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# Teaching Students with Low Academic Achievement in Reading Through Multisensory Approach – Intervention Programme

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## ABSTRACT

Jolly Phonics is a multisensory approach designed to teach children how to read, write and spell using a systematic multisensory phonics program. It uses synthetic phonics method. In this programme children learn the letter sounds first and then move on to blending [putting together] the sounds in order to read words. Jolly Phonics was developed for children from junior kindergarten to grade 2. It can be used for children who have reading/ writing difficulties. The researchers have noticed, while working as supervisors in Cycle One Omani schools, that grade three students have certain weaknesses in reading. They realized that some students could not even read simple words though they have spent 2 years and a half studying English. In order to investigate this problem, six low achievers students from grade 3 were selected; they were males and females and their age is between 8-9 years old. A certain scheme was designed; it included teaching one lesson a week for 4 months using Jolly Phonics programme. The teacher was provided by the Jolly Phonics materials to help her teaching the lessons effectively. The programme included learning the letter sounds, learning the letter formation, blending, identifying sounds in words and spelling the tricky words. A certain exam has been given to the students before and after the programme. The results show that there is a noticeable improvement in the students' academic achievement comparing with their previous level. The presentation will be interactive, researcher and audience together will explore to what extent this programme has certain effectiveness on students' performance. Findings will be set beside those from previous studies, implications for the Omani classroom will be discussed, and recommendations made for future research. Excerpts from students reading and writing will be shared with the audience.

**Keywords:** teaching low achievers, multisensory approach, intervention programme

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## INTRODUCTION

Multi-Sensory approach teaches reading and writing through using auditory, visual and kinesthetic pathways; it is diagnostic as it involves constant testing and reflection on the knowledge of the student (Al-Mamari, 2012). It is systematic and seeks to unite the components of written language. Thus, it treats sound-symbol knowledge, oral language (grammar and pronunciation), written language conventions and handwriting in an organised and integrated ways (Steward, 2011). The researchers have noticed, while working as supervisors in Cycle One Omani schools, that grade three students have certain weaknesses in reading. They realized that some students could not even read simple words though they have spent 2 years and a half studying English For Me syllabus. As supervisors, they believe in a developmental approach to teaching literacy skills. Therefore, they utilize an intervention programme based on jolly phonic approach as it is a multi-sensory approach to teach children the sounds of the English language and their alphabetic representations. Each sound is taught through a story with a

picture clue and motion to help students remember the sound. Jolly Phonics is a programme designed to teach children how to read, write and spell using a systematic multisensory phonics program. It uses synthetic phonics method. In this programme children learn the letter sounds first and then move on to blending [putting together] the sounds in order to read words. Jolly Phonics was developed for children from junior kindergarten to grade 2 and it can be used for children who have reading and writing difficulties (Al-Mamari, 2012).

## LOW ACADEMIC ACHIEVEMENT IN READING

Reading is central to the learning process. It is considered as one of the most difficult tasks of a language teacher to foster. Unfortunately, due to time limits and other constraints, teachers are often unable to actively encourage children to approach, Latha (2005). Thus, many students still face serious difficulties in reading and always seek for help from teachers. In Omani context students who are suffering from

reading difficulties, as characterized by Al Humidi (2009), are those who have very basic grapho-phonemic knowledge which allow them to sound some (but not all) of the words. Their syntactic knowledge, though, seem limited and they are not able, for example, to use morphological clues to work out the meanings of words. Their vocabulary is very limited, and thus they rely largely on pictorial clues in interpreting the text. Their ability of reading on the whole is very slow and they are very hesitant and lack confidence.

## REVIEW OF RELEVANT STUDIES

In 2004, Watson & Johnston conducted a study that offered support for synthetic phonics applied for 3 groups. One group received an analytic phonics programme, the second group received the same programme plus phonological awareness training and the third group was taught using a synthetic phonics method. The intervention programme was 20 minutes a day and lasted for 16 school weeks after which the participants were post –tested. It was found that the synthetic phonics method group had better reading, spelling and phonemic awareness than the other 2 groups that were taught by analytic phonics.

Dalgreen & Boulware- Gooden (2002) conducted a study to examine the efficacy of a multisensory teaching approach to improve reading skills at the first-grade level. The control group was taught by Houghton-Mifflin Basal Reading programme while the treatment group was taught by the Language Basics which incorporates the Orton- Gillingham-based Alphabetic Phonics Methods. The Orton-Gillingham, similar to the jolly phonics, is a multisensory method of teaching language related skills that focuses on the use of sounds, syllables, words, sentences and written discourse. The results showed that the treatment groups made statistically significant gains in phonological awareness, decoding and reading comprehension while the control group made gains only on reading comprehension.

Stewart (2011), in a quasi- experimental study, investigated whether first grade struggling readers, those who score below the 30<sup>th</sup> percentile, will make greater progress in decoding skills with phonics instruction that is based on a highly systematic and multisensory instructional approach than struggling readers using a traditional design. The experimental group received multisensory instructions through direct teaching of synthetic sequential phonics using Orton-Gillingham approach while the control group received phonics instructions using a traditional basal reading approach. Pretest and posttest scores measured progress on word attack and word identification. Data analyses using t-test results support that direct instruction using systematic, multisensory, synthetic phonics techniques significantly increased the decoding skills of readers.

