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Teachers' Perspectives toward Educational Illustrations in Science Textbooks for Third Graders in Jordan

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Article History	Abstract
<p>Article Submission 20 November 2020</p> <p>Revised Submission 10 January 2021</p> <p>Article Accepted 1 March 2021</p>	<p>The study investigated perspectives of third grade teachers in Jordan toward educational illustrations included in science textbooks for third grade students. to achieve the goals of the study, the researchers developed a questionnaire to collect data consisting of (54) items distributed into five areas: the extent of clarity of the educational illustrations contained in the textbook, the scientific accuracy of the educational illustrations, educational illustrations relevance to subjects, educational illustrations relevance to students and diversity of the educational illustrations. The sample of the study consisted of (114) male and female teachers. Results showed teachers' perspectives toward the scientific accuracy of educational illustrations were high, but their perspectives on the other aspects were moderate.</p> <p>Keywords: Educational illustrations, teachers' perspectives, third grade students, science textbook.</p>

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1. Introduction

Illustrations are important elements in school textbooks, especially in scientific textbooks. They support activities and accelerate effectiveness; advance methods used in achieving teaching goals, and improve teaching outcomes. They are major factors in developing teaching and learning processes and must be effective in these goals. School textbooks are one of the most basic educational tools in the learning process that aids learners to develop. It contributes to forming learners' brains, provides them with right concepts, and helps them discover their abilities and talents. The effects of textbooks are beneficial as long as they agree with learners' readiness and tendencies. Therefore, textbooks are foundational to learning and must be continuously developed to ensure effectiveness. The process of preparing textbooks is important and purposeful, involving many experts and experienced teachers to achieve specific objectives.

The effectiveness of school textbooks depends on a number of factors. Some of these include: executing vocabulary, directing teachers to use it correctly, specifying targeted activities and the availability of teaching aids such as images, shapes and other examples to serve the educational text (Bolling, et.al 2004). School textbooks rely heavily on the quality of illustrated tools to cover all aspects of life. Their existence is an indicator of textbook quality. Educational illustrations have become standards to distinguish textbooks from each other according to the selection of images, drawings accompanying the text, printing quality and color consistency (Rashrash, 2008). Educational illustrations can be defined as images that are used in conjunction with texts to explain, decorate or interpret the text (Klosa, 2015). Educational illustrations are important aids that can effectively influence and benefit young learners as they promote imagination and creativity. They can also account for individual learning differences more effectively than written text alone. Illustrations enhance the powers of observation, the ability of constructive criticism, and employ additional senses within learners, which enhances the permanence of learning (Kuzu, et.al 2007).

Children are attracted by artistic beauty and affected by visual shapes. They can be amazed by attractive bright colors, and merge with imaginative worlds whether they are realistic, potential or impossible. Young learners can assimilate meaningful messages through visual images and it may reduce their boredom during lessons. Hence, illustrations are important methods in the educational field because of their diverse benefits and roles (Kareman, 2018). Educational illustrations have design standards with clear and specific standards to fit learners in terms of their experiences and cognition, incentive toward learning, improve scientific thinking methods, self-education and understanding global or national dimensions (Barakat & Khaza'leh, 2008).

Illustrations in school textbooks can be evaluated using the following standards:

- Efficiency standard: images in textbooks achieve available educational adequacy.
- Clarity standard: images (shapes, dimensions, colors) of textbook are characterized with clarity.
- Accuracy standard: the images of textbooks is embodied in student environment
- Appropriateness of learners' age standard: images consider the age of learners and psychological and intellectual abilities.
- Harmony standard: agreement between text and images in the textbooks to strengthen the text.
- Multiplicity standard: images follow certain patterns or characterized with innovation, multiplicity, and creativity. Functional standard: do images attract the attention of learners and increase concentration levels that positively lead to understanding and comprehending textbooks? (Hanny, 2017)

Teaching with illustrations is superior to verbal teaching alone in term of developing mental processes. The positive effects of using images in the learning process include transferring meanings and verbal experiences into material that learners can easily understand. Illustrations provide learners a change from the verbal routine (Martinez & Harmon, 2012).

It is worth mentioning that although illustrations appear frequently in textbook (Al-Kawaldeh, 2013), the use of illustrations can be helpful once employed and used effectively by teachers, which cannot be attained unless the illustrations are organized and prepared to agree with design and

educational standards. Considering the fact that the first three grades of students can have difficulty understanding abstract concepts (Al Bo Hasel 2019), illustrations can be helpful in these stages.

