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Full Length Research Paper

Investigation of knowledge and usage levels of problem-solving strategies of prospective classroom teachers

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Today, it is important how much individuals acquire knowledge and use this theoretical knowledge in their daily life. A qualified training program is expected to train individuals who can solve problems. The prospective classroom teachers, who are expected to train individuals who can solve problems, should also have knowledge about the problem-solving process and applying it to the problem situations that they face in their own lives. This situation is thought to have a positive effect on the academic achievement of the students who will be trained. The study was conducted at the beginning of 2019-2020 academic year with 52 third grade prospective classroom teachers. Semi-structured interview form prepared by the researchers were used to examine the knowledge and usage levels of the prospective classroom teachers about problem-solving strategies. This study concluded that prospective classroom teachers could informally use some problem-solving strategies, even if they were not trained. However, the prospective classroom teachers failed to perform as expected.

Key words: Problem-solving in mathematics, problem-solving strategies, prospective classroom teachers, teacher training.

INTRODUCTION

The importance of problem-solving in teaching and learning of mathematics has been emphasized since the 20th century. Based on a model by Pólya (1949), intuitive thinking is at the forefront in the first phase of research on problem-solving, especially in the 1960s and 1970s. In the 1980s, however, it was emphasized that problem-solving should be the focus of school mathematics

(NCTM, 1980). In order to teach and learn problem-solving in mathematics courses, the scope of problem-solving has been expanded by adding cognitive and intuitive thinking, as well as student-oriented opinions such as opinions, attitudes, emotions, and self-regulation behaviors (Schoenfeld, 1985, 1987, 1992). Mayer (1982), Schoenfeld (1982) and Silver (1982) state that preliminary

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information is a key element in the problem-solving process. Preliminary information affects the problem solver's understanding of the problem and the choice of strategies to be called in trying to solve it. Prior knowledge and experience are decisive factors in a problem solver's first attempt to solve a problem. In his book "How to solve it?" Polya (1949), sets out the process of problem-solving based on prior knowledge and experience. He summarizes his four-stage process as follows: understanding the Problem, devising a Plan, carrying Out the Plan, looking Back. The idea of how much problem-solving individuals can use the theoretical knowledge acquired in school mathematics in their daily lives is directly related to the concept of mathematical literacy.

The concept of literacy is defined as the competence of students to use their knowledge and skills, analyze, make logical inferences and communicate effectively while defining, interpreting and solving problems encountered in various situations in the main subject areas. The increase in science and technology as 21st century skills in our daily lives also highlights digital competence. Digital competence, along with literacy, brings out the need to raise individuals with mathematical thinking and problem-solving skills. The general aims of the Mathematics Curriculum related to the subject are stated as;

"3. Will be able to express their thoughts and reasoning easily in the problem-solving process and will be able to see the gaps or deficiencies in the mathematical reasoning of others. 9. Will be able to develop a positive attitude for mathematics through his / her experiences in learning mathematics and develop a self-confident approach to mathematical problems (MNE, 2019).

However, international examinations such as PISA and TIMSS reveal that our students do not perform as expected. PISA research mainly evaluates students' skills in the fields of science, mathematics and reading skills. PISA aims to assess how students can make sense of what they know, and how they can apply mathematical knowledge, including new and unusual situations. To this end, PISA refers to real-life situations where many of its math units and questions require mathematical skills to solve a problem. In addition, students are expected to have the ability to formulate, use and interpret mathematical situations in the field of mathematics literacy. In TIMSS applications, concept and processing skills which are fundamental in learning mathematics are measured in routine and non-routine (in a context that students are unfamiliar with) problem-solving and reasoning skills. In order to measure these skills, questions are prepared by taking into account two dimensions: the learning area and the cognitive area. While PISA targets 15-year-old students, TIMSS evaluates the performance of 4th and 8th grade students. Turkey, with an average of 420 in mathematics literacy

field, is below the average in of all countries. In contrast to the results of PISA (2015), the average achievement of 31% of schools in Turkey, are above the international average according to TIMSS 2015 mathematics results. It is seen that approximately 30% of the students in the 4th grade in lower level schools do not reach the basic level of knowledge and skills in mathematics. In the 8th grade, this rate is approximately 40%. (TEDMEM, 2020).

The relationship between teachers' participation in professional development activities and student achievement is examined. For this purpose, in the TIMSS 2019 cycle, teachers were asked about professional development activities they have participated in the last two years. In the questionnaire, mathematics teachers' participation in professional development activities on mathematics course content, mathematics teaching, mathematics curriculum, integration of technology into mathematics teaching, developing students' critical thinking and problem-solving skills, measuring and evaluating mathematics, and meeting the individual needs of students were investigated.

Participation rates in development events, international is running lower than the average. Especially in the last two years, students' critical thinking and problem-solving in-service education to develop skills to be an average rate of 44% in international students with 4th-grade math teacher are noteworthy that despite 17% in Turkey. In line with the answers of the teachers, more than 80% of the students had both mathematics and science teachers' integration of technology into mathematics/science teaching' and the professional needs of 'developing students' critical thinking and problem-solving skills come to the fore (TEDMEM, 2020).

It is thought that the professional development of teachers can improve students' achievement by improving their teaching practices. In addition to the contribution of in-service trainings to professional development, it is important that programs that train classroom teachers should also train literate and problem-solving teachers. There is no direct course where problem-solving strategies are taught and non-routine problems are solved by using strategy in classroom education undergraduate program. Furthermore, problem-solving is introduced for the first time in the third grade of the undergraduate program in the scope of mathematics teaching 1-2 courses. This situation negatively affects the training of qualified teachers.

In order to increase the problem-solving success in mathematics course, first, it is necessary to examine the thinking and solution ways of the students (Krawec, 2014). It is thought that knowing the thinking styles of the students by the teachers will affect their applications in the classroom and their learning to a great extent (Bozkurt et al., 2011; Krawec and Montague, 2014). In the literature, it is recommended to examine the problem-solving skills of primary school students without being informed about the strategies. Thus, they are expected to

try alternative approaches and come up with creative solutions. Studies show that students use some problem-solving strategies informally, although they have not received any training on this subject (Yazgan and Bintaş, 2005). There are studies showing that problem-solving skills can be learned (Anzai and Yokoyama, 1984; Çelik and Güler, 2013; Artut and Tarım, 2009; Ersoy and Güner, 2014; Gökkurt et al., 2015; Verschaffel et al., 1999).

In the study conducted by Altun et al. (2007), the effects of the education on problem-solving strategies given to the students of classroom teacher training programs on problem-solving success were examined as well as their opinions on problem-solving strategies. The study was carried out on 120 prospective classroom teacher students. The students were given a 5 - week training and their learning strategies and problem-solving success levels were determined by applying pre-test and post-test. Teaching has been effective in teaching all strategies except equation writing and reasoning and has led to increase the problem-solving success. It was found that problem-solving success could be explained by three factors, and it was concluded that the strategies of looking for a pattern, working backwards, simplifying the problem, making systematic lists, reasoning and making a drawing or diagram strategies were strong in pointing the problem-solving success. All of the students stated that teaching strategies subject to the study should be included in teacher education.

In the study conducted by Dede and Yaman (2005), primary school mathematics and science textbooks were examined in terms of problem-solving and problem posing activities. In the examination of the textbooks, "problem posing and solving scale" consisting of 17 items was used. As a result of the research, it has been determined that problem-solving and problem posing activities are not adequately included in science and mathematics textbooks. In addition, it was found that science textbooks include more problem-building and problem-solving activities than mathematics textbooks. Tertemiz et al. (2014) revealed that the most preferred strategy of prospective classroom teachers was "writing an equation or inequality" strategy, and "looking for a pattern" and "making a drawing or diagram" strategies were among the mostly preferred strategies.

When the domestic literature on problem-solving is examined, there are studies on the problem-solving strategies, approaches and process choices of elementary school students and prospective teachers (İskenderoğlu et al., 2004; Yazgan and Bintaş, 2005; Artut and Tarım, 2006; Altun et al., 2007; Altun and Memnun, 2008; Avcu and Avcu, 2010; Tertemiz et al., 2014) the relation of problem-solving and mathematics success (Özsoy, 2005; Karataş and Baki, 2017), the effect of problem-solving education on the choice of problem-solving strategies (Arslan and Altun, 2007; Ramirez et al., 2016).

When the foreign literature is examined, there are studies on the problem-solving strategies of students and prospective teachers (Cai, 2003; Van Dooren et al., 2003; Elwan, 2016), the effect of the field knowledge of prospective classroom teachers on the evaluation of students' problem-solving strategies (Van Dooren et al., 2003), the relationship between problem-solving strategies and problem-solving success, the effect of problem-solving education on the choice of problem-solving strategies, (Verschaffel et al., 1999).

Problem-solving can be considered as one of the metacognitive strategies used to understand how an individual performs thinking and learning processes when faced with a mathematical problem and how he/she recognizes his / her knowledge. Metacognition is a form of cognition, it is a high level thinking process that involves active control over cognitive processes. In today's world, instead of individuals that memorize and store the information and are expected to reflect exactly what they have been taught; individuals that think, learn information by making sense of it, optimally make use of their thinking abilities and are able to reflect their own comments and understanding in addition to their acquisitions need to be educated. (Gama, 2005; Kazu and Ersözlü, 2008 cited by Koçak and Boyacı, 2010).

This study investigates the pedagogical knowledge and metacognition about problem-solving of prospective teachers and their abilities in the use of strategies. Change in education also includes the change in teacher education (National Council for Accreditation of Teacher Education (NCATE) 2008). The qualifications, competencies, and knowledge that teachers should have in the field of teacher training are constantly updated. With various approaches, theories, and models, the issue of what knowledge teachers have and how to train them with this information is constantly being examined. In this context, the type and quality of knowledge that the teacher to be trained gains importance.

As a result, it is expected to train individuals who can "solve problems" from a qualified training program. In this context, the aim of this study is to examine whether the prospective classroom teachers that are expected to train "problem-solving" individuals have knowledge about problem and problem-solving, problem-solving processes and problem-solving strategies and how they can use problem-solving strategies in the situations they encounter.

In this study, answers to the following questions were sought:

- 1) What is the level of knowledge of prospective classroom teachers about problem and problem-solving concepts?
- 2) What is the level of knowledge of prospective classroom teachers about problem-solving strategies?
- 3) What is the level of using problem-solving strategies of the prospective classroom teachers?

MATERIALS AND METHODS

In the study, case study, which is one of the qualitative research designs, was adopted. Case study is defined as a document or a special case for a single issue (Bogdan and Biklen, 2003). With the case study, a rich description of the situations in the problem-solving process and the level of knowledge and use of the problem-solving strategies of the prospective classroom teachers (Hitchcock and Hughes, 1995) was provided.