Al-Mamari (2012) conducted a quasi- experimental study to investigate the effectiveness of integrating synthetic phonics instruction on developing early reading skills (namely phonics identification, phonemic awareness and word reading skills). The study also compared students' performance in early reading skills with the minimum required level set by the Ministry of Education in Oman. Two intact classes comprising fifty grade one Omani students from Yanabi-Al-Hikma School in Batinah South Governorate participated in the study. One class, the experimental class was taught using a commercially synthetic program called Jolly-Phonics while the control class was taught using the traditional method of whole word reading. Both groups were pretested on measures of phonics identification,

phonemic awareness and word reading prior to the 9- week intervention using either the experimental or control method. Then students were post-tested on all measures immediately after intervention. Data analyses using t-test results support that direct instruction using synthetic phonics techniques significantly increased phonics identification, phonemic awareness and word reading skills of readers.

## THE PURPOSE OF THE PROGRAMME

In Oman, the English language is considered as a foreign language for Omani students studying in government schools. Students in Oman start learning English from grade one and they take seven weekly lessons of 45 minutes long in the first four grades. Despite the great emphasis in developing reading skills, we have noticed as supervisors that most students in cycle one schools still encounter difficulties in reading. According to our observations, we have noticed that students see words as whole patterns and, therefore, memorize the look of words and learn to associate the printed word with meaning which is the Omani developed "English For Me" syllabus is based on. We have experienced that 4 out of 30 students in grade 3 could not even read simple words or recognize simple letters. Based on that, the current intervention programme investigates the effect of integrating multisensory approach within the "English For Me" syllabus for grade 3 low achievers.

## THE METHOD

In order to investigate this problem, six students who have serious weaknesses in reading were selected. They are in grade 3 from Ashuaiba (1-4) school; they were 4 boys and 2 girls, and their age is between 8-10 years old. The six students have been selected from different academic and social back grounds. These students have been chosen on specific criteria including previous academic performance (continuous assessment records), teachers' daily observations, students' portfolios and pre-test. The students have been taught by Wafa Al Nofli, who is one of the best and well qualified teachers in A'shuaiba school. A certain scheme was designed; it included teaching one lesson a week for 3 months using multi- sensory Jolly Phonics programme after which the students were post-tested. The teacher was provided by the Jolly Phonics materials to help her teaching the lessons effectively. The programme included learning the letter sounds, learning the letter formation, blending, identifying sounds in words and spelling the tricky words. A certain exam has been given to the students before and after the programme.

## RESULTS AND DISCUSSIONS

The students have shown good improvement in reading letters and simple words as it is clearly shown in **Table 2** of post test scores. The improvement shown by the students in reading skills could be attributed to the Jolly phonics programme which has implemented with the targeted group. The programme emphasizes the teaching of phonics, word reading and phonemic awareness. The findings match previous researches that investigated the effectiveness of synthetic phonics in settings where English is spoken as a first language (Watson

**Table 1.** Pre test scores

No	Name	Class	Pre test						Total score of correct responses
			Letters			Words			
			Correct	Incorrect	NR	Correct	Incorrect	NR	
1	Yaqeen Al Shabibi	3/1	11	7	8	3	18	5	14
2	Aysha Al Nofli	3/2	17	3	6	16	10	0	33
3	Mohammed Al Hanai	3/3	11	12	3	0	23	3	11
4	Waleed Al Shiryani	3/4	6	5	15	3	23	0	9
5	Mishari Al Beloushi	3/4	7	19	0	0	26	0	7
6	Ammar Al Jabri	3/3	17	9	0	11	15	0	28

**Table 2.** Post test scores

No	Name	Class	Post test						Total score of correct responses
			Letters			Words			
			Correct	Incorrect	NR	Correct	Incorrect	NR	
1	Yaqeen Al Shabibi	3/1	22	4	0	22	4	0	44
2	Aysha Al Nofli	3/2	Transferred						
3	Mohammed Al Hanai	3/3	16	7	2	16	9	1	32
4	Waleed Al Shiryani	3/4	16	8	3	15	11	0	31
5	Mishari Al Beloushi	3/4	20	4	2	14	12	0	34
6	Ammar Al Jabri	3/3	25	1	0	25	1	0	50

& Johnston, 2004; Boulware- Gooden, 2002; Stewart, 2011). Besides, improvement made by students in phonics identification could be referred to some elements found in synthetic phonics instruction in addition to some other elements unique to Jolly Phonics. For example, phonics teaching is multisensory and is done using all learning pathways in the brain (Kinesthetic, visual, auditory and tactile) which enhances memory and learning, Al-Mamari (2012).

It has been noticed that students have enjoyed learning using the multisensory approach (Jolly Phonics programme) because, according to the scheme, for each letter introduced there is a story, a simple song and an action reflecting an event in the story. Added to this, there is also simulating picture within the programme (including big books, flash cards and visual cards) that enhance students recall of these phonics. Moreover, students maintain workbooks that contain pictures illustrating the actions for each letter which help students to remind them of the actions and accordingly the corresponding letters. It is worth mentioning that the students' families have played a vital role in upgrading the students' level. Being in contact with the students' families, via what's up group, paved the road for the teacher to follow up her students successfully. Gutman & McLovd (2000) have stated that parents, as managers of their children's environments, not only create learning environments within the home but also encourage, organize, and supervise their children's educational opportunities in the community.

Some other factors have an influence on the targeted low achievers ability to improve their reading skill in this programme as summarized by Pressley & Hilden (2006). They proposed that not only knowledge and use of learning strategies are essential for learning and achievement but that various individual characteristics of learners influence their ability to be self-regulated and to act successfully during learning; some of these are prior achievement, domain-specific knowledge, performance and regulation strategies and cognitive motivational differences. Moreover, another factor that affects the students' ability to improve rapidly is students' engagement and participation with the teacher in the lessons which makes them more confident and eager to learn. Hall (1984) has stated that students' engagement with active

responding or opportunity to respond is a key factor in any academic achievement programme for students who face difficulties in reading,

## TEACHER'S FEEDBACK UPON THE TARGETED GROUP PERFORMANCE

The teacher has played a significant role to improve the students' performance in reading. The teacher has established good rapport with the students; for example, she is very patient, flexible, funny as well as cooperative. She was very keen to analyze her students' personality and she was a very good observer of their gradual academic progress.