Based on the above, this study was conducted to show the perspectives of third grade teachers in Irbid Educational Directorate towards the educational illustrations in science textbooks. The rationale for choosing third grade since their science books are full of illustrations as well as the science textbook was chosen. First, it includes many illustrations throughout the textbook. The textbook is clearly aiming to explain basic as well as complex scientific phenomena and processes both in text and in illustrations. Second, the students will be familiar with these textbooks.

Research on illustrations in textbooks has been dominated by evidence coming from analyses by researchers themselves, insights from users (e.g., students and teachers), and textbook designers. In addition using of illustrations in education is important for all subjects. This section provides a brief review of the relevant past studies.

In the study conducted by Martin and Pinto (2021) using interactive images in physics by teaching the Illustrator software that allowed the teachers to create an illusion of movement in the image when moving a page with vertical lines, enabling the student's imagining and understanding. The results of the study shows a better performance in the students answers with the interactive images, which allows teachers to infer that moving images can facilitate students' learning

Another study conducted by Trahorsch & Jan (2020) aimed to analyze and evaluate how convenient the structure of visuals represented in the curriculum in Czech geography textbooks is. The researchers used an expert evaluation of visuals in 16 textbooks by the quantitative content analysis method. The results of the analysis show that the key visual feature in geography textbooks is photographs, whose educational value is far less in comparison to other kinds of visuals.

Ghazi (2017) investigated the estimations of (190) Islamic education teachers regarding the features of Islamic education textbook development for the first three grades basic stage in Jordan. The results showed that the development features of Islamic education books ranked in medium degree. The results also revealed that developmental features in the area of educational illustrations also had an average degree and there were no statistical significance differences in responses of sample attributed to their gender, experiences or qualifications.

Al-Barakat and Khaza'leh (2008) aimed to develop a list of standards to design educational illustrations and apply them to a sample of (360) teachers of the first three grades in Irbid Educational Directorate to reveal their perspectives about employing these standards when using illustrations to teach children in those grades. The results revealed a majority of teachers supported the idea of using a developed standard list to design educational illustrations. The results also revealed no statistically significant differences in teachers' perspectives attributed to the variables of gender or qualification. However, there were statistical differences attributed to experience and grade variables. The study supported the importance of employing a developed standard list in designing educational illustrations.

Talafha (2005) conducted a study to investigate the features of development in national and social education textbooks for the tenth grade in Jordan from the perspectives of teachers and supervisors. The sample consisted of (192) teachers and (22) supervisors working in Jordanian schools of the Ministry of Education. The results indicated the scarcity of illustration aids in these books.

Barakat (2003) investigated the effectiveness of images included in Arabic language textbooks for first-graders on developing linguistic skills. Data was collected using semi open-ended interviews with teachers selected randomly, with total of (25) teachers from the first grade in the city of Irbid. The study concluded that usage of available educational images in school textbooks varied. Investment and employment of using images positively in the classroom may be affected by many different factors, including the ambiguity of images, which may not help children to understand the content as well as not considering individual differences.

1.1 Statement of the Problem

Educational illustrations are important factors in textbooks for the first three grades because they contribute to clarify concepts and improve students' learning in different skills, as well as cognitive and linguistic fields. They are a common denominator between teachers and students

since they are involved in implementing and applying them continuously. The researchers have noticed during their supervisory work that many teachers do not look to these illustrations in their teaching for different reasons including the scarcity of resources for some schools and the scientific design of illustrations, clarity and accuracy. Since teachers are primary partners to develop and improve the teaching-learning process, their perspectives are important to achieve the targeted objectives of curricula. However, teachers of science curricula in Jordan for the first three grades have faced some obstacles, e.g. time limits, the number of students, and lack of financial resources.

The purpose of this study was to examine teachers' perspectives toward the educational illustrations included in science textbooks for third graders. The following research questions guided the current study.

1.2 Research Questions

1- What are teachers' perspectives toward the clarity of educational illustrations included in science textbooks for third graders?

2- What are teachers' perspectives toward the scientific accuracy of educational illustrations included in science textbooks for third graders?

3- What are teachers' perspectives toward the correlation of educational illustrations with the subject matter for third graders?

4- What are teachers' perspectives on the relevance of educational illustrations to students included in science textbook for third graders?

5- What are teachers' perspectives toward the diversity of educational illustrations included in science textbooks for third graders?

