative and effective processing of visual material in the classroom*". T2: "*Training and reskilling teachers in using visual material in their lessons*". T3: "*The reskilling of teachers would help in improving the quality of the teaching*". T4: "*All schools should have the means to create targeted illustrative material*". T5: "*The acquisition by teachers of new knowledge and skills is both necessary and of benefit for their work*". T6: "*All schools should be equipped with the electronic means for the teachers to be able to create visual material*". T7: "*Teachers should be aware of the possibilities that the visual tools have to offer. They will learn how to use them effectively through their involvement with them and from experience*". T8: "*A positive attitude towards educational challenges and the enhancement of schools through the provision of technical equipment are factors which will guide teachers towards using these tools effectively*". T9: "*All my colleagues should use visuals in all their teaching, not just selectively in some*". T10: "*The contact by the teachers with modern technological tools should be more constructive so that they can design material for their lessons... and they should never over-use images... these shouldn't replace the traditional teaching model but simply act as aids*". T11: "*I would suggest that all teachers should use illustrative material for better learning outcomes*".

## 5. Discussion of the findings– Conclusions

A major limitation, meaning that the findings of this survey cannot be generalised was the small size of the sample. Furthermore, the participating teachers came from one specific city, and this creates another limiting factor for not being able to generalise the findings: the locality being restricted. Therefore, further research studies will have to be carried out on this subject in order to have a more extensive survey of secondary-school teachers' views on the use of transformative images when teaching a lesson. Finally, this survey only considers the views of secondary-school teachers and not those of primary-

school teachers, with whom a comparative approach could be attempted. Lastly, the views of the pupils, who are the most important pillars in the learning process, have not been taken into consideration. For this reason, this investigation into the effectiveness of the use of transformative images must be considered as being one-sided.

The teachers participating in the survey stated that the most important aims of the use of transformative images in teaching were: attracting the pupils' interest, actively involving them in the lesson, searching for immediacy, gaining a better understanding of the lesson, and linking up the information provided by them with reality. This illustrative material can enhance the educational process, facilitate learning, and contribute to an interdisciplinary approach to learning subjects. Through the visualisation of information, students can have an easier approach to new knowledge and can assimilate the subject being taught in a better way. Rieber (2000) points out that illustrations clarify difficult concepts, something which can act in a supportive way in the hands of a teacher.

Regarding the role of transformative images in reading and understanding a text, the secondary-school teachers' views did not all converge. Most of them thought that these visual media made a positive contribution in this direction because the information contained in a text is visualised, and it thereby becomes easier to memorise the data provided. On the other hand, there were colleagues who argued that transformative images did not offer any real help in teaching theoretical subjects because the information they provide makes things more difficult for the students rather than helping them. They suggested highlighting the most important points in a text in bold print, because they thought that this was more helpful for their students. They did, however, say that because transformational images are a means of critical thinking and of evaluating data and not simply tools for presenting numbers or transmitting data, they should only be used when teaching the sciences. These findings contradict the findings of the Shah and Hoeffner (2002) study, which states that graph-reading skills should not just be limited to the sciences but should be extended to the social sciences. Similar findings are set out in another study (Petropoulou *et al.*, 2019), which highlights the importance of visual media in teaching the sciences, but with the prospect of using them in education in general.

At the same time, teachers were invited to make suggestions as to how to use transformative images more effectively in the learning process. In their replies, they particularly emphasised the need to equip schools with material-technical resources, which, with the help of special programs and software, would help teachers to create transformative images for their lessons. Particular reference was also made to the need to reskill teachers, which the participating teachers regarded as being important and beneficial. As Lafatzi (2005) argues, technologies contribute to the creation of modern and innovative ways of teaching as well as to the improvement of the entire learning process. For this reason, it is essential for all teachers to have adequate training in Information and Communication Technology so that they can use it more fully and correctly (Nikolopoulou & Gialamas, 2006). Only in this way will teachers be able to make good use of transformative images in their daily teaching, thereby making it more interesting, of better quality and more effective.

## 6. Conclusion

The subject of this survey has been to explore the views of secondary-school teachers on the use of specific illustrative material in the teaching of lessons. This is a subject which has not been studied well enough because there are aspects which still need to be investigated and which could further help to enhance this field. However, with this work, an attempt has been made to explore the aspirations of teachers who use transformative images in their teaching and to hear suggestions for improving their use.

The findings of this survey have shown that most teachers recognise the value of illustrations in the learning process and point out that they use visual representations as much as they can to achieve the desired results. They stated in their responses that these are teaching tools which help pupils to understand new concepts and save on valuable teaching time. The visualisation of information provides another way to present the facts, thereby enhancing visual perception and allowing pupils to access new knowledge more easily and better assimilate the subject being taught. The teachers thought that transformative images can improve the learning process by providing an interdisciplinary approach to the lessons.

However, it turns out in practice that their use is not always possible, because the existing equipment in many schools does not enable illustrative material to be created. At the same time, many teachers do not have the knowledge required to be able to digitally create transformative images and to use them in their daily teaching. Images contain unique information and serve as tools for organising the content of a lesson. For this reason, they should neither be underestimated nor fail to be included in teaching.

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