The criteria sampling method was used when creating the study group. Problem-solving Basic mathematics subjects such as numbers and operations, ratio-proportion, relations, sets, data collection, and conversion to graphs are taught in the first year of the primary school undergraduate program in the full term within the scope of the Basic Mathematics 1 course. In the first grades, in the spring term, algebraic expressions, equations, and inequalities, basic geometry knowledge, and drawings are taught within the scope of the Basic Mathematics 2 course. In the third year, information is given about problem types, problem-solving strategies, and stages within the scope of the Mathematics Teaching 1 course in the full semester, limited to two weeks. In this context, while determining the study group, it was determined that the prospective teachers had not received any problem-solving training, but had taken basic mathematics lessons. For this reason, the study was conducted at the beginning of 2019-2020 academic year with 52 third grade prospective classroom teachers studying at Balıkesir University Necatibey Faculty of Education.

In the study, semi-structured interview form prepared by the researchers was used to examine the knowledge and usage levels of the prospective classroom teachers about problem-solving strategies. In the first part of the form, prospective classroom teachers were asked to express mathematics problem and problem-solving in mathematics with at least three concepts in order to determine whether they have knowledge about problem and problem-solving. The prospective classroom teachers were not asked to make a mathematical definition, but they were asked to list the first concepts that came to their minds.

In the second part of the form, they were asked to explain their problem-solving strategies in a few sentences. Then, two problems were addressed in order to see whether they use these strategies effectively in problem-solving. While selecting the problems, non-routine problems from the domestic and foreign literature and the strategies used to solve them were searched. As a result of this survey, it was found that the six most common problem-solving strategies were studied. These strategies are prediction and control, making a drawing or diagram, looking for a pattern, simplifying the problem, making systematic lists and working backwards. Two problems in which these strategies can be used were used as data collection tools in the study. The original versions of the problems are in the book titled "Problem-Solving in Mathematics (for 3-6th Grades) Powerful Strategies to Deepen Understanding" written by Posamentier and Krulik (2009) and translated into Turkish by Akgün et al., 2016.

There are two items in the third part of the form. The first item states, for the problem "Ali has a frog. This frog can jump 1 or 2 meters at a time. How many different ways can the frog jump 7 meters?", specify the strategy or strategies you will use to solve the problem. Strategies to be used in problem-solving are making systematic lists, acting-out, drawing figures or diagrams or finding correlations. The second item is "there is a snail at the bottom of a 16 cm tall glass. How many days can the snail climb up 4 cm during the day and slide 1cm back at night?", Specify the strategy or strategies to solve the problem and solve the problem. Strategies to be used in the solution; making a drawing or diagram, looking for a pattern, working backwards or acting-it-out. The solution to this problem also needs to be associated with daily life. There are many examples of the second problem, also known as the snail problem, in mathematics textbooks at different grade levels where only

modifying numerical data are used.

Qualitative data were analyzed using descriptive analysis technique. Qualitative data were analyzed separately by two researchers, and thematic coding was performed. The reliability of the study was tested based on the reliability formula proposed by Miles and Huberman (1994). Accordingly, the reliability was ensured as reliability coefficients for themes, and codes were calculated with the formula "reliability = number of agreements / (number of agreements + number of disputes)" were higher than 70%. In order to increase the reliability, prospective classroom teachers' solutions and opinions were directly quoted. Instead of the names of the prospective teachers participating in the study, the acronym PT was used and these abbreviations were numbered from 1 to 52.

RESULTS

First research problem

Concept of mathematical problem

In this study, where the level of knowledge and use of prospective classroom teachers in relation to their problem-solving strategies was investigated, prospective classroom teachers were asked to list the concepts that came to mind when math problem is first mentioned. The aim here is to examine whether the concept of problem and the concepts of problem-solving are confused or not. After the descriptive analysis of the concepts stated by the prospective teachers about mathematics problem, these concepts were collected under themes.

The concepts of problem and problem-solving were taken into consideration while themeizing the concepts. In the most general sense, problem is the case that the person wants to do something but cannot predict what to do immediately. Problem-solving is knowing what should be done in such situations where it is not known what to do. Polya's four-stage problem-solving process is widely used. This process includes understanding the problem, selecting the strategy related to the solution, implementing the strategy and discussing the solution.

The results of the descriptive analysis of the concept of mathematics problem are given in Table 1. It was determined that 10% of the 190 concepts stated by the prospective teachers were related to the definition of mathematics problem. 65% of 190 concepts are expressions of mathematical coverage. It has been revealed that the 37 concepts used for the math problem are related to problem-solving.

A problem is defined as being complex or the result is uncertain, needs to be solved and arouses curiosity. A problem is also a challenge, the solution requires research, discussion or mind gym. There is no preliminary preparation for the solution and it has not been encountered before.

Those who describe the problem informally, PT12 has defined the problem as "difficult but solvable, there are those who have nothing to do with daily life and some of them are wastetime for students" and provided an opinion

Table 1. Descriptive analysis results related to the concept of Mathematics problem.

Theme	Code	f	%
For the definition of the problem	Difficulty	9	4.74
	Thinking	2	1.05
	Struggle/speculate	3	1.57
	Logic	2	1.05
	Life	1	0.53
	It may not be related to daily life	1	0.53
	Taking time	1	0.53
Subtotal		19	10
For problem-solving	Four operations (addition/subtraction/ multiplication /division)	23	11.82
	Solution	5	2.57
	Result	2	1.03
	Setting up an equation	2	1.03
	Reading comprehension	1	0.51
	Interpretation of understanding	1	0.51
	Given /data	1	0.51
	Requested	1	0.51
	Processing from the mind	1	0.51
Subtotal		37	19
For mathematical content knowledge	Equation	27	14.27
	Numbers (Including four operations)	26	13.73
	Age, pool, worker, speed problems	26	13.73
	Unknowns	13	6.86
	Formula	4	2.11
	Ratio-proportion	4	2.11
	Geometry	3	1.59
	Probability	3	1.59
	Fractions	3	1.59
	Equality	3	1.59
	Inequality	2	1.06
	Identities	1	0.53
	Term	1	0.53
	Trigonometry	1	0.53
	Algebra	1	0.53
	Integral	1	0.53
	Digit	1	0.53
	Symbol	1	0.53
	Equivalent	1	0.53
	Relation	1	0.53
Subtotal		123	65
For positive attitude	Delight	1	0.666
	Happiness	1	0.666
	John Nash	1	0.666
Subtotal		3	2
For negative attitude	Paragraph (length of problem sentence)	3	1.5
	Higher education exam	3	1.5
	Abstract concept	1	0.5
	Mathematics teacher	1	0.5
Sub total		8	4
Grand total		190	100

about problem-solving rather than problems. Especially due to the nature of non-routine problems, their solutions are time consuming. Therefore, the expression "waste time for students" was not evaluated as a negative attitude, but was examined in relation to the definition of the problem.

PT24, provided an opinion of solving the problem more than problem by stating expressions "converting verbal language into mathematical language (equation), understanding what you read and the interpretation of what you understand". On the other hand, PT25 presents both problem and problem-solving data with the concepts of "numerical data, four operations and difficulty". Similarly, PT33 and PT35 use the concepts "equation, operation and difficulty" for the problem.

PT48 provides both mathematical coverage and problem-related data with the expressions "numbers, four operations, thinking, fractions", while PT49 provides data on both mathematical scope and problem with the expressions "four operations, equations, logic, numbers". PT52 develops codes related to problem, problem-solving and mathematical scope themes with the expressions "operation, algebra, number, occupation, difficult".

It has been determined that other prospective classroom teachers mostly use expressions that form the theme of mathematical scope. For example, the concepts used by PT39 are "age, pool, worker problems, unknowns, equations, inequality" whereas the concepts used by PM9 are "x, ratio, triangle, equality, equivalence". PT51, emphasized negative attitude and mathematical scope with the expressions "formula, difficulty, exam, equation, unknown", and PT1 emphasized problem and problem solution with the expressions "struggle, result, delight and happiness".

Concept of problem-solving in mathematics

Prospective classroom teachers were asked to rank the concepts that came to their minds when problem-solving in mathematics mentioned. The 152 concepts obtained accordingly are collected under 6 themes and given in Table 2. The first four themes are about the problem-solving process, while the other two themes are about computational tools and attitudes. It is a remarkable finding that 94.1% of the concepts presented by prospective classroom teachers are directly related to problem-solving.

When determining the codes forming the theme of understanding the problem, it was examined whether the prospective classroom teachers wrote concepts that would answer two basic questions: "(1) What are the data, what are the conditions? (2) What is unknown / requested? Since if the student / teacher can write what is given and what is requested, he has fully understood the problem.

Other criteria of the theme of understanding the problem were also used as in the literature. These criteria

are;

- 1) can the student read the problem with appropriate emphasis considering meaning?
- 2) can the student know if the problem is missing or there is more information?
- 3) can the student see what information is obtained from the problem?
- 4) can the student make a drawing or diagram suitable for the cases and relations in the problem?
- 5) can the student divide the problem into sub-problems?

While the concepts forming the theme of selecting the strategy related to the solution were investigated, after the problem was understood, the appropriateness of the relationship between those given and unknown in the problem was investigated. There are criteria that can be used in this theme. If the prospective teacher / student cannot find an immediate relationship, prospective teacher / student should ask him / her some questions. These questions are:

- 1) Have I solved another problem like this before? What did I do there?
- 2) Do I know a correlation that will work in solution?
- 3) Do I use all the information in my designed solution?
- 4) Can I guess the answer to this problem? Which values can the answer be?
- 5) Can I solve the problem part by part? How close do I approach to solution each time?

While determining the codes that will form the theme of the implementation of the strategy, the actions taken by using the chosen strategy during the step-by-step solution of the problem were taken into consideration. Performing arithmetic operations is seen during the implementation of the strategy and related codes are gathered under this theme.

When assigning codes to the theme of discussing the solution, the actions to be taken at this stage of problem-solving are taken into account.

These actions are:

- 1) check the accuracy and appropriateness of the results,
- 2) solve the problem in other ways, if any and
- 3) express the different forms of the problem and think how the solution will be in this case.

The accuracy and relevance are also checked thanks to these questions. The expressions of the prospective classroom teachers about the concept of problem-solving in mathematics are settled as examples. PT5 has provided views on the themes of discussing the solution, attitudes, understanding the problem by using the words "failure to solve, low grade, complexity". The statements of the PT7 as "thinking, following steps, creating equations, concluding" are related to the themes of choosing the strategy for the solution and implementing the strategy. Similarly, PT50 has provided data on the themes of selecting the strategy and implementing the

Table 2. Results on descriptive analysis on the concept of problem-solving in Mathematics.