1.3 Significance of the Study

This study investigates teachers' perspectives toward educational illustrations in third grade science textbooks. Understanding these perspectives may lead to either validity of illustrations or highlight needed changes for achieving educational goals. Understanding teachers' perspectives may be a basic step to identify the weaknesses in educational illustrations in third grade science textbooks and lead to their adjustment.

The significance also comes from interest in a research topic that very few researchers have investigated in Jordan in particular, and the Arab World in general. Therefore, it is an understudied phenomenon and is important in the Jordanian academic environment. It is expected that the results of this study will contribute to improve and enhance different educational illustrations in third-grade textbooks in Jordan.

1.4 Delimitations

The study was conducted during the first semester of the academic year 2019-2020, and it was limited to educational illustrations found in third-grade science textbooks also the sample and population of this study are limited to third-grade teachers in the schools of Irbid Educational Directorate.

2. Methodology

After reviewing the educational literature related to this study, a questionnaire was developed that included features and characteristics that were considered effective in designing the illustrations for young learners in the previous studies. The initial instrument included four domains: the clarity of educational illustrations had (14) items, scientific accuracy related to the educational illustrations had (11) items, educational illustrations relevance to subjects had (11) items, and relevance of educational illustrations to students had (17) items.

The instrument employed a five-point Likert scale (very low, low, medium, high, very high) the following values were given (1, 2, 3, 4, 5), respectively. To read the scales easily, (very low/ low) were considered as one category (low), (moderate) with the category (moderate), and (high/ very high) within the category (high). The scale then was as follows: 1-1.66 low, 1.67-3.33 moderate, 3.34-5.00 high.

The instrument of this study was distributed to 114 third-grade teachers in Irbid Educational Directorate, since the original population is small, this sample size is representative and

comprehensive results can be assumed.

2.1 Validity and Reliability

For validity Purposes six faculty members from the College of Education at Yarmouk University and six class teachers of the first three grades reviewed the questionnaire. Feedback was used to clarify some words and items. Changes were made as suggested by the reviewers. The final formula of the questionnaire consisted of five domains and (54) items. The first domain was the extent of clarity of the educational illustrations mentioned in the science textbooks and had (11) items. The second domain was the scientific accuracy related to the educational illustrations and had (9) items. The third domain was the educational illustrations relevance to subjects and had (10) items. The fourth domain was educational illustrations relevance to students and had (17) items. The last domain was the diversity of the educational illustrations and had (7) items.

In addition, for reliability the Cronbach's Alpha method was used to test the reliability for calculating internal consistency for each field. The internal consistency was 0.87. This result means that the reliability coefficient was satisfactory for the purpose of this study. Table (1) showed the value of the stability coefficient related to the questionnaire as well as the study fields.

Table: 1
Stability Coefficient and Total Stability using Cronbach's Alpha Formula

Domain	items numbers	reliability
Clarity of educational illustrations	11	0.73
scientific accuracy of educational illustrations	9	0.71
Relationship between educational illustrations and subject	10	0.56
Suitability of educational illustrations to students	17	0.71
diversity of the educational illustrations	7	0.68
Total	54	0.87

2.2 Data Collection and Analysis

The questionnaire was distributed to the sample of the study with instructions to clarify the purpose and importance of the study. The members of the sample were asked to read each item carefully and to answer them honestly. The researchers explained that the collected data were confidential and collected only for scientific research. Participants took between twenty to twenty-five minutes to complete the questionnaire. Nine completed questionnaires were excluded due to incompleteness, leaving the final number to be analyzed at (105). A current version of SPSS was used to analyze the data. Frequencies, percentages, means, standard deviations and T-tests were used on the data.

3. Results and Discussion

A .05 Alpha level was applied to all results to find significance. Means and standard deviations were computed for each domain.

Table: 2
Means, Standard Deviations and Estimation Degree to Teachers' Responses to Domains

Order	Domain	M	SD	D
1	clarity of educational illustrations	4.43	0.89	High
2	scientific accuracy related to the educational illustrations	3.93	0.41	High
3	educational illustrations relevance to subjects	2.89	0.92	moderate
4	educational illustrations relevance to students	2.89	0.97	moderate
5	diversity of the educational illustrations	2.73	0.65	moderate
	Total	3.37	0.77	High

As seen in Table 2, the highest domain of teachers' responses was "clarity of educational illustrations" ($M = 4.43$), followed by "scientific accuracy related to the educational illustrations" ($M = 3.93$), followed by "educational illustrations relevance to subjects and students" with a mean of ($M = 2.89$), and finally "diversity of the educational illustrations" had the lowest mean at ($M = 2.73$).