The teacher maintains an organized and accurate field notes upon each student's performance based on her daily observation. Accordingly, she has noted that the whole students enjoyed learning the sounds with actions. She mentioned that the enthusiastic learning environment including songs, tactile activities, flash cards and using big book for story demonstration has promoted students to participate willingly in the programme. Besides, the small number of the students (six students only) as well as using various teaching techniques has encouraged them to be more confident and willing to share with their classmates. Also, what helps the students to improve rapidly that they have been chosen from the same academic standard (Low achievers); therefore, they have felt more independent and comfortable to learn together and correct each other's mistakes.

## SAMPLES OF THE TEACHER'S COMMENTS UPON EACH INDIVIDUAL STUDENT

*Al Yaqeen was very shy and she remains shy till the end of the programme. She wasn't that much initiative and always afraid to participate. Her parents are old and no one could help her at home. She prefers working in group rather than individually. At the end of the programme she has shown great improvement; in instance, the total score of her performance in the pre-test is 14, while the total score of her post-test is 44.*

*Aysha was the best in the pre-test as seen in Table 1. She was quite and that might due to her parents' divorce. She could recognize sounds easily but she couldn't read words. She is very quite but she is willing to participate in the written activities. I have noticed good improvement in reading words consisting*

of three sounds. She is good in blending and her performance in the tactile activities was amazing. Unfortunately, Aysha couldn't conduct the post test due to her family circumstances.

Mohammed missed some lessons because his mother seems to be busy. At the beginning wasn't able to recognize sounds or words and that has been evident from his pre- test score (11). His low performance might due to the private school that he spent 2 years in. Gradually, Mohammed has shown good improvement in reading words and that was clearly seen in his post-test (31).

Al Waleed was very moody and very dependent on his father. He is suffering from serious disease. He has the ability to read and write but he got bored easily. He has shown great improvement; in instance, the total score of his performance in the pre-test is 9, while the total score of his post-test is 31.

Mishari is the only child in his family. He is willing to participate with his classmates and his handwriting is very neat. He is a very well-organized student among his classmates. His low performance at the beginning of the programme might due to lack of parents' follow up. He has shown great improvement; in instance, the total score of his performance in the pre-test is 7, while the total score of his post-test is 34.

Ammar has suffered from some family problems and that affected his academic performance at the beginning of the programme. Gradually, he has gained some confidence from his teacher and his classmates. He seems to be very interested in the programme thus he was the best among his group. He has shown great improvement; in instance, the total score of his performance in the pre-test is 28, while the total score of his post-test is 50.

## DIFFICULTIES OF IMPLEMENTING THE PROGRAMME

- Lack of collaboration from the part of school administration in setting up the schedule of the programme.
- The timing of the programme is not suitable for both the teacher and the students.
- The scheme is too detailed and needs some amendments regarding the content; for example, more time is needed for teaching 'tricky words' and 'diagraphs'. Besides, teaching five individual sounds is beyond the students' ability.
- Shortages of instructional materials.
- Lack of cooperation from the part of students' parents.

## RECOMMENDATIONS

- This type of intervention programme should be conducted from the beginning of the year.
- The materials should be prepared in advance, therefore, the concerned teacher will be able to run the programme earlier.
- A meeting with parents should be conducted prior to the programme implementation.
- Clear instructions concerning conducting pre and post tests should be stated and discussed with the concerned teacher from the beginning of the year.
- Such programme will be of great benefit for low achievers, as they are usually highly neglected by their teachers in the normal lessons. On this basis, schools should integrate such intervention programme to the whole low achievers in the school. This can be included in the school annual plan.

To conclude, the study identified certain areas that need attention. Firstly, it suggests that a new assessment tool needs to be developed to identify those who need such intervention programmes. Secondly,

closer collaboration between teachers, parents, students and other professionals could strengthen the diagnosis process, which could see the structured use of observations. Thirdly, teachers, parents and students themselves should be more systematically involved in sharing knowledge, experience and skills in order to help students with low academic achievement in reading. Finally, the study suggests a strategy needs to be developed that will enable support to be provided for all students who have certain weaknesses in reading, that is, such students to be under focus while teaching takes place. It suggests a move towards inclusive classrooms and inclusive teaching, and the use of differentiated instruction and differentiated tasks that give all the opportunity to achieve, Al Ghafri (2009).

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**Web Resources**

[http://www.ehow.com/info\\_8742280\\_homemade-phonics-games](http://www.ehow.com/info_8742280_homemade-phonics-games)

<https://www.wordsforlife.org.uk>

<http://search.proquest.com/docview/225382153?accountid=27575>

<http://search.proquest.com/docview/856900916?accountid=27575>

<http://learninghelp.org.au/multi-sensory-approaches-to-teaching/>



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## The Evaluation of Elementary 4th Grade Science Curriculum

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### ABSTRACT

The aim of this study is to evaluate Primary Institutions Science Curriculum implemented in 2004-2005 and revised in 2013 education year. The dimensions of the curriculum, which are needs assessment, aim, content, learning-teaching process and assessment process, will be evaluated in terms of principles of curriculum design. The data of research has been collected with "Curriculum Evaluation Analysis Form", prepared by researchers. In this study, document analysis has been used to demonstrate the features of elementary 4th grade science curriculum in terms of the elements of education program. The reliability of analysis form has been found .73. According to the results obtained from study, regional disparities have been ignored in the process of determining needs assessment. In addition to this, determining the objectives of the curriculum beforehand doesn't match the basics of approach it relied on. However, content, learning-teaching process and assessment process dimensions of curriculum have been prepared according to the basics of curriculum design.