Themes	Codes	f	%	
Understanding the problem	Analysing	4	2.66	
	Complexity	2	1.32	
	Unknown	2	1.32	
	Struggle	2	1.32	
	Understanding logic	1	0.66	
	Given/Data	1	0.66	
	Requested	1	0.66	
Subtotal		13	8.6	
Choosing the strategy related to the solution	Reasoning	9	5.91	
	Formulas/rules	8	5.26	
	Tactical / method development	6	3.94	
	Thinking	5	3.29	
	Operation priority	4	2.63	
	Equivalent	2	1.32	
	Equality	2	1.32	
	Ratio/proportion	2	1.32	
	Step-by-step progress	2	1.32	
	Systematic thinking	1	0.65	
	Inequalities	1	0.65	
	Subtotal		42	27.6
Implementation of the strategy	Finding a result/solution	20	13.16	
	Operations	19	12.50	
	Creating equations	19	12.50	
	Looking for a pattern	2	1.32	
	Writing equation	2	1.32	
	Simplifying the problem	2	1.32	
	Making table	2	1.32	
	Replacement	1	0.66	
	Finding the unknown	1	0.66	
	Collecting the same graded terms	1	0.66	
	Simplifying the problem	1	0.66	
	Trial-error	1	0.66	
	Solving with drama	1	0.66	
	Using ratio-proportion	1	0.66	
	Pooling/grouping	1	0.66	
	X to the unknown	1	0.66	
	Elimination	1	0.66	
	Sorting data	1	0.66	
	Subtotal		77	50.7
	Discussion of the problem	Practice	3	1.97
Interpretation		2	1.31	
Different solutions		2	1.31	
Proof		2	1.31	
Success in solution		1	0.65	
Inability to solve		1	0.65	
Subtotal		11	7.2	
Calculation tools	Abacus	2	1.1	
	Calculator	1	0.55	
	Paper-pen	1	0.55	

Table 2. Contd.

	The multiplication table	1	0.55
	Finger account	1	0.55
Subtotal		6	3.3
	High school	1	0.65
Attitudes	Low grade	1	0.65
	Abstract	1	0.65
	Intelligence	1	0.65
Subtotal		4	2.6
Grand total		155	100

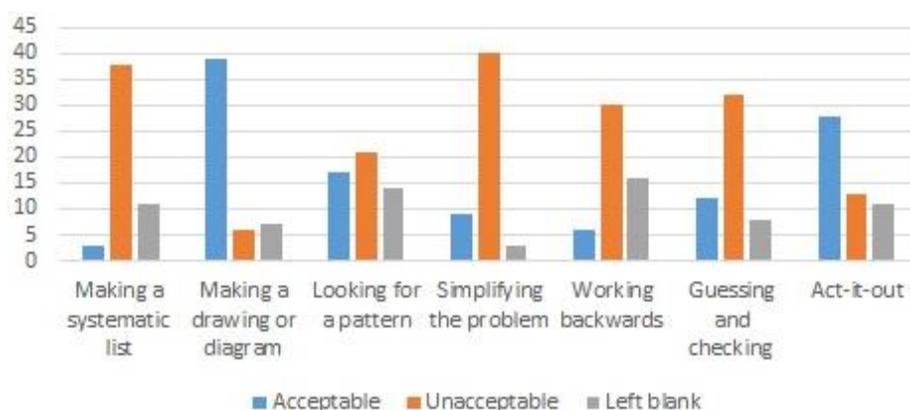


Figure 1. The results of the descriptive analysis that reveal prospective classroom teachers' level of knowledge of problem-solving strategies.

she/he used are “equality list, finding unknowns and collecting terms of the same rank”. The PT3 presented data on problem-solving in mathematics using the concepts of “formula, abacus and finger calculation”. These concepts have been examined under the themes of analyzing and selecting the method related to the solution. Another prospective teacher who refers to “abacus and multiplication table” among the calculation tools is PT4. PT44 is the prospective teacher who states “paper-pencil”. The concepts that PT42 states as “systematic thinking, abstract, step-by-step progress, finding the result” are examined under the themes of attitudes, determination of the solution-related strategy and implementation of the strategy.

Second research problem

The prospective classroom teachers were asked to explain the strategies in a few sentences in order to determine whether they have information about the problem-solving strategies. The qualitative data obtained were considered to be acceptable as definition and

not acceptable as definition. When the leaving blank rates for each strategy are analyzed, it is seen that strategies for working backwards and finding correlations are prominent. While the strategy that teacher trainees could define at least was to make a systematic list, the most successful strategy in defining was making a drawing or diagrams. The act-out strategy is the second acceptable definition. When the prospective classroom teachers' explanations about the strategies to simplify the problem and make a systematic list are examined, it is noteworthy that these strategies are by far the most unacceptable definitions. Similarly, most of the prospective classroom teachers' explanations to estimation and control and backward working strategies were considered as unacceptable definitions. Figure 1 shows the results of the descriptive analysis that reveal the level of knowledge of problem-solving strategies.

Making a systematic list strategy

A systematic list-making strategy is very useful for problems that require finding all the possibilities for a

Table 3. Results on systematic list making strategy.

Acceptable	Unacceptable
<p>PT35</p> <p>Sistematik liste yapma</p> <p>Bir durumu bütün haliyle görmek için yapılır, çözüme böyle ulaşılır.</p>	<p>PT23</p> <p>Sistematik liste yapma</p> <p>Çözüne ulaşmak için verilerin listesini yapma</p>
<p>PT21</p> <p>Sistematik liste yapma</p> <p>Problemdaki verileri liste halinde ilgili olarak yazma.</p>	<p>PT22</p> <p>Sistematik liste yapma</p> <p>Verilen bilgileri ve istenen bilgileret sıralamak</p>
	<p>PT26. "Systematic, regular list making"</p> <p>PT29. "Solving questions step by step by making a list"</p> <p>PT36. "The known to one side, the unknown to the other side."</p>

Table 4. Results on making a drawing or a diagram.

Acceptable	Unacceptable
<p>PT7</p> <p>Şekil veya diyagram çizme</p> <p>Problemden verilen verileri şekil ve diyagram üzerinde daha açık şekilde gösterilme.</p>	<p>PT42</p> <p>Şekil veya diyagram çizme</p> <p>Öğrencilerin dikkatini çekmek için yapılır.</p>
<p>PT21</p> <p>Şekil veya diyagram çizme</p> <p>Verileri grafiğe ve görsel bir şekilde gösterme</p>	<p>PT22</p> <p>Şekil veya diyagram çizme</p> <p>Havuz probleminde soruyu anlamayı kolaylaştıran yöntemdir.</p>
<p>PT35</p> <p>Şekil veya diyagram çizme</p> <p>Verilerin arasımsal ilişkileri göstermek için yapılır.</p>	<p>PT6</p> <p>Şekil veya diyagram çizme</p> <p>Problem akıldan canlandırılarak somut bir hale getirilir.</p>

case. A system that ensures that no possibility is repeated must be established. In this context, the following description of PT23 is not considered as an acceptable definition. Example cases are given in Table 3.

Drawing a figure or diagram strategy

The strategy for drawing figures or diagrams involves the use of visually supportive drawings to solve the problem. It is visualizing what is given in the problem by making a

drawing or diagram. The problem is given by drawing a figure or diagram. It can make it easier to understand both the problem and to see the relationship in the problem and reach the solution. Example cases are given in Table 4.

Looking for a pattern strategy

The strategy of finding correlations is the only strategy taught in both primary and secondary school mathematics

Table 5. Results on looking for a pattern strategy.

Acceptable		Unacceptable	
PT41		PT6	
Bağıntı bulma	Verilen tek veri arasındaki bağlantıyı bulmak mümkün kolaylaştırıcıdır	Bağıntı bulma	Problemin çoğunda yönelle bağlantılar kurulur.
PT21		PT42	
Bağıntı bulma	Verilerin arasındaki ilişkiyi ortaya çıkarma	Bağıntı bulma	Konular arasındaki ilişkiyi kurabilmek.

Table 6. Results on working backwards strategy.

Acceptable	Unacceptable
PT11.	PT3.
Geriye doğru çalışma	Geriye doğru çalışma
Bizden istenilen soruda verilenlere doğru gitme.	Büyükten parçaya gitme.
PT40.	PT40.
Geriye doğru çalışma	Geriye doğru çalışma
Meşela üniversite öğrencisinin kararıyla, bir problemi daha iyi anlamak için lise yıllarındaki çalışmalarına bakması, soruları yeniden tekrar alması olabilir.	

programs as “Patterns and desing”. This strategy involves finding repetitive shape / number sequences or repeating events sequences. It also allows the person to reduce a complex problem to a relation and then use the relation to produce a solution. This strategy is often used in combination with the Table 5 or diagram strategy and the simplification strategy.

Working backwards strategy

In some problems, the person is given the situation reached as a result of all the actions that take place in the problem and is asked to find out what the original situation is. The working backwards strategy (Table 6) is particularly useful for such problems. If the result of arithmetic operations is given in the problem, what is to be done is to reverse the operations. If the result of a series of events is given, but not the arithmetic operation, it is necessary to start from the last stage and then examine the previous stage, then the previous stage, and

continue until it reaches the initial state.

Simplifying the problem strategy

Simplifying the problem strategy (Table 7) is a strategy that examines the version of the same problem with simpler or smaller numbers when faced with a problem that seems difficult due to the complexity or size of the numbers. There are two cases:

- 1) exploring the solution of the original problem by solving the simpler form of the problem
- 2) to examine the problem with the smallest number that makes it possible, then increase the numbers gradually and get the generalization from which to solve the real problem.

Guess and check strategy

The student using the guess and check strategy (Table

Table 7. Results on simplifying the problem strategy.

Acceptable	Unacceptable				
<p>PT3.</p> <table border="1"> <tr> <td>Problemi basitleştirme</td> <td>Problemi aşamalaştırıp küçük problemler halinde basitçe çözmeye</td> </tr> </table>	Problemi basitleştirme	Problemi aşamalaştırıp küçük problemler halinde basitçe çözmeye	<p>PT41.</p> <table border="1"> <tr> <td>Problemi basitleştirme</td> <td>Çözümleri sadeleştirip sadece bizden isteneni bulmak için kullanacağımız verileri ayıklamak</td> </tr> </table>	Problemi basitleştirme	Çözümleri sadeleştirip sadece bizden isteneni bulmak için kullanacağımız verileri ayıklamak
Problemi basitleştirme	Problemi aşamalaştırıp küçük problemler halinde basitçe çözmeye				
Problemi basitleştirme	Çözümleri sadeleştirip sadece bizden isteneni bulmak için kullanacağımız verileri ayıklamak				
	<p>PT11</p> <table border="1"> <tr> <td>Problemi basitleştirme</td> <td>Problem içerisinde geçen kavramların kavramlar isimise yansıyan bilgileri ayıklama</td> </tr> </table>	Problemi basitleştirme	Problem içerisinde geçen kavramların kavramlar isimise yansıyan bilgileri ayıklama		
Problemi basitleştirme	Problem içerisinde geçen kavramların kavramlar isimise yansıyan bilgileri ayıklama				

Table 8. Results on guess and check strategy.