These results seem to indicate that designers of the curricula focused primarily on designing the educational illustrations with the domain of clarity and accuracy. At the same time, they did not focus well on the domain of diversity or relevance to students in educational illustrations. Thus the fact that the designers and planners of the curricula pay attention only to the domain of clarity and scientific accuracy of illustrations due to many reasons; For the rest of the domains, they also require from teachers a lot of effort to specify the actual availability of them since it is difficult to judge them by quick scanning or using them as illustration during the lesson which leads to minimise their effectiveness in teaching and this of course reflects on the performance of the teachers. To answer the first research question concerning the perspectives of third grade teachers in Irbid directorate toward the clarity of educational illustrations in science textbooks, means and standard deviations were computed.

Table: 3
Means, standard deviations and corresponding degrees to domain " clarity of educational illustrations"

No.	Order	Item	M	SD	D
9	1	illustrations are free from complication	4.52	1.13	high
1	2	illustrations in the textbooks are enough	4.23	0.76	high
11	3	Educational illustrations characterized with good designing	4.23	0.87	high
2	4	illustrations characterized with reality	4.17	0.79	high
3	5	illustrations reflect lesson ideas	4.17	0.79	high
4	6	illustrations are with precise colors	4.15	0.83	high
5	7	illustrations contain written text	4.13	0.86	high
6	8	illustrations depend on color contrast	4.11	0.88	high
7	9	illustrations serve the academic content	4.00	0.85	high
10	10	illustrations summarize the ideas of the textbook	2.23	1.14	moderate
8	11	illustrations diversity affect clarity	0.12	0.85	low
Total			3.65	0.89	high

As seen in table 3, the mean score related to the extent of clarity of educational illustrations mentioned in the science books in general was (3.65), which reflects a high degree of agreement on this domain. Based on the standard deviation, respondents were relatively close in agreement towards these items as a whole (0.89).

All items in this domain had a high degree of agreement, with means between (4.52-4.00), except for items (10 and 11). Item (10) was, "Illustrations summarize the ideas of the textbook," which had a moderate agreement degree with the mean of (2.23). This indicates that illustrations to abbreviate ideas were not at the level that teachers wanted. Item 11 was "Illustrations' diversity affect clarity" had the lowest mean at (0.12), which means that the diversity of educational illustrations included within the textbooks had no effects on the clarity of the targeted meaning. Few respondents to this item agreed that it had effects on clarity.

It is important to notice that the mean score had a high estimation degree and this affirmed that illustrations in the way of designing and preparation were characterized with clarity. This was affirmed by the holistic result of the domain with a high estimation degree. The result of this study contrasted with the results of Ghazi (2017), Barakat, and Khaza'leh (2018), which had estimation degrees that were moderate; Talafha (2005) also had a low estimation degree, also the results of this study contradicted with results of Valipour(2020)

in this research, researchers reviewed the illustrations of two Farsi language teaching books ,

they found that the illustrations of this book are not perfect, and poor representation of the content, unsuitable outlining, lack of clarity, unrelated to the lesson goals, and graphics ambiguity are inadequacies causes cognitive overload for the learner.

The second question concerned teachers' perspectives toward the accuracy of educational illustrations in science textbooks. Means, standard deviations and estimation degrees to each item in this domain were calculated, table 4 shows the results related to these questions.

Table: 4
Means, Standard Deviations and Estimation Degrees to "Scientific Accuracy Related to the Educational Illustrations" Domain

No.	Order	Item	M	SD	D
17	1	illustrations focus on the objectives of the subject	4.36	0.88	high
13	2	illustrations are free of scientific mistakes	4.27	0.93	high
12	3	illustrations include different topics meet the needs and interests of students	4.19	0.98	high
15	4	Illustrations considerate authenticity & modernity	4.17	0.96	high
18	5	illustrations focus on using information & communication technology	4.09	0.92	high
16	6	illustrations are characterized with scientific accuracy	4.04	0.87	high
20	7	illustrations dealt with modern issues	4.04	0.85	high
14	8	illustrations cared about applied aspects	3.96	0.89	high
19	9	illustrations are easy to understand	2.24	1.00	moderate
Total			3.93	0.92	high