**Keywords:** science and technology course, science course, curriculum evaluation

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### INTRODUCTION

Science and technology education play a key role in terms of the future of societies today when scientific knowledge is growing increasingly, technological innovation is in advancing rapidly and the impact of technology is seen clearly in all areas our lives. Therefore, all societies especially developed ones are trying to improve the quality of science and technology education constantly. This situation, bringing together new approaches in education, has revealed the necessity of the renewal of Science and Technology Curriculum. In the light of the emerging needs, Elementary 4th Grade Science Curriculum has been renewed and started to be implemented under the name of Primary Institutions Science Curriculum by the Ministry of National Education the Board of Education (MEB, 2005).

At first, from the beginning of 2004-2005 academic year Science and Technology Course has been taught in the first level of 120 pilot schools by Ministry of National Education (MONE) and then it has started to be implemented in all first levels of schools in 2005-2006 academic year. Then, the new curriculum has been officially implemented in all sixth grades of secondary schools in 2006-2007 academic year. The ongoing curriculum evaluation and development after the implementation of the curriculum and the recent changes done according to 4+4+4 system have occurred in 2013 academic year and it has been launched to teach as Primary Institutions Science Curriculum (3-8).

Lots of studies were conducted in order to enforce the effectiveness of curriculum, to identify the shortcomings of it, if there was, and to correct them. Ministry of National Education (2004) was conducted a research taking teachers' views to investigate strengths and weakness of 2004 curriculum which is the basis of 2013 curriculum. The most powerful aspects of the curriculum are the spiral structure, taking into account individual differences, going towards minded individuals, materialization, the foundations of the curriculum, efforts in preparation and reduction the number of topics. In the same research, the weakest aspects of curriculum are supporting education of teachers, unity of language, the integration of science and mathematics, the integration of science and life science, the concept of unified class and the equipments. When looking at other researches on this issue, there are similar and different views.

Sert (2008) says that curriculum and practices dimensions of Science and Technology curriculum compliance with the principles of constructivism, however there are some uncertainties in content, learning-teaching process, assessment process dimensions and the usage of resources. It was found that there were some problems about the implementation of the curriculum and the principles. The studies done by Özkan (2002); İnce (2005); Çınar, Teyfur & Teyfur (2006); Gözütok, Akgün & Karacaoğlu (2005); Erdoğan (2005); Özsevgeç (2006); Ünal & Akpınar (2006); Yiğit, Devcioğlu & Ayyacı (2007); Gömleksiz & Bulut (2007); Dindar & Yangın (2007); Tüysüz & Aydın (2009); Doğan (2010) support the idea that the curriculum can not be performed in desired level according to teachers' perspective.

According to the results of research about the evaluation of the curriculum done by Dede Er, Sari and Çelik (2013), students fail to associate between the acquired knowledge in the unit "Electricity in Our Lives" and daily life. Moreover, when students increase the levels of science process skills, they can associate between knowledge and daily life.

Reseachers made different evaluations about 2013 curriculum in terms of the content, objectives, vision and approaches of it. However, these studies are generally about teachers' opinions about the curriculum and mostly about implementation of the curriculum. In other words, there aren't much studies about the main elements of the curriculum. Whether the basic elements of the curriculum (needs assessment, objectives, content, learning-teaching process, assessment process) are formulated according to the principles of curriculum development or not is important for the achieving the curriculum's objectives. In this context, in this study, the basic elements of elementary 4th grade science curriculum (needs assessment, objectives, content, learning-teaching process, assessment process) will be examined with analysis form preperad according to the principles of the curriculum development.

In this study, it is aimed to evaluate the needs assessment, objectives, content, learning-teaching process, assessment process dimensions of the elementary 4th grade science curriculum which was implemented in 2005-2006 academic year and renewed in 2013 academic year according to the principles of the curriculum development. For this purpose, the sub-problems are defined as follows:

- 1- What is the compliance level between the determined criteria and "needs assessment" of elementary 4th grade science curriculum?
- 2- What is the compliance level between the determined criteria and "objectives" of elementary 4th grade science curriculum?
- 3- What is the compliance level between the determined criteria and "content" of elementary 4th grade science curriculum?
- 4- What is the compliance level between the determined criteria and "learning-teaching process" of elementary 4th grade science curriculum?
- 5- What is the compliance level between the determined criteria and "assessment process" of elementary 4th grade science curriculum?

## METHOD

In this study, document analysis has been used to reveal the properties of elementary 4th grade science curriculum in terms of the basic elements of it. Document analysis involves in the analysis of written materials containing knowlence about cases and the intended case. Document analysis is a data collection technique which is essential for almost every survey (Madge, 1965). Which documents are important and can be used as a data source is closely related to the research problem (Goetz and LeCompte, 1984). Therefore, elementary 4th grade science curriculum prepared by Ministry of Education The Board of Education has tried to reveal general condition of the basic elements of the curriculum and to evaluate in a systematic manner with the criteria in the observation form.