Acceptable	Unacceptable				
<p>PT7.</p> <table border="1"> <tr> <td>Tahmin ve kontrol</td> <td>Problemın sonucu tahmin ederek bir varsayımda bulunma ve doğruluğunu kontrol etme.</td> </tr> </table>	Tahmin ve kontrol	Problemın sonucu tahmin ederek bir varsayımda bulunma ve doğruluğunu kontrol etme.	<p>PT35.</p> <table border="1"> <tr> <td>Tahmin ve kontrol</td> <td>Problem hakkında işlen yapmada çözüme ulaşma.</td> </tr> </table>	Tahmin ve kontrol	Problem hakkında işlen yapmada çözüme ulaşma.
Tahmin ve kontrol	Problemın sonucu tahmin ederek bir varsayımda bulunma ve doğruluğunu kontrol etme.				
Tahmin ve kontrol	Problem hakkında işlen yapmada çözüme ulaşma.				
<p>PT8.</p> <table border="1"> <tr> <td>Tahmin ve kontrol</td> <td>Sarıda birineğin bulunması gereken sayıyı onun yerine bir sayı deneyerek bulmak. Kı, Bir sayı deneyiz, yerine koyarız ve doğru mu diye kontrol ederiz.</td> </tr> </table>	Tahmin ve kontrol	Sarıda birineğin bulunması gereken sayıyı onun yerine bir sayı deneyerek bulmak. Kı, Bir sayı deneyiz, yerine koyarız ve doğru mu diye kontrol ederiz.	<p>PT42.</p> <table border="1"> <tr> <td>Tahmin ve kontrol</td> <td>İleride istenecek kavramlar için öngöründe bulunmak</td> </tr> </table>	Tahmin ve kontrol	İleride istenecek kavramlar için öngöründe bulunmak
Tahmin ve kontrol	Sarıda birineğin bulunması gereken sayıyı onun yerine bir sayı deneyerek bulmak. Kı, Bir sayı deneyiz, yerine koyarız ve doğru mu diye kontrol ederiz.				
Tahmin ve kontrol	İleride istenecek kavramlar için öngöründe bulunmak				

8), starts with a logical estimation and tests the estimation. If the estimation is inaccurate, he makes another prediction. It's more than a simple trial and error. However, the new estimation should take into account the results of the previous one. This process continues until the student reaches a possible result in the problem. It's more than a simple trial-and-error process.

Act-it-out strategy

Acting-it-out strategy (Table 9) can be especially useful in small classes. Children can really own the roles in the problem and portray the action. They can use bottle caps, chips, written papers, models or drawings.

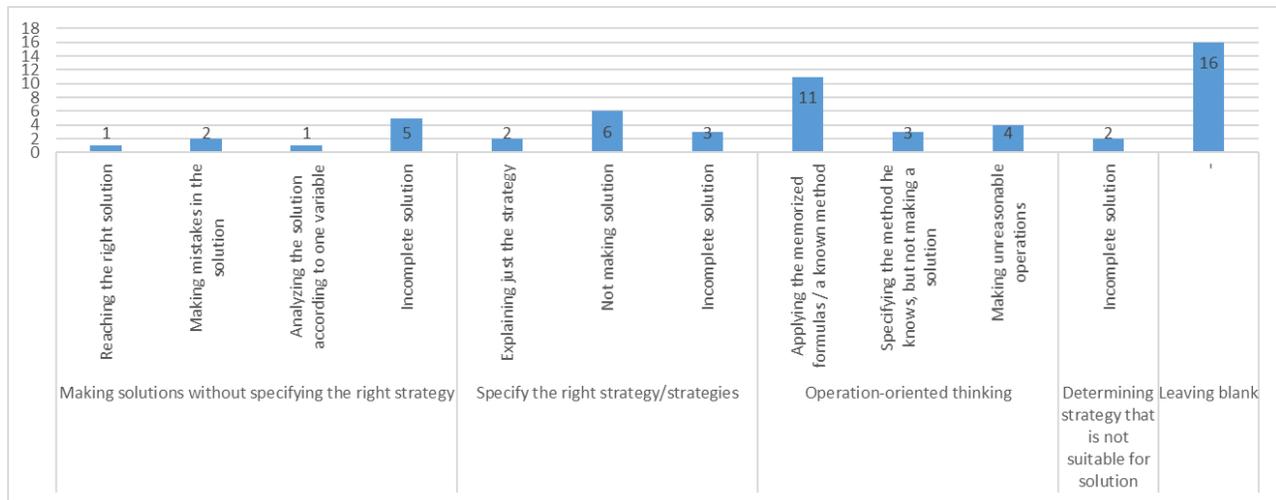
Third research problem

Strategies used in the solution of the frog problem

The solution processes for each problem were examined and thematic coding was done in order to determine the level of use of problem-solving strategies of the prospective classroom teachers. According to this, five themes and sub-themes were obtained in relation to the solution of the frog problem. According to Figure 2, it is seen that even if the prospective classroom teachers determine the correct strategies for solving the problem, they are not able to make a complete solution by using these strategies. Only 1 out of 8 prospective classroom teachers who informally used the right strategy was able

Table 9. Results on act-it-out strategy.

Acceptable		Unacceptable	
PT39.		PT21.	
Canlandırma	Verilen problemlerdeki olay ve objelerin gözünde contlandırarak çözüm bulmaya çalışırım	Canlandırma	Problemin çözümünün doğruluğundan emin olma.
PT3.		PT6.	
Canlandırma	Problemi olasılıkla kılma adına sırf ortamına entegre edip tiyatroylaştırma	Canlandırma	Problem dışınımda uygularım.

**Figure 2:** Strategies used in the solution of the Frog problem

to reach the right solution. Instead of understanding the problem, they focused only on the numerical values given in the problem and the structure of the problem, which showed that the prospective classroom teachers adopted more process-oriented thinking. Similar results are found in the literature.

The strategy of looking pattern is also used in the solution of the frog problem. The prospective classroom teachers would form the Fibonacci sequence informally as soon as they could find out the rule of the pattern in solving the problem. There have been prospective classroom teachers who have indicated that a correlation strategy could be used to solve the frog problem, but they have not presented data on the solution. Two prospective classroom teachers who have stated that they are using the correlation finding strategy are actually using the systematic list making strategy.

They could not complete the solution. In Table 10, there are examples of solutions to the frog problem of prospective classroom teachers'and evaluations made by

researchers on these solutions.

Strategies used in the solution of the snail problem

In order to determine the prospective classroom teachers' level of using problem-solving strategies, the solution processes related to the snail problem were examined and thematic coding was conducted. Accordingly, five themes and sub-themes were obtained for the solution of the snail problem. The results are presented in Figure 3.

According to Figure 3, it was revealed that 6 of the prospective classroom teachers who determine the right strategies make a complete solution using these strategies and 6 of them use the right proportion as a memorized method, but they do not pay attention to day-night distinction. 9 out of 10 prospective classroom teachers who informally used the right strategy achieved the right solution. While the prospective teacher should take into account the day-night variables given in the

Table 10. Contd.

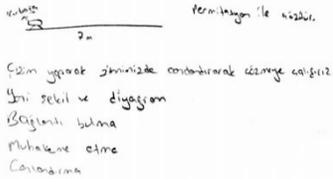
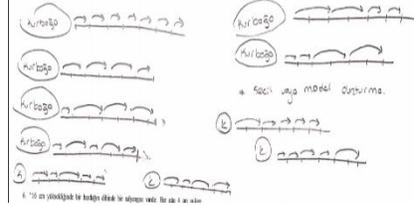
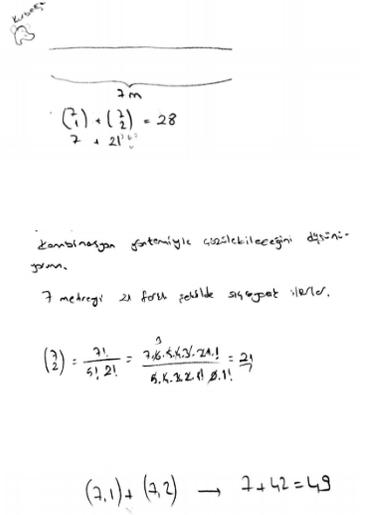
<p>Just explaining the strategy</p>	<p>2</p>	<p>5. "Ali'nin bir kurtbağsı var. Bu kurtbağa bir seferde 1 ya da 2 metre sırayabiliyor. 7 metreyi kaç farklı şekilde sırayabilir?" şeklinde verilen problemin çözümünde kullandığınız strateji ya da stratejileri belirtiniz ve problemi çözünüz.</p> <p>Çözümlendirme, Tahtaya 1 öğrenci çıktıdır. 7 metre sırayabilir. Öğrencinin bir sırayısı 1 metre olarak kabul edilir. Öğrenci önce birer metre sırayarak gider. Daha sonra farklı şekillerde denemektedir öğrenci. Çözümce ulaştırılır.</p>	<p>PT11 has identified a strategy that can be used to solve the problem. It was determined that the the prospective teacher had information about the strategy to be appropriate to the solution of the problem from his / her statements, but s/he did not provide any data on the solution.</p>
<p>Specify the right strategy/strategies</p>	<p>6</p>	<p>Not making solution</p>  <p>Başlangıç bulup, problemi basitleştirip seçtiği adımla problemi çözmeye çalışır.</p>	<p>PT23 lists the strategies that can be used. Unlike other prospective classroom teachers, it is seen that he has a strategy of reasoning. However, no finding on the solution has been reached.</p>
<p>Making incomplete solution</p>	<p>3</p>		<p>PT31 uses the making a drawing or a diagram strategy, which s/he states as a form or model creation statement, to solve the problem. This statement is acceptable and the solution is successful, but only 10 situations are illustrated. PT31 is the only prospective teacher who uses the figure/diagram strategy correctly.</p>
<p>Operation-oriented thinking</p>	<p>11</p>	<p>Applying the memorized formulas/a known method</p> 	<p>PT4 thinks that the problem can be solved by combination. However, it was determined that the prospective classroom teachers has deficiencies in the process of meaning of the problem. Indeed, repeated permutations are used to solve this problem.</p>
			<p>Similar solution of PT8 is observed. The main point to focus on here is that prospective classroom teachers 1-4 as the grade level of the. to be able to teach mathematics at grade level. Here, the main point to be considered is that these prospective classroom teachers are to be teaching grade level of 1-4 mathematics at classroom level.</p>
			<p>In this context, teachers are expected to use methods appropriate to the level of their students.</p>
			<p>However, a third of the prospective classroom teachers tried to use a method they knew or memorized. PT19 thinks that the problem can be solved by permutation method, as well.</p>

Table 10. Contd.