Results indicated that the overall mean on the domain related to the scientific accuracy of educational illustrations was ($M = 3.93$) with standard deviation at (0.92) which fits the high estimation category. This indicated that the policy makers involved in designing and selection of these illustrations met the expectations of these teachers in scientific and applied knowledge. This may be attributed to the importance and nature of the role these illustrations played in the learning-teaching process. Item 17, "Illustrations focus on the objectives of the subject," was the highest with a mean of (4.36). This result supports the concept that curricula designers focus most on the textbook and material's objectives. All items in this domain received a high estimation ranking except for item 19, "Illustrations are easy to understand," with a mean of ($M = 2.24$). This may indicate a non-sufficient balancing between simplicity and complexity in designing these illustrations, or teachers believe that they are overly complicated and inconvenient to the students, and/or the inability of teachers to explain them well enough to students.

The third question was related to "what are the teachers' perspectives towards the educational illustrations' correlation with the subject matter mentioned in the science textbooks?" To answer this question, means, standard deviations and estimation degrees were calculated to each item/paragraph in this domain.

Table: 5
Means, Standard Deviations and Estimation Degrees for the "Educational Illustrations Correlation with the Subject Matter of Science Textbooks" Domain

No.	Order	Item	M	SD	Degree
21	1	Illustrations linked with the school textbook	4.25	0.72	high
30	2	Illustrations contribute in clarifying the content of school textbook	3.97	1.05	high
23	3	Illustrations provides flexibility in dealing with textbook	3.67	0.64	high
28	4	Illustrations provide sufficient answers to students' questions about the textbook they deal with	3.09	0.98	moderate
24	5	Illustrations encourage students toward learning	2.39	1.34	moderate
25	6	Illustrations shorten the needed time for teaching	2.09	0.98	moderate
22	7	Illustrations provide students with experiences to enlarge their perception toward their materials	2.03	0.85	moderate
29	8	Illustrations help in translating material content to applicable material	2.01	0.89	moderate
27	9	Illustrations provide students and teachers with chances to discuss the lesson topics	1.97	0.75	moderate
26	10	Illustrations consider cognitive structure to the diverse educational materials	1.87	0.89	moderate
		Total	2.73	0.91	moderate

As seen in table 5, the results indicated that teachers rated an average degree (moderate) to the domain of educational illustrations correlation with the subject matter of science textbooks. This can be explained by the possibility that the teachers do not seem to be creative and resourceful enough in correlating the illustration with the instructional materials and subject matter to make the teaching and learning more effective. Moreover, many of the illustrations may not represent the

ideas they intended. However, illustrations in some fields were high on teachers' estimations except in the field of correlation with the subject matter.

It is clear from table 5 that these teachers do agree that educational illustrations were linked well with the material, were able to clarify the content, and provided some flexibility to the educational material. This result might be explained by the fact that the illustrations focused on main ideas and obtaining essential skills for students. However, teachers' estimations for the remaining items in the domain were only moderate. This may be attributed to the inability of designers to recognize the needs and cognitive abilities of children this age as well as the teachers. While the designers of educational illustrations focus on accuracy, colors and other aspects, teachers focus on the educational and psychological dimensions for children and not only on professional aspects. This was supported by Martinez and Harmon's (2012) study that aimed to reveal the relationship between the functions of images and texts as well as the importance of this correlation.

The fourth question was related to how the teachers felt the illustrations were relevant to their students. Means, standard deviations and estimation degrees were calculated for each item .

Table: 6
Means, Standard Deviations and Approval Degree on "Educational Illustrations Relevance to Students" Domain

No	Orde	Paragraph	M	SD	degree
38	1	Illustrations enhance the idea of group work	4.71	0.98	high
43	2	Illustrations provide students with enhancement & development within textbooks	4.52	0.86	high
31	3	Illustrations consider individual differences	4.27	0.74	high
39	4	Illustrations suit students' chronological age	4.23	0.77	high
32	5	Illustrations suit students' mental age	4.20	0.89	high
41	6	Illustrations enable students to understand the materials simply	4.12	0.86	high
34	7	Illustrations contribute in the effective participation in the material	4.09	0.87	high
42	8	Illustrations diversity addresses students differently	4.00	0.94	high
33	9	Illustrations enhance students' super-cognitive skills	3.56	0.78	high
44	10	Illustrations harmonize between theoretical & practical style	2.97	1.06	moderate
45	11	Illustrations provide learners with sufficient feedback	2.65	1.12	moderate