**Table 1.** The score ranges of criteria

I completely agree	5.00	4.20
I agree	4.19	3.40
Somewhat agree	3.39	2.60
I agree less	2.59	1.80
I disagree	1.79	1.00
No information	0	

## Data Collection and Analysis

At the stage of data collection, the literature related to needs assessment and the basic elements of curriculum were reviewed in order to ensure content validity. In the light of this information, an item pool including a large number of criteria which could reveal the characteristics of curriculum was generated. These criteria were examined by an expert\* and three teachers\*\*, who are PhD students in "Curriculum and Teaching Department", and then necessary corrections were made to form the last version of an analysis form. The analysis form prepared in order to evaluate needs assessment, objectives, content, learning-teachig process, assessment process dimensions of the curriculum has been called "Curriculum Evaluation Analysis Form". Reseachers were educated about curriculum evaluation and analysis form and then the form was filled.

The analysis form\*\*\* consists of five sections. The first part is "needs assessment", the second part is "objectives", the third part is "content, the fourth part is "learning and teaching process" and the fifth part is "assessment process". These sections were evaluated by three PhD students in Curriculum and Teaching Department by examining elementary 4th grade science curriculum which is the part of the Primary Institutions Science Education Curriculum 3, 4, 5, 6, 7 and 8. Grade published by Board of Education in 2013 academic year. In addition, researchers benefited from the publications of Board of Education related to the curriculum development and the introduction part of the curriculum being in 2005 curriculum but not in 2013 curriculum.

The percentage of agreement between analysis done by experts was calculated in order to ensure the reliability of research (Miles and Huberman, 1994). In this study, for this purpose, "Consensus/(Consensus+Dissidence)\*100" formula was used and the reliability was calculated as .73. According to Sencan (2005), the percentage of agreement is the ratio of the total number of assessment or observation to the number of criteria observers and assessors match. In order to accept the values as reliable, the percentage of agreement must be above .70. The score ranges of criteria (Table 1), according to Range Width=(String Width)/(The Number of Groups) formula was determined as 4/5=.80 (Tekin, 1996).

## FINDINGS

In this research, analysis form was filled individually by three teachers who are PhD students in Curriculum and Teaching Department and evaluated by calculating average scores.

- 1- What is the compliance level between the determined criteria and "needs assessment" of elementary 4th grade science curriculum?

According to Table 2, when determining the needs, environmental or regional differences haven't been considered. It is observed that there is no information about that scientific developments have been taken

**Table 2.** The evaluation of “Needs Assessment” dimension of elementary 4th grade science curriculum

NEEDS ASSESSMENT	OBSERVER1	OBSERVER2	OBSERVER3	AVERAGE
1. When determining the needs, environmental and regional differences are taken into account.	1.00	1.00	1.00	1.00
2. Scientific developments are taken into account when determining the needs.	5.00	5.00	5.00	5.00
3. The overlap level of the needs with education philosophy				
3.a. Perennialism	1.00	1.00	1.00	1.00
3.b. Essentialism	1.00	1.00	1.00	1.00
3.ç. Progressivism	4.00	5.00	4.00	4.33
3.d. Re-constructionism	4.00	4.00	4.00	4.00
4. The usage of needs assessment techniques:				
4.a. Delphi technique is used.	0	0	0	0
4.b. Questionnaire development technique is used.	0	0	0	0
4.c. Dacum technique is used.	0	0	0	0
4.ç. Occupation analysis technique is used.	0	0	0	0
4.d. Measuring tools-testing technique is used.	0	0	0	0
4.e. Interview-group meetings technique is used.	5.00	5.00	5.00	5.00
4.f. Observation technique is used.	0	0	0	0
4.g. Literature review technique is used.	5.00	5.00	5.00	5.00
5. When determining the needs, the views of stakeholders are taken into account:				
5.a. Experts Views	5.00	5.00	5.00	5.00
5.b. Students' Views	5.00	5.00	5.00	5.00
5.c. Teachers' Views	5.00	5.00	5.00	5.00
5.ç. Parents' Views	5.00	5.00	5.00	5.00
5.d. Managers' Views	5.00	5.00	5.00	5.00
5.e. Inspectors' Views	5.00	5.00	5.00	5.00
5.f. Non-governmental Organizations' Views	5.00	5.00	5.00	5.00
6. When determining the needs, the needs assessment approaches are used:				
6.a. Different approach is adopted.	0	0	0	0
6.b. Descriptive approach is adopted.	0	0	0	0
6.c. Democratic approach is adopted.	4.00	4.00	4.00	4.00
6.ç. Analytical approach is adopted.	4.00	4.00	4.00	4.00
7. Determining the stage of needs assessment:				
7.a. Preparatory work is carried out.	5.00	5.00	5.00	5.00
7.b. Data collection efforts are carried out.	5.00	5.00	5.00	5.00
7.c. Data analysis is carried out.	5.00	5.00	5.00	5.00
7.ç. Information reporting is carried out.	5.00	5.00	5.00	5.00
7.d. Use of information studies is carried out.	5.00	5.00	5.00	5.00
8. Needs assessment studies meet the needs of individuals.	4.00	4.00	4.00	4.00
9. Needs assessment studies meet the needs of community.	4.00	4.00	4.00	4.00

\* and \*\* while preparing these criteria, Assoc. Prof. Gürbüz Ocak, working in Universtiy of Afyon Kocatepe Faculty of Education Department of Educational Sciences Curriculum and Teaching, and three teachers and PhD students in the same department, Ramazan Yurtseven, Zeynep Gökteke and Emine Akkaş Baysal, express their opinions. \*\*\*The analysis form used in this study is intended to be used in the evaluation of other curriculums. The analysis form was used in “The Evaluation of Secondary School’s Fifth Grade Social Science Curriculum” in ICOINE2014.

into account when determining the needs. Observers’ response to the criterion which says that the education philosophy of the curriculum overlaps with idealism and essentialism is “disagree” level; however, their response to the criterion which says that education philosophy of the curriculum overlaps with progressivism and re-constructionism. Observers stated their opinions as “I completely agree” level to the criterion which says stakeholders’ views are taken while determining the needs. They expressed their opinions as “I agree” to the criterion which says democratic and analytical approach are used. They stated their opinions as “I completely agree” to the criterion about the steps followed in needs assessment. They responded as “I agree” level to the criterion which says needs assessment meets the needs of individuals and community.