Specifying the method s/he knows but not solving	3	<p>Kombinasyon vs Permutasyon kullanmak gerektigini düşünüyorum. Ancak iki konuda da eksiklerin olduğunu bu problemi nasıl aşmam gerektiğini bilmiyorum.</p> <p>Ösülük kullanılarak ölçüler diye tahmin ediyorum. -kna hatırlanıyorum</p>	<p>PT22 and PT17 state that the problem can be solved by one of the methods they memorized, but it is clear that they do not have the knowledge of these methods. However, if s/he could not focus on the process but visualize the problem situation in the simplest sense, s/he would be able to develop his own method. What is stopping the prospective teacher from mathematical thinking in this problem?</p> <p>Why do we encounter similar situations in our students? The Results of another recent study revealed a similar situation in secondary school students</p>	
Making meaningless operation	4	$\frac{1}{2} \cdot 7 = \frac{7}{2}$ <p>1 gelme davilipi $\frac{1}{2}$ 2 pime davilipi $\frac{1}{2}$?</p>	<p>The meaningless operations and meaningless explanations made by Ö39 and Ö50 for the solution of the problem are given as examples.</p>	
Determining strategy that is not suitable for solution	Making the incomplete solution	2	<ol style="list-style-type: none"> 1 7.1 → Bağırntı bulma 2 5.1 + 2 3 2.2 + 3.1 4 2.1 + 5.1 5 2.3 + 1 <p>5 farklı şekilde</p>	<p>Although PT20 has stated a strategy that can be used to solve the problem, s/he has tried to make a solution suitable for a different strategy. In his/her solution, it appears that s/he does not examine all situations.</p>
Leaving blank	-	16	<p>It was found that the prospective classroom teachers made no explanation for the solution or simply wrote the phrase "I could not solve it".</p>	

problem, only making progress over one day and therefore using the correct proportion showed that the prospective teachers adopted more operation-oriented thinking. In the solution of this problem, prospective classroom teachers should associate their solutions or their results with daily life. Although more positive results were obtained for the solution of this problem than frog problem, operation-oriented thinking could not be prevented. Table 11 shows the examples of the solution of the prospective classroom teachers about the Snail problem and the evaluations made by the researchers about these solutions.

DISCUSSION

Prospective classroom teachers have associated the math problem most with mathematical scope. In addition, 19% of problem-solving was associated with the problem, while only 10% identified the concept of problem recognition. From this point of view, it is concluded that the prospective classroom teachers did not have enough information about mathematics problem.

A large majority of teachers (92.5%) associated problem-solving in mathematics with the problem-solving process. From this point of view, it is concluded that the

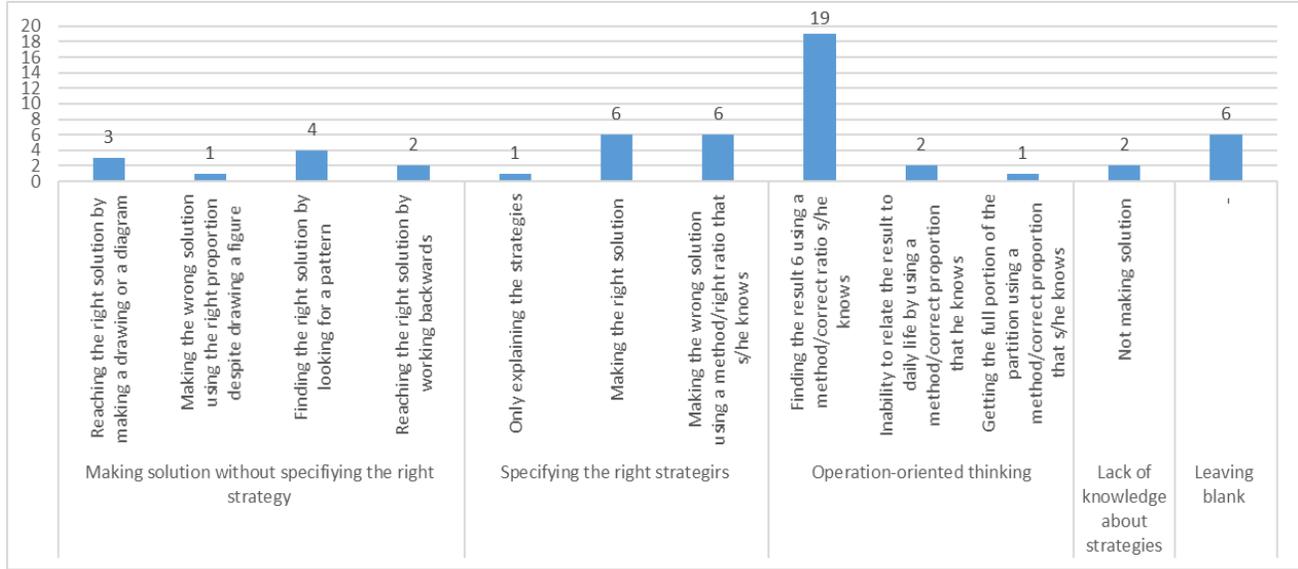


Figure 3. Strategies Used in the Solution of the Snail Problem.

Table 11. Results on the strategies used in the solution of the Snail Problem.

Theme	Sub-theme	f	Example solution	Prospective teacher
	Reaching these right solution by drawing a figure	3		PT1
Making solutions without specifying the right strategy	Making the wrong solution using the right proportion despite drawing a figure	1		PT28
	Finding the right solution by finding the correlation	4	<p>4-1=3cm Her gün 3cm tırmanıyor</p> <p>16cm'ye <u>5</u> günde ulaşır.</p> <p>5.gün 4cm ilerler.</p>	PT7

Table 11. Contd.

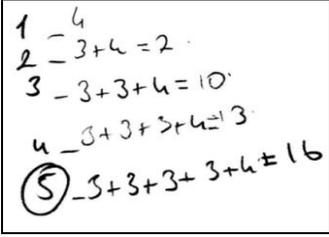
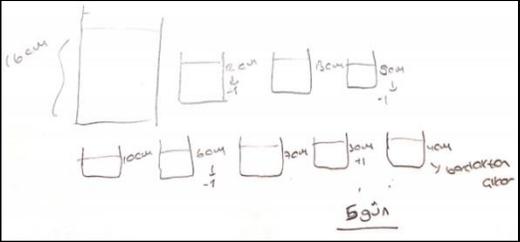
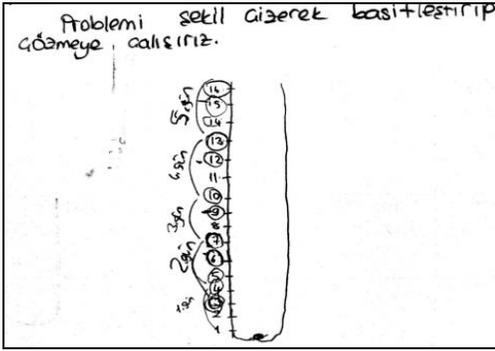
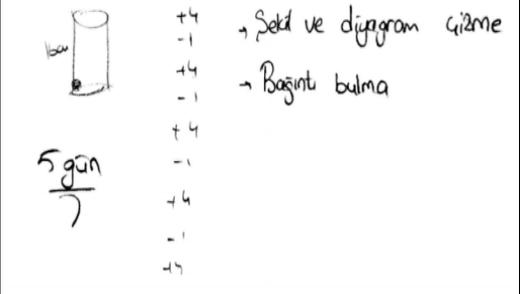
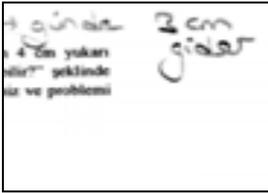
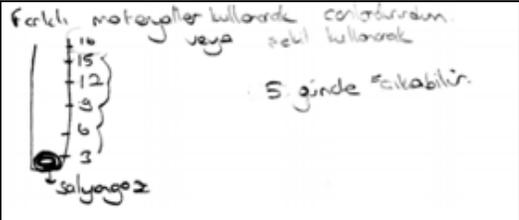
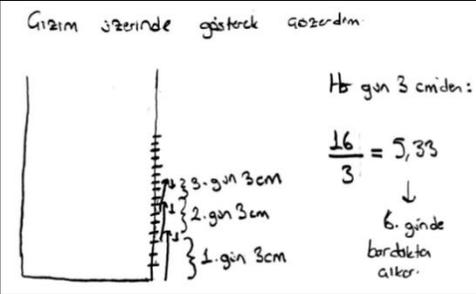
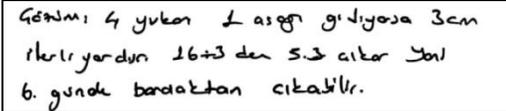
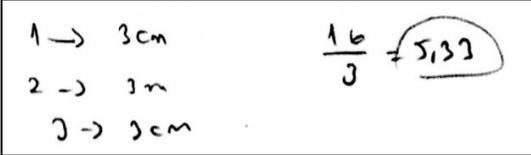
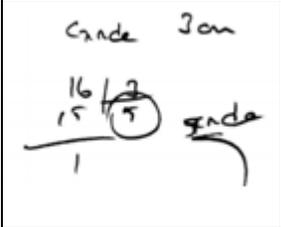
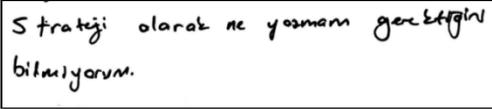
				PT14
Reaching the right solution by working backwards	2			PT35
Only explaining strategies	1		<p>Problemi basitlestirme, canlandırma.</p> <p>Öğrenciden biri tektaya çizdirilir. Salıyenger yerine bir insan, 1cm yerine 1adam kullanılabılır. Yine canlandırma yöntemiyle soru özellebilir.</p>	PT11 did not present data on the solution, but explained how the strategy could be used
Specifying the right strategies		6		PT16
Making the right solution				PT20

Table 11. Contd.

				
				PT49
Specifying the right strategy	Making the wrong solution using the right proportion despite drawing a figure	6		PT3
	Finding the result 6 using a method/correct ratio he knows	19		PT22
Operation-oriented thinking	Inability to relate the result to daily life by using a method/correct proportion that he knows	2		PT4
	Getting the full portion of the partition using a method/correct proportion that it knows	1		PT17
Lack of knowledge about strategies	Not making solution	2		PT22
Leaving blank	-	6	-	-

prospective classroom teachers have knowledge about problem-solving.

Although no training was given to prospective classroom teachers about problem-solving strategies, it was determined that the most acceptable strategy was the figure or diagram strategy. It is concluded that the

prospective classroom teachers have knowledge about the strategy of drawing figures or diagrams. The prospective classroom teachers explained this strategy by giving examples such as graphs and schemas in sets.

Rosengrant et al. (2007) emphasizes the importance of visualizing the problem while solving the problem. The

use of the most meaningful expressions in this strategy also predicts that prospective classroom teachers should use this strategy effectively. However, the rate of achieving the right solution by using the strategy of drawing figures and diagrams is quite low among the prospective classroom teachers. Similar results are also found in secondary school students.

Yazgan and Bintaş (2005) concluded in a study of the problem-solving strategies of elementary school fourth and fifth grade students that the students learned the use of some strategies informally, although they did not receive such an education. The results of the studies of Ersoy and Güner (2014) and Bal-İncebacak and Ersoy (2016) are also similar. Similar results were obtained in this study, as well.

- 1) None of the 11 prospective classroom teachers who stated the right strategy in the problem reached the right solution. Only 1 prospective teacher who informally made a solution with the right strategy without specifying the right strategy was able to reach the right result.
- 2) There are 6 prospective classroom teachers who specify the right strategy and reach the right solution in the problem. 9 prospective classroom teachers made solutions using strategy informally without specifying the right strategy and reached the right result.

This study did not include strategies of creating equations or inequalities, making tables, and reasoning that require high-level thinking. The strategy of establishing an equation or inequality can be used in high school, especially by 7th and 8th grade students. It is one of the strategies taught under the normal curriculum in connection with algebra and used best by students.