40	12	Illustrations suit students' needs precisely	2.65	1.23	moderate
46	13	Illustrations provide students with chances to apply what was learned inside the classroom	2.10	0.97	moderate
35	14	Illustrations suit students' environment	2.09	1.03	moderate
36	15	Illustrations are derived from students' culture	1.89	1.12	moderate
47	16	Illustrations suit students' attitudes	1.34	1.76	moderate
37	17	Illustrations are characterized with easiness & clarity	1.12	1.14	Low
		TOTAL	3.21	1.00	moderate

Results indicated that teachers felt illustrations were relevant to students to a moderate degree ($M = 3.21$), with the deviation at (1.00). This reflects general agreement in the sample members' answers. In general, any illustration demands precise designing to achieve educational goals. However, the illustrations do not support and clarify the content well enough to meet all students' needs, so this is why the degree was moderate. Nine items had a high agreement degree, with their means ranging between (4.71- 3.56). The researchers attribute the high agreement degree of these items to several reasons. First, the designers focus on areas that attract the attention of students towards cognition and discussion in classrooms; second, the awareness of designers on the needed enhancements and developments to these illustrations, and third the importance of teacher's role in achieving educational goals to enable students to interact with such illustrations precisely.

Item 37, "Illustrations are characterized with easiness & clarity" showed the lowest mean at ($M = 1.12$). This is potentially attributable to the fact that some teachers do not pay enough attention to these illustrations because they need to complete the curriculum. In addition, the results indicated that teachers do not ignore the importance of educational illustrations and the necessity of their usage, but they do not show enough interest with these illustrations due to many reasons such as caring about the scientific content more than trying to explain these illustrations. This is shown in their moderate estimations on whole for the domain. This was affirmed in the study by Al-Barakat (2003), which indicated that the important factors in teaching the educational illustrations is their relevance to students and consider the individual differences.

The fifth question was related to teachers' perspectives towards the diversity of educational illustrations. Means, standard deviations and estimation degrees were calculated for each item in the domain.

Table: 7
Means, standard deviations and estimation degree to domain "the diversity educational illustrations."

No	Order	Item	M	SD	degree
53	1	Illustrations are diverse without repetition	4.61	1.23	high
52	2	Illustrations suit different cognitive structure for materials	3.92	1.34	high
49	3	Illustrations present different models within the same educational material	3.13	0.91	moderate
51	4	Illustration's diversity does not distract students within the same educational material	2.52	1.04	moderate
48	5	Illustration's diversity provides students with integrated experiences	2.30	1.02	moderate
54	6	Illustrations depend on different shapes within the same material	2.12	0.76	moderate
50	7	Illustration's diversity concentrates on higher levels of thinking	1.71	1.11	moderate
		Total	2.90	0.93	moderate

As seen in table 7, teachers' perspectives indicated a moderate level of diversity in educational illustrations for the whole domain ($M = 2.90$). However, the first two items concerning the diversity and cognition structure was rated high; this can be attributed to the fact the teachers were aware of the importance of the illustrations and the need for diversity and suitability. While, the item "Illustrations have diversity in concentration on higher levels of thinking" got the lowest rank with a mean of (1.71), which is a moderate degree. This contrast is possibly attributable to the teaching methods that teachers use educational illustrations, whereas the teachers' estimations in general regard this item with a moderate degree. This confirms that concentration on the higher levels of thinking in educational illustrations did not have a tangible effect from the teachers in a way that increased their estimations regarding this item.

This result contradicts with a study conducted by Talafha (2005) that found scarcity and the absence of diversity in educational illustrations mentioned in the tenth-grade textbooks. This difference may be due to different grade levels (third and tenth grades).

4. Conclusion, Recommendations and Implications

In summary, the evidence obtained supports those developers, designers, planners and teacher must be extremely aware about the effectiveness of illustrations in science textbooks. They also need to be well aware of the importance of using a systematic procedure to design and evaluate illustrations to ensure valid learning for curricula.

In light of the results, this study recommends to concentrating on the clarity and preciseness of images, shapes and drawings, correlation of illustrations with the textbooks before including them in school textbooks , in addition focused on the suitability of educational illustrations to students and Working on diversity of educational illustrations that suit student' abilities.

More further conducting additional studies to investigate perspectives of first three grades' students towards educational illustrations mentioned within their textbooks, and conducting similar studies for different textbooks and grades by using different ways to collect data like qualitative research.

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