2- What is the compliance level between the determined criteria and “objectives” of elementary 4th grade science curriculum?

According to **Table 3**, observers have expressed their opinions as “I completely agree” to the criterion which says that the curriculum has both overall and specific objectives. It is seen that objectives overlap the

needs and specific objectives. Moreover, they have expressed their opinions as “I agree” to the criterion saying the overlap of objectives with progressivism and re-constructionism. It is stated that neither Bloom’s Taxonomy nor Bloom’s Revised Taxonomy are taken into consideration. Observers have stated their opinions as “I agree” to the criteria which say objectives show what students should do, objectives are related to learning products, objectives are seen to be self consistent, objectives are feasible and accessible, objectives are accessible during academic year.

3-What is the compliance level between the determined criteria and “content” of elementary 4th grade science curriculum?

According to **Table 4**, the content of the curriculum overlaps objectives. Observers have stated their opinions as “I agree” to the criterion which says objectives of units are suitably shared in time of units. However, they have said that topics don’t consist of extensive information. Content is achievable and there is a relation between topics and activities. According to findings, the content is not organized in a modular form. There is relation between interdisciplinary

**Table 3.** The evaluation of "Objectives" dimension of elementary 4th grade science curriculum

OBJECTIVES	OBSERVER 1	OBSERVER 2	OBSERVER 3	AVERAGE
1. The overall objectives of the curriculum are stated.	5.00	5.00	5.00	5.00
2. The specific objectives of the curriculum are indicated.	5.00	5.00	5.00	5.00
3. Objectives overlap with the needs.	4.00	4.00	3.00	3.66
4. Objectives overlap with specific objectives.	4.00	4.00	4.00	4.00
5. The overlap of objectives with education philosophy:				
5.a. Perennialism	1.00	1.00	1.00	1.00
5.b. Essentialism	1.00	1.00	1.00	1.00
5.c. Progressivism	4.00	5.00	5.00	4.66
5.d. Re-constructionism	4.00	4.00	4.00	4.00
6. Bloom's Taxonomy is taken into consideration when determining objectives.	1.00	1.00	1.00	1.00
7. Bloom's Revised Taxonomy is taken into consideration when determining objectives.	1.00	1.00	1.00	1.00
8. Objectives express what students should do.	5.00	5.00	5.00	5.00
9. Objectives are based on learning products.	4.00	4.00	4.00	4.00
10. Objectives seem to be self-consistent.	4.00	4.00	4.00	4.00
11. Objectives are feasible.	4.00	4.00	4.00	4.00
12. Objectives are achievable.	4.00	4.00	4.00	4.00
13. Objectives are reachable during an academic year.	4.00	4.00	4.00	4.00
14. Suitability of objectives with the readiness of students:				
14.a. Objectives are suitable for prior learning.	5.00	3.00	5.00	3.25
14.b. Objectives are suitable for students' developmental level.	5.00	5.00	5.00	5.00
14.c. Objectives are suitable for students' interest.	3.00	3.00	2.00	2.66
14.c. Objectives are suitable for students' individual characteristics.	3.00	3.00	2.00	2.66
15. Objectives are clear, understandable and clearly stated.	4.00	4.00	4.00	4.00
16. Objectives are from easy to difficult and from simple to complex.	4.00	4.00	4.00	4.00

**Table 4.** The evaluation of "Content" dimension of elementary 4th grade science curriculum

CONTENT	OBSERVER 1	OBSERVER 2	OBSERVER 3	AVERAGE
1. Content overlaps with objectives.	4.00	4.00	5.00	4.33
2. The curriculum answers the question "What will we teach?"	4.00	4.00	5.00	4.33
3. Objectives of units are suitably shared in time of units.	4.00	3.00	4.00	3.66
4. Topics of units consist of extensive information.	2.00	2.00	2.00	2.00
5. Content is feasible.	4.00	4.00	4.00	4.00
6. There is a relation between topics and activities.	4.00	4.00	4.00	4.00
7. Topics are suitable for students' readiness.	3.00	3.00	3.00	3.00
8. Content is organized from simple to difficult.	4.00	4.00	4.00	4.00
9. Topics and concepts are repeated at regular intervals.	4.00	4.00	4.00	4.00
10. Topics are prerequisite of each other.	4.00	4.00	4.00	4.00
11. Content is organized into modules.	1.00	1.00	1.00	1.00
12. There is a relation between interdisciplinary objectives and the objectives of units.	4.00	4.00	4.00	4.00
13. There is a relation between objectives of units and basic skills:				
13.a. There is a relation between objectives and critical thinking.	4.00	4.00	4.00	4.00
13.b. There is a relation between objectives and creative thinking.	4.00	4.00	4.00	4.00
13.c. There is a relation between objectives and communication skills.	4.00	4.00	4.00	4.00
13.d. There is a relation between objectives and questions ability.	4.00	4.00	4.00	4.00
13.e. There is a relation between objectives and problem solving skills.	4.00	4.00	4.00	4.00
13.f. There is a relation between objectives and information technology.	4.00	4.00	4.00	4.00
13.g. There is a realtion between objecitves and entrepreneurial skills.	4.00	4.00	4.00	4.00
13.h. There is a relation between objecvtes and using Turkish correctly, effectively and well.	4.00	4.00	4.00	4.00
14. There is a relation between content and real life.	3.00	4.00	3.00	3.33

objectives and the objectives of units. Observers have stated their opinions as "I agree" to the criterion which says there is a relation between objectives and critical thinking, creative thinking, communication skills, research and inquiry skills, problem solving skills, information technology skills, entrepreneurial skills and using Turkish correctly, effectively and well. They have expressed their opinions as "somewhat agree" to the criterion which says the content is related to real life.