The main idea of a table-making strategy is to write the given data into the table in such a way as to reveal a relation and, thus to find the missing information. Tables usually consist of rows and columns that are list important variables. Usually the first cell of a row or column of the table becomes a starting point, from which the data progresses regularly.

At this point the table reveals the answer. This strategy is often used in conjunction with the strategies of drawing figures or diagrams, simplifying the problem, and finding correlations to produce the data in the table.

The solution of some problems is based on reasoning as the basic strategy. These problems may be problems that require simple logic, such as which product is better to take, or they may be more difficult problems that involve a chain of inferences. You make one inference, that inference gives rise to a second inference, and so on. This process will continue until the problem is solved.

Follmer (2000) investigated the effect of problem-solving skill on thinking ability. He studied with the 4th grade students. It has been found that thinking skills are very effective in problem-solving and students are more successful when they solve problems by recognizing their

thinking ability.

In literature, a study which reached a similar conclusion, it was revealed that the prospective classroom teachers were prone to operation-oriented thinking. Operation-oriented thinking was an identified problem in 18 prospective classroom teachers in the 1st problem while in the 2nd problem this number was found to be 22. As a result, operation-oriented prospective classroom teachers were not successful in reaching the correct result.

In their studies Bozkurt and Karşlıgil-Ergin (2018), they concluded that about one-third of the students in 4th and 5th grades, while a significant number of the class students in 6th grade was making meaningless operations with numbers.

It has emerged that the vast majority of the students in the classroom are not proficient in problem-solving and determining solution strategies correctly. It was found that the majority of 4th, 5th and 6th grade students were insufficient to determine problem-solving and solution strategies correctly. So much so that when they encounter a problem, they tend to take a look at the problem and quickly apply the operations that need to be applied to the numbers and find the result. In the Singapore study (Cai, 2003), when solution types are examined, it is observed that students use numerical solutions, and this usage increases in proportion to grade level.

Similar cases were found in this study. Among those who stated that permutation/combination could be used in the solution of the first problem, there were cases of making operation mistakes, making meaningless operations and leaving the problem unsolved. Prospective classroom teachers think that the frog problem can be solved by a method they have memorized or already known. However, it is seen that these thoughts do not motivate them to solve the problem, but rather cause them to make no attempt. As a matter of fact, leaving the frog problem blank without any solution was observed in 16 prospective classroom teachers, while in the snail problem this situation was observed in 6 prospective classroom teachers.

Recommendations

Based on the results of this study, elementary school students, like classroom prospective classroom teachers, should encounter more frequent problems that are not routine. Non-routine problems should be included in textbooks that are an effective resource in teaching mathematics. Thus, students will be able to develop solutions to everyday situations from a mathematical perspective.

This study concluded that prospective classroom teachers could informally use some problem-solving strategies, even if they were not trained. However, the prospective classroom teachers failed to perform as

expected. At this point, it can be examined by another study whether classroom prospective classroom teachers' awareness of problem-solving strategies will change the results of the practice.

Teachers should ensure that students develop their operational skills, recognize different problem types and solutions with the various problems examined, and recognize and address various real-life problems appropriate to their level. In this context, it is important to include applied problems that reflect real-life that will enable students to think metacognitive, open-ended problems for conceptual understanding, and mathematics research/projects in addition to problems that require four operations (Foong, 2002; cited by Tarım and Hacıömeroğlu, 2019).

In order to improve math literacy and achievement in international exams mathematics applications were added to the 5th and 8th grades. It may be suggested to include them in the curriculum starting from the 1st grade and to include problem-solving practices within the scope. Seeing that different strategies are used and solutions are reached in problem-solving will also enable the student to determine the best strategy for the solution. Individuals who can solve problems are expected to understand the problem well, develop strategies for the solution, make solutions with this strategy and discuss the solution. Although understanding the problem is very effective in solving the problem, every stage of the problem-solving process is important. Especially in the final stage, problem writing skills are also gained. As a continuation of this study, problem writing skills of the prospective classroom teachers who have problem-solving training can also be investigated.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Discourses in ICT integration: Pedagogical orientations in selected city primary schools in Uganda

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This study sought to recognize the tricky keystones in the execution of the amalgamation of ICT usage during teaching and learning in Ugandan city primary schools in Kampala focusing on the cumbersomeness teachers face while employing modern ICT tools and pedagogical experiences. A mixed research design with compliments from questionnaires, interviews and classroom observations was employed in the study to obtain data from the respondents (N=80). It was observed that teachers and students occasionally/rarely had access to technological tools due to limited time allocation and an insufficient number of technological tools and this negatively affects lessons. Teachers' lack of ICT skills is due to inadequate training that intensely influences the use of ICT in the classroom despite most of the schools being highly populated. It was thus established that for effective and efficient use of ICT tools in Ugandan schools, the government via the Ministry of Education should consider involving all teachers in rigorous ICT training to gain adequate knowledge and skills. The more ICT training is prioritized, the more integrating ICT in pedagogical orientation in primary schools will be enhanced. Thus, teacher access to personal laptops, exposure laboratories, and teacher's continuous ICT training sessions could be a good recommendation/justification if the government is to achieve its vision 2040 ICT agenda.

Key words: Primary education in Uganda, ICT usage agenda, Vision 2040 in Uganda, teachers digital pedagogy.

INTRODUCTION

The use of Information Communication and Technology (ICT) education in Uganda began way back in the 1980s,

possibly due to the belief that ICT can offer unprecedented opportunities to enhance quality, access

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and equity in education and training (INTO, 2017). There were reported positive results in the use of ICT in education, including the following benefits: improved lesson delivery, student involvement, provision of information, and facilitated information and knowledge sharing among teachers and students towards the training and development of students to more productive adults for national development in the 21st century. All learning institutions in Uganda are encouraged to use ICT (UCC, 2014). The education stakeholders believe that application of ICTs in the teaching-learning process can enhance the quality of education in several ways like accelerating, enriching, and deepening skills, that motivate and engage students, enabling them to link school experience to work practices (Mutonyi and Norton, 2007), hence creating economic viability; in addition, it strengthens teaching and enable schools to transform (Moges, 2014). The use of ICT in education in Uganda has been taking place in higher institutions and secondary schools. The education sector thought of exposing learners to ICT tools at an early age to reinforce the acquisition of ICT knowledge and skills at a tender age (Stephen, n.d.). These will lead to learners being well positioned to have a strong foundation in technology, and will, later on, lead to learners being creative and competitive for the current globalisation (Abas, 2009). The nature of Education in Uganda continues to be readjusted either politically or depending on societal needs. Equipping citizens with technological skills was considered as a basic need in Education by the current government. The government through the Ministry of Education saw the need of providing technological tools to selected urban primary schools as a way to benchmark for other learners across the country using ICT in learning drive (The Republic of Uganda, 2012).

These were to transform the teaching and learning processes to provide learners with the necessary skills and knowledge so that they can be competitive and able to thrive in the 21st century era. This study intended to identify the reasons underlying the problematic implementation of integration of ICT in teaching and learning.

The official use of ICT in the selected urban primary schools took place recently and was rolled out by the Ministry of Education and Sports in partnership with Ministry of ICT and other development partners; however, most teachers prefer to use traditional methods of teaching. They are still struggling with how to use ICT tool in their classroom teaching, which has made it difficult to resolve this situation. Why are Ugandan Primary school teachers still reluctant or incapable of teaching using technology? From general observations, teachers struggle to use technology in the classroom due to various reasons that range from school leadership, lack of training, lack of equipment and many students in the classroom. In some schools, lower primary sections are the ones that use ICT in learning and teaching.

School leaders and other teachers in schools do not involve themselves in the ICT use process due to aggressiveness towards national assessments. Lower primary teachers lack support by fellow teachers, school leaders and school administration. Also, teachers lack ICT knowledge; they find it challenging to link curriculum with the learning software due to insufficient ICT training, that affects their attitude, beliefs and perceptions towards ICT use in the classroom. Older teachers mostly teach lower classes in Ugandan schools as they find technology challenging for them. Can old age be a contributing factor to poor implementation? The ICT tools distributed to schools are inadequate as compared to students' population in public primary schools. Public schools lack infrastructure and have high student population which results from continuous students' enrollment process in schools. The number of ICT tools provided to schools might have been enough for students, but due to the ongoing high enrollment process, they are insufficient. Therefore, it is necessary to identify the reasons underlying the problematic keystones in implementation of the integration of ICT in teaching and learning in selected Ugandan urban primary schools.

REVIEW OF RELATED LITERATURE

ICT in teaching and learning

Assimilation of ICT in teaching and learning is valuable to both teachers and students because it provides a dynamic and proactive teaching-learning environment that is initiated by the teachers (Arnseth and Hatlevik, 2010). Almas and Krumsvik (2008) argued that ICT is believed to play a significant role in lesson presentation and exploration to facilitate learning and improve teachers and learners' performances. Teaching and learning using ICTs is a process where the teacher guides learners to construct their knowledge during the learning process. The learning process is majorly learner-centred where teachers facilitate learning, unlike the traditional learning methods where teachers are producers of knowledge. This type of learning model enables students to be critical thinkers and have an open mind. Creativity in student's ignition is through this learning process, and students get the inner motivation of desiring to learn from their colleagues through brainstorming and sharing.

Modern technology offers many tools that can be used in classrooms to improve teaching and learning quality (Hamidi et al., 2011). These tools provide teachers with a variety of resources that they use to plan their ICT lessons. They also allow students to have many reference materials that help them in their learning process. After equipping students with technological skills and knowledge, they are set to face future challenges based on proper understanding (Costin, 2017). They will

be confident to face the future since they acquired the necessary skills to thrive in the current 21st century.

Impact of ICT on learners

ICTs is beneficial to students of all levels as it does not only help them in their knowledge acquisition process but also enhances students innovation, acceleration, enrichment and deepening of skills. It also enhances their motivation and engagement in learning the learning process, through which the students connect school experience to work practices that are crucial for economic development, strengthen teaching and help schools change (Noor-ul-amin, 2017).

ICT is also essential in students learning process because when students use ICT tools in their classroom, they become immersed in the process of learning and more students use computers as information sources and cognitive tools (Moges, 2014). This facilitates faster retention of the knowledge learned and also increases a student's concentration skills. Students learn to be attentive learners who keenly involve themselves in their studies. Students are shaped by ICT to be smart learners. The skill attained enable learners to learn better. Through these ways, the quality of education acquired improves since their learning motivation and engagement is improved. Moges (2014) postulated that when students use ICT, learning characteristics and problem tasks transform, it is because ICT enhances students' cognitive development and acquisition of generic cognitive competencies.

Learning using ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student-centred settings and by enabling learning to be related to context and to practice (Barron, 1998; Berge, 1998). Use of ICT in learning engages and inspires students, and also contributes to the adaption of ICT in education (Richard, 2015).