4-What is the compliance level between the determined criteria and "Learning-teaching Process" of elementary 4th grade science curriculum?

Research findings (Table 5) show that there is a relation between objectives and teaching strategies, methods/techniques. The implementations of the curriculum during learning-teaching process is consistent with objectives of the curriculum. Observers have stated their opinions as "I agree" to the criteria which say there is a relation between defined learning experiences and other courses, learning experiences and other learning experiences are associated with each other, learning experinces support the upper class and reinforce the subclass. Learning-teaching approaches are chosen suitably in accordance with subject areas. Learning-teaching process are selected in basic life skills qualifications. Learning-teaching process seems to

**Table 5.** The evaluation of “Learning-teaching Process” dimension of elementary 4th grade science curriculum

LEARNING-TEACHING PROCESS	OBSERVER 1	OBSERVER 2	OBSERVER 3	AVERAGE
1. Teaching strategies and methods / techniques have been associated with objectives.	4.00	4.00	3.00	3.66
2. The practices in teaching-learning process is consistent with the program's objectives.	4.00	4.00	4.00	4.00
3. The defined learning experiences' overlapping level in terms of:				
3. a. Student's interest	4.00	4.00	4.00	4.00
3. b. Students' prior learning	4.00	3.00	3.00	3.33
3. c. Students' developmental level	4.00	4.00	3.00	3.66
4. The defined learning experiences of the program is accordance with the affordability principle of the program.	4.00	4.00	4.00	4.00
5. The relationship between the other courses and defined learning experiences has been established (coherence principle).	4.00	4.00	4.00	4.00
6. The defined learning experiences in itself is associated with other learning experiences.	4.00	4.00	4.00	4.00
7. The defined learning experiences of upper-lower class relations:				
7. a. Supports the upper class.	4.00	4.00	4.00	4.00
7. b. Reinforces lower class.	4.00	4.00	4.00	4.00
8. The defined learning experiences in the program are selected in accordance with the principle of progressivity.	4.00	4.00	4.00	4.00
9. Learning experiences are listed in accordance with the principles and the policy of learning-teaching process.	3.00	4.00	4.00	3.66
10. The proposed teaching-learning approaches in the program are selected according to subject area.	4.00	4.00	4.00	4.00
11. The defined teaching-learning process improves the quality of basic life skills such as:				
11. a. Critical thinking skills	4.00	4.00	4.00	4.00
11. b. Creative thinking	4.00	4.00	4.00	4.00
11. c. Research, inquiry and decision making skills	4.00	4.00	4.00	4.00
11. d. Problem solving skills	4.00	4.00	4.00	4.00
11. e. Communication skills	4.00	4.00	4.00	4.00
11. f. Using Turkish right, good and effectively way	4.00	4.00	4.00	4.00
11. g. Entrepreneurial skills	4.00	4.00	4.00	4.00
11. h. Ability to use information technology	4.00	4.00	4.00	4.00
12. Teaching-learning process:	4.00	4.00	4.00	4.00
12. a. Supports 5E model.	4.00	4.00	4.00	4.00
12. b. Seems to support discussion methods (debates, panel discussions, open forums etc.).	4.00	4.00	4.00	4.00
12. c. Supports teacher-centered methods (lectures, question-answer etc.).	1.00	1.00	1.00	1.00
12. d. Supports group teaching methods.	4.00	4.00	4.00	4.00
13. Teachers are directed to be granted special teaching methods of the course in the program.	4.00	4.00	4.00	4.00
14. The teaching-learning process directs teachers are to make preparations before the course.	4.00	4.00	4.00	4.00
15. Learning experiences direct teacher to make assessment.	4.00	4.00	4.00	4.00
16. Program's level in terms of directing teachers to use the teaching-learning process variables such as:				
16. a. Reinforcement	2.00	2.00	2.00	2.00
16. b. Clue	2.00	2.00	2.00	2.00
16. c. Encourages the use of feedback.	2.00	2.00	2.00	2.00
17. Teaching-Learning process encourages student participation.	4.00	4.00	3.00	3.66
18. Teaching-Learning process is associated with learning areas.	4.00	4.00	4.00	4.00
19. The flexibility level of the activities in the teaching-learning process in terms of:				
19. a. Time	1.00	1.00	1.00	1.00
19. b. Region	1.00	1.00	1.00	1.00
19. c. Developmental characteristics	4.00	4.00	3.00	3.66
19. d. taking account of prior learning.	4.00	3.00	4.00	3.66
20- The examples related to the courses are:				
20. a. Student-centered	4.00	4.00	4.00	4.00
20. b. Teacher-centered	1.00	1.00	1.00	1.00
21. The teaching-learning process makes the choice of material easy for teacher.	2.00	2.00	2.00	2.00
22. The relationship between the suggested methods and techniques of the program and learning styles has been established.	3.00	2.00	3.00	2.66
23. The final activities such as discussion questions, trip, observation, experiment, summarizing, producing guide teachers effectiveness is a guiding nature.	3.00	2.00	3.00	2.66
24. The classroom layout is stated in the program.	1.00	1.00	1.00	1.00
25- The program leads teachers to effective classroom management. teacher's	1.00	1.00	1.00	1.00
26- The time allocated for the teaching-learning activities is sufficient.	1.00	1.00	1.00	1.00
27- The activities seem to guide students.	4.00	4.00	4.00	4.00
28- The activities seem to guide teachers.	4.00	4.00	4.00	4.00
29- Teaching-learning activities can be performed.	4.00	4.00	4.00	4.00