ICT in contemporary primary schools

Primary school education lays the foundation for childhood education. The nature of education students acquire in their early years has a significant influence on how they will fare in the whole course of their education. That is why there is a need to expose learners to the best education as in their early years. Infusing ICT in primary education allows learners to build their education foundation actively. These are because they will need those skills throughout their course of education and the rest of their lifetime (Selwyn and Bullon, 2002). Currently, application of ICT is in almost every aspect of our daily activities throughout the world. Enlightening children about ICT at an early age empowers them, and makes them have an added advantage of successfully

competing in the 21st century. A research conducted under Ofsted (An Office for Standards in Education) to identify good practices in ICT in teaching took place in 2005 and 2008 (Ofsted, 2009). The study findings showed that ICT had contributed to improving the performance of children in some subject areas even though the curriculum was poorly balanced. Not only does ICT equip students with knowledge and skills, it also grants them an opportunity to link their curriculum with daily life activities.

The very essence of ICT in children's education is for them to become engaged in their learning and also allow teachers to manage large class sizes. Also, students learn to collaborate with their peers, hence making the learning environment to be rewarding. The use of technology in learning excites students so much; they always look forward to learning using technological tools. However, their classroom engagement while using a computer is significantly affected by other factors (Selwyn and Bullon, 2002) which include a large number of students in the classroom, few numbers of technological equipment, unreliable power supply, and limited technological infrastructure.

Teachers in primary schools are willing to use ICT in teaching in their classroom, but tend to encounter obstacles from within and outside the school environments that hinder them from effectively applying it. According to Andoh (2012), factors affecting learning in the classroom could be due to insufficient government investment in the development of the subject and lack of enough structure and support on how to teach different subjects. When the government takes an initiative of minimising problems that might arise in classrooms when teachers use ICT, better results are achievable.

Challenges facing teachers while integrating ICT in teaching and learning

Teachers are the driving force behind the implementation of ICT in schools. However, they can successfully do so after managing the limiting factors. Teachers are sometimes afraid of using new technologies in the classroom. These might be due to fear of the unknown or afraid of change. Teachers fear of technology in the classroom might be due to lack of sufficient knowledge on how to fuse technology with learning (Davis, 2003). If not exposed to ICT training, they will not be able to transfer skills to learners. Obijiofor (2009) argued that lack of continuous professional training is another factor hindering teachers' use of ICT. On the contrary, provision of these training, enough time to learn, practice and peer collaboration enables teachers to adopt ICT in the classroom. During this training, teacher's attitudes and beliefs should be well tackled to help them understand the importance of using ICTs in teaching. Lack of understanding of why and how they should use ICT and

how exactly they should use them is a challenge to the implementation of ICT in schools (Higgins and Moseley, 2011).

Countries located in the sub-Saharan African are finding it challenging to implement ICT in education. These are because of the many challenges in place, which include lack of stable supply power, infrastructure, teacher training and a large number of students. These many factors in place show that integration of ICT in teaching and learning is not dependent on just one factor, but on several interrelated factors that directly or indirectly affect the use of ICT in classroom instructions (Tedla, 2016).

Successful integrations of ICT can only take place after dealing with the challenges at school levels. Laronde et al. (2017) listed some of the challenges that contribute to unpreparedness for the laptops as well as computer implementation in school, which include lack of adequate training in ICT for teachers and administrators, limited computer hardware for administrative work, lack of time and absence of appropriate administrative software. There is a need to expose everyone in the school to ICT tools, which will equip them with ICT tools and knowledge, and will be resourceful to teachers who are implementing ICT in classrooms. Also, the lack of insufficient technological awareness and how to link it with the existing pedagogical content knowledge to support student learning (Hutchison and Reinking, 2011) is a factor too. Inadequate training leaves teachers vulnerable. There is a need for schools to implement professional development programs for teachers' skills to continuously be sharpened. Teacher training schools can also help to manage these by including computer courses in their training curriculum.

The other challenge that teachers encounter is large class sizes. Blatchford et al. (2011) suggested that classroom management with large class sizes can be challenging for teachers, especially when there are few computers in place. It becomes difficult to achieve learning goals because many students have to share one computer. In the process, it happens that only a few students actually follow. Kiptalam and Rodrigues (2010) found out that access to ICT facilities is a significant challenge in most African countries, as there is a ratio of one computer to 150 children against the ratio of 1:15 in the developed countries. The use of ICT tools in learning is thought to help manage large class sizes, but if the ICT tools are limited, it becomes difficult for the teachers.

Infrastructure and ICT tools maintenance is also one of the challenges teachers encounter. Poor ICT infrastructure, for instance, computer laboratories limits teachers from maximizing the use of ICT tools fully. If a school does not have enough infrastructures, the teacher is forced to keep on improvising ways on how to use the tools in teaching and learning. These become an added duty on teachers' tables which makes them waste much time rather than invest them in teaching. Lack of proper structure for equipment maintenance leads to teachers

and administrators being afraid of using the tools. The fear is due to the distress of being charged to repair the equipment. Liu and Szabo (2009) observed that teachers' challenges are due to a lack of technical and financial support. Technological equipment needs proper maintenance else they become inefficient.

It is critical to fathom those factors that affect the process by which teachers integrate ICT's into teaching (Chigona et al., 2010). Administrators and school leaders should be well informed about the ICT implementation process. These will help them to always be ready to support the implementing teachers. In terms of being supportive, decisive leadership and pedagogical assistance provided to teachers encourage them to use technology (Stoll et al., 2012). There is also a need for teachers' collaboration and peer (pedagogical) support as lack of these along with inexperience among cooperating teachers (Ertmer and Otterbreit-Leftwich 2010), leaves implementing teachers helpless and become overwhelmed by their daily school activities unlike when others are available to collaborate and support them.

STUDY METHODOLOGY

The study sought to use a mixed method research design that involves qualitative and quantitative research approaches. Quantitative and qualitative research methods when used in a single study reveal findings that complement, inform, illustrate, diversify views, confirm and discover the finding of a phenomenon. In this case, the finding obtained from questionnaires could help the researcher understand respondents' settings and behaviour, whereas interviews and classroom observations allowed the researcher to understand their context clearly. Only five public primary schools in Kampala City were sampled. The choice of the schools is purposive in that the city divisions comprised those that have been lagging in terms of academic achievement for the past years. Questionnaires were used to gather quantitative data due to their nature of obtaining quantity information and were analysed using SPSS. The interviews helped in data collection since it is one of the primary techniques used in qualitative research method. The study also conducted classroom observations to have a real experience of a lesson integrated with ICT. These were well coded, transcribed and transmitted qualitatively.

DATA PRESENTATION AND ANALYSIS

Classroom factors that influence ICT use in learning

Data results of factors influencing teachers and student's ICT use in learning show that many factors contribute to inefficient integration of ICT in education (Table 1). The findings show that teachers have limited access to computing devices, lack of ICT knowledge and skills, limited time to plan and use technological tools and limited access to digital resources. It is described in six (6) questions ranging from Q1-Q6 (Table 3).

Teachers' and student's ICT knowledge and skills

Teachers and students need ICT knowledge and skills to be able to use technological tools in learning. The findings showed that 60% of the teachers and students occasionally had access to

Table 1. Summary of participants (N=80).

Title	Item	Number
Head teacher	Questionnaire	5
Deputy head teacher	Questionnaire	5
Students	Questionnaire (group)	50
Teachers	Interview	15
Laboratory technicians	Interview	5

Table 2. Interviewed teachers' summary.

Teacher's name	Teaching grade	Experience	School	Reporting name
T1	2	2years	P1	T1-P1
T2	1	1year	P2	T2-P2
T3	2	2years	P3	T3-P3
T4	3	2years	P4	T4-P4
T5	1	One year	P5	T5-P5

Source: Primary data.

Table 3. Questions from Q1-Q6.

Q1	Q2	Q3	Q4	Q5	Q6
Teachers and students' access to ICT tools.	They have enough time to use ICT in the classroom	They have regular access to digital learning resources	Students use a dedicated computing device	students use a shared computing device	Teachers attend ICT training regularly.

Source: Primary data.

technological tools. 20% have frequent access, and 20% always have access. These show that teachers and students hardly had access to technological tools and is occasioned by limited time and an insufficient number of technological tools. "Sometimes, they do not have adequate time to use ICT in the classroom; Never (12)20%, Sometimes (48)80%."

One teacher who narrated that evidenced these;

"The lesson takes longer due to time wastage in preparation of ICT tools which involved transporting them from administration office to the classroom and setting up the tablets; there is need to do so since our school does not have a computer lab structure." (T5-P5) (Table 2).

This pinpoints that lack of enough time to use ICT tools negatively affects lessons. ICT lessons need extra time to prepare the tools and execute lessons. These draw the attention of school leaders to adjust the time allocated for classes that use ICT. Access to digital learning materials was minimal due to lack of computer lab structure, lack of time and technological tools. 80% never had regular access to digital learning resources whereas 20% sometimes have access. The numbers of technological tools are less compared to a large number of students." 60% of the students never had access to a dedicated computing device, and 40% sometimes did. Inadequate tools forced students to share computing devices during the learning process. 80% of the students

occasionally have access to a shared computing device, and 20% frequently have access.

One teacher and one laboratory technician supported these; they narrated that;

*"ICT integrated lesson takes much time as compared to the traditional lesson. Also, there are many students in classes, hence a challenge to teachers. However, students' level of grasping content is higher in ICT classrooms."LT2
ICT has a positive impact on students. Nevertheless, a large number of students to computer ratio is a problem when it comes to classroom learning." (T2-P2)*

These indicate that there are few ICT tools in schools yet the number of students is high. The ICT tools are not enough to accommodate these large number of students hence a challenge when learning using ICT tools. These call for government stakeholders to intervene in the situation by providing enough tools for learning (Figure 1).

Teachers' lack of ICT skills is due to inadequate training that intensely influences the use of ICT in the classroom. Their insufficient skills directly affect learners. (60)100% of teachers "never attend ICT training regularly. Students who used ICT in learning were of 7-9 years old. Their lack of ICT skills negatively affects their learning pace too. However, ICT integration has positively contributed to the learning process.