support 5E models and argument methods. Observers have stated their opinions as “somewhat agree” to the criterion which says that the curriculum supports teacher-centered methods. They have expressed their opinions as “somewhat agree” to the criterion which says that the curriculum supports group-teaching method. Observers have said that learning-teaching process is less flexible. It is seen that examples given during course are student-centered not teacher-centered. They have

expressed their opinions as “I agree less” to the criterion which says learning-teaching process helps the choice of material, the relation between methods/techniques and learning styles. The activities which are discussion questions, travel-observation, experiment, summary, producing direct the teacher less. The curriculum doesn't direct the teachers about effective classroom management and also time allocated for learning activities in not enough.

**Table 6.** The evaluation of "Assessment Process" dimension of elementary 4th grade science curriculum

ASSESSMENT	OBSERVER 1	OBSERVER2	OBSERVER 3	AVERAGE
1. The program has a part of the assessment.	4.00	5.00	4.00	4.33
2. The assessment part of the program shows how to test samples of the objectives.	4.00	4.00	4.00	4.00
3. The examples given for assessment process measure the level of learning of related subjects.	4.00	4.00	4.00	4.00
4. The examples given for assessment process are associated with the taxonomy of the objectives.	1.00	1.00	1.00	1.00
5. The program directs teachers to use alternative assessment and evaluation tools in the process of evaluation of objectives.	5.00	5.00	5.00	5.00
6. The program gives information how to use assessment and evaluation tools.	4.00	4.00	4.00	4.00
7. The usage level of examples for assessment and evaluation tools:				
7.a. It is directed to product.	4.00	4.00	4.00	4.00
7.b. It is directed to process.	4.00	5.00	4.00	4.33
8. At the end of each unit there are measurement tools to determine the level of students.	4.00	4.00	4.00	4.00
9. Student's level of participation in the assessment process:				
9.a. There are measurement tools for self-assessment.	5.00	5.00	5.00	5.00
9.b. There are measurement tools for peer assessment.	5.00	5.00	5.00	5.00
9.c. There are measurement tools for group assessment.	5.00	5.00	5.00	5.00
10. There is table of indicators.	1.00	1.00	1.00	1.00
11. Explanations for the assessment of the measurement results are included.	4.00	4.00	4.00	4.00

5-What is the compliance level between the determined criteria and "Assessment Process" of elementary 4th grade science curriculum?

According to **Table 6**, observers have expressed their ideas as "I agree" to the criteria which say there are examples about how to test objectives and these examples can test the learning level of related topics. The examples given in the assessment is not consistent level taxonomies of objectives. Curriculum gives information about how to use assessment tools and there are convenient assessment tools at the end of every unit. There are assessment tools about self-assessment, peer assessment and group assessment. Also, explanations for the assessment of the measurement results are included.

## RESULTS AND DISCUSSION

According to the findings, elementary 4th grade science curriculum has an innovative perspective. It is obvious that the curriculum has a structure taking into consideration students more. Unlike, the previous curriculum, the new curriculum stresses students' interest and their needs. New science curriculum has a constructivist understanding which requires active student participation. The curriculum often emphasizes the necessity of learning doing-living-thinking. Tüysüz and Aydın (2009) says in their studies most of the teachers participated in the study believe that the new program is suitable to students' level, has developed according to students' developmental level, provide opportunities for students to discovery of their learning, and is suitable to group study. On the other hand, teachers also declare that to apply such a program in over crowded classes is quite difficult.

Overall and specific objectives are clearly seen in elementary 4th grade science curriculum. The curriculum bases on a progressivist philosophy and emphasizes often constructivist approach. However, defined objectives don't reflect students' interests and individual characteristics. Objectives of science curriculum aren't flexible, and they aren't defined with teachers and students. Moreover, objectives aren't according to their interest. In addition, the number of objectives has been reduced. The study done by Arsal (2012) supports these findings. Yurdakul (2005) says in his study, objectives of the curriculum are mostly in information and perception levels, so they haven't constructivist approach.

The curriculum has descriptions which help teachers while handling units and matters to which teachers should pay attention. For example, the description part consists students' misconceptions which may occur during learning topics, the relevant descriptions and links to other courses. Objectives and classroom activities are associated with each other and other lessons and interdisciplinaries. The new curriculum's learning-teaching activities are more student-centered than those of the old curriculum. Activities aren't flexible in terms of time and region. Sıcak and Arsal (2013) say in their studies the pattern related to the learning outcomes was weak due to the learning outcomes in appropriate to the general-specific principle; the different subject weights in the learning outcomes; lack of order between the learning outcomes appropriate to the level of learning; and due to the existence of more than one statements regarding the learning outcomes. The experts reported that the content was consistent with the learning outcomes; that it was permanent and persistent except for certain information; that it was selected from the real environment.

2013 curriculum has a constructivist approach in terms of the principles of curriculum development. However, when we compare the documents prepared by the Board of Education to introduce the new curriculum and the new curriculum, the details and implementation of curriculum aren't suitable with the theoretical framework. The study done by Doğan (2010) supports this result.

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