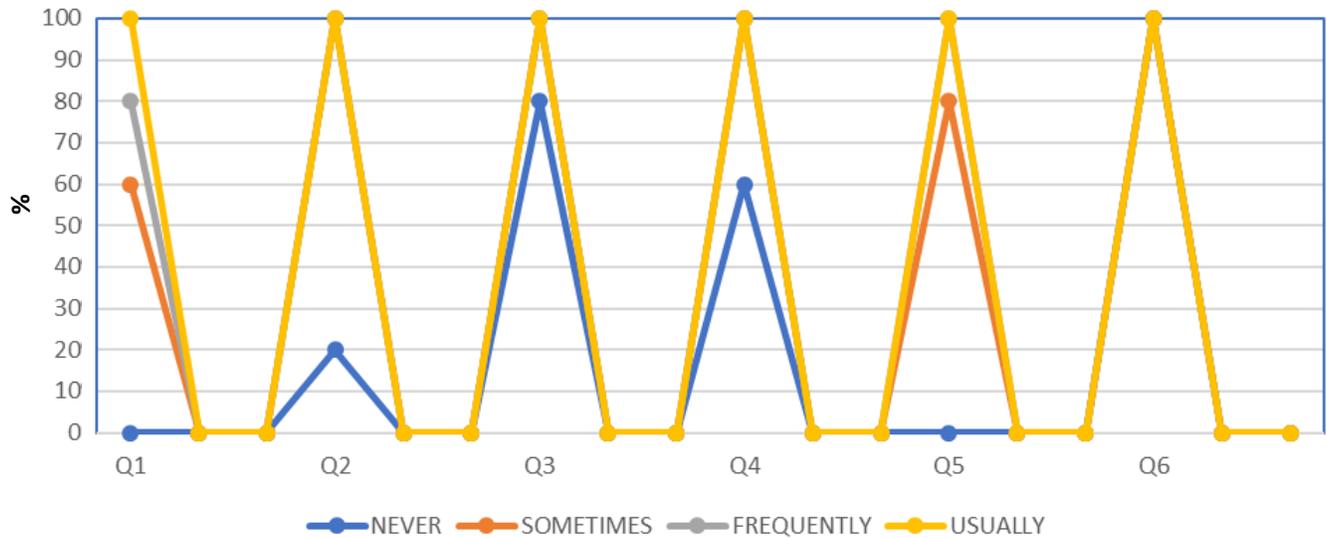


Figure 1. The indicative line graph showing response results of teachers' and students' ICT knowledge and skills on actual use of technology in teaching.

Two teachers narrated that;

"All learners are well taken care of by the use of ICT, and they do exercises at their own pace. The tablets accommodate slow learners; this enables them to catch up with others and has helped them to retain content taught in the classroom." (LT3).

"ICT impresses the students, and has led to students' improvement in performance, but the challenge is that the computer tools provided are few. Moreover, it is essential as it reinforces learning and makes it exciting. Since the introduction of ICT in public primary schools, learners have had a remarkable improvement in their performance" (LT1).

These show that ICT is essential in the learning process with students and teachers highly benefiting from it. Therefore, there is a need to minimize all factors that contribute to poor implementation in the use of ICT.

DISCUSSION OF FINDINGS

Classroom factors that influence students' ICT use in learning

In an ICT classroom set up, many factors influence how learning and teaching process takes place. The factors mentioned in this study were: students and teachers lack ICT skills, lack of computer tools, large class sizes, unstable power and lack of enough time. Interviewed teachers reported that for an ICT lesson to take place, many activities must be taken into consideration; for instance, the teacher needs time to plan for the lesson, prepare and set up technological tools. For those schools that lack a computer lab structure, it involves teachers transporting of technological tools to their classrooms.

Nevertheless, the research findings showed that students could highly benefit from the use of ICT in their

classes as they understand and grasp concepts easily and quickly. Also, the introduction of ICT in schools has helped to curb absenteeism. This is because the student finds ICT lessons interesting because they are usually deeply involved in active learning.

Size of classes

Most of the Ugandan city primary schools generally have high students' population. School enrollment rate increased after the government introduced free primary education. This research took place in Kampala city in Uganda. The schools sampled for the study had a diverse student population. There were those who had many students while others few students. The rate of enrollment in schools highly depends on the school location. Most schools reported higher student population; they also mentioned that the enrollment process is continuous throughout the year. When the government was introducing the use of ICT tools in schools, they provided tools as per the number of students in school; however, due to the continuous enrollment process, the tools cannot accommodate learners. Therefore, large class sizes is a factor that negatively affects the use of ICT tools in classrooms as reaffirmed by Stoll et al. (2012).

Bauer and Kenton (2005) conducted a study that revealed teachers were highly educated and skilled with technology. They were innovative and skilled at overcoming obstacles yet; they did not integrate technology continually for both teaching and learning. Failure to do so was occasioned by lack of enough computers for students, and lack of teachers extra planning time for technology lessons. These study

findings show that teaching using ICT for teachers was challenging due to the lack of infrastructure and ICT tools. Most of the schools lacked computer laboratories forcing teachers to improvise ways of teaching with technological tools in classrooms. Also, the classroom structure is not well furnished to accommodate technological tools. In some schools, there were many students in classes, while the number of computer tools was few. It was difficult for teachers to manage this type of classes since other students could not access the learning material in the tools. That could force the teachers to group students so that they could learn in shifts. These made the learning process to take more time than expected.

Student population relative to computer-ratio

There was a large school population in the sampled schools of this study. The number of students was stated to be higher in the schools' lower primary section, yet the computers and ICT tools provided for learning are fewer in number. These were in the schools located in highly populated areas. Although some schools had enough tablets for each student, still every student could not have free access to software learning content due to connectivity issues. This problem could arise during the connection as the computers have to be connected to a content server for students for it to show learning materials. However, these content servers had slow bandwidth which limited it from sending signals to many tablets during the loading process. At the end of it, many tablets could be disconnected forcing students to share with others and this scholarly-wise was advanced by Rich et al. (2010).

Students ICT knowledge and skills

In this study, ICT had impacted students differently; it has led to students' improvement in terms of ICT skills, knowledge and increased student involvement in the learning process. Besides, ICT has managed to transform teaching and to learn in a real-life situation. These are through the pictures and videos that are part of the learning content installed in the software, hence no need to arrange for many field trips. Research findings showed that the use of ICT in teaching leads to the student-centred type of learning that considers different learners needs. ICT tools allowed learners to learn at their own pace, to refer back to previous documents and provides many practice lessons which relate to the content learned.

On the flip side, it is quite challenging for young learners due to students' inadequate ICT skills. The learners in grade 1 and 2 are still young. 90% of them interact with the tablets and ICT tools for the first time in school, which makes it hard for them to manoeuvre

around using the software as they are not used to it, due to lack of ICT skills. their learning using the tablets takes much time to complete a lesson.

These students' low level of ICT skills requires them to spend much time with technological tools. Unfortunately, the time allocated for every lesson as per the school schedule is a limiting factor. These consequentially lead to ineffective learning. The observed challenge in this case was time; lessons that involve the integration of ICT need to be allocated with more time so that teachers and students can have time to learn as championed by Selwyn and Bullon (2002).

Conclusion

Synoptic underpinnings indicate that teacher needs time to plan for the lesson, prepare and set up technological tools. The larger classes need many technological tools and supporting teacher. At times the tools could be enough, but due to the server's inability to sustain many tablets online, only a few will be connected. These study findings showed that for teachers, teaching using ICT was challenging due to lack of infrastructure and ICT tools. These accession coincide with the research finding done by Bauer and Kenton (2005), Becta (2004), and Rich et al. (2010).

Lack of support, ICT training, few numbers of technological tools, teachers' lack of ICT knowledge and skills affect ICT implementation process. Primary school teachers can use ICT, but the above challenges hinder them. Finding solutions to these problems should be the next thing considered by teachers, school leaders, and government stakeholders. Besides, there is still hope for the effective and efficient use of ICT tools in Ugandan schools. The government via the Ministry of Education and that of ICT and National Guidance should consider involving all teachers in rigorous ICT training to gain adequate ICT knowledge and skills. Teachers should be motivated at the school level and also by the society on the excellent work they are doing. After minimizing the problems mentioned above, there will be positive outcomes in education through ICT.

Recommendations

The use of ICT in education is very beneficial to both teachers and students, as they both acquire ICT knowledge and skills, making learning real and enjoyable. ICT tools and software allow students to grasp difficult concepts quickly and complements learning especially for visual learners. Teachers' work is simplified since the learning software meets all learners' needs. For slow learners, also, the software allows students to learn at their own pace. Lesson planning materials and extra learning materials are accessible in the software. Additionally, classroom instruction delivery methods are

improved through the use of ICT tools. Nevertheless, the challenges reported in this study have to be solved otherwise the integration of ICT would be considered as the worst decision.

For practical use of ICT in schools to take place the following should be considered; ensure each child gets his/her laptop and be exposed to the laboratory; teachers need to have continuous ICT training sessions. There should be stable electric power supply in place. In case there are no laboratory technicians in school, the school should allocate teacher assistants to those classes using ICT tools to help manage a large number of students.

The government of Uganda via the Ministry of Education should address the issue of repairing faulty tablets as most teachers do not know who and how to address the faulty tablets. Due to inappropriate information, some schools are afraid of continuously using the tablets due to fear of damaging them.

The use of tablets in the classroom involves connecting to a server which is known as a content server. The content server has lower bandwidth that cannot support many tablets, the low bandwidth disconnects other tablets, and the loading process takes time. Stakeholders are encouraged to reconsider increasing the server bandwidth and strength for smooth learning of lessons.

There is a necessity to train all teachers in schools, head teachers and educational officials. This is because teachers need peer support when using technological tools. Education officials training is necessary since they are the individuals who assess teachers using ICT. Equipping them with the skills will be beneficial both to the school and the government, and this will lead to a reshuffling of the training content they expose teachers to. Most of them have no idea how the implementation process takes place. Unfortunately, those who could be sent to assess teachers do not have a theoretical idea of ICT use in teaching and learning.

Teachers should transform their mindset to embrace the use of ICT. They need to be open-minded to learn from their experienced colleagues in schools. Age should not hinder them from embracing ICT. Many old teachers are ICT technocrats, and they are managing very well with technological equipments. Arising out of the above accession, teachers have to change their perceptions, attitudes, and beliefs towards ICT by taking it as an opportunity to improve their pedagogical practice.

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CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

The effect of phenomenon-based learning approach on students' metacognitive awareness

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This study aims to determine the effect of learning activities conducted in accordance with the phenomenon-based learning approach on the metacognitive awareness level of students. Pre-test and post-test control group design of the experimental method was used. The application of the study was carried out in a sample of 60 students studying in the 7th grade of middle school in the 2019-2020 academic year. While "phenomenon-based learning approach" was implemented in the experimental group, traditional teaching was used in the control group. In this research, as data collection tool "metacognitive awareness" scale was used. The scores of the experimental and control groups obtained from the scale were compared to the dependent groups with the t-test, and when there was a significant difference between the students' pre-test scores and post-test scores, the effect size of the difference was found by looking at the Cohen's d value. In addition, when the pre-test scores of the students in the experimental group and the control group were taken under control, covariance analysis was conducted to determine whether there was a significant difference according to the post-test scores. According to the indications obtained at the end of the research teaching activities conducted in accordance with the phenomenon-based learning approach provided significant differences in the metacognitive awareness levels of the students in favor of the experimental group.

Key words: Phenomenon-based learning, metacognition, metacognitive awareness.

INTRODUCTION

Recently, there is a rapid increase in knowledge. Students need to get the information that will be useful among many to meet their needs. In the process of responding to their needs, it is also important to know the most accurate information, how, when and where it should be used. In this case, the students should be able to control and manage their own cognition structure by

questioning themselves about what they know or not. This is important for the metacognitive concept.

Flavell (1976), who was the first researcher to use the concept of metacognition in the field of education defines it as "It is individuals' cognitive processes, learning outcomes or knowledge about themselves." Boekaerts (1997) defines metacognition as the processes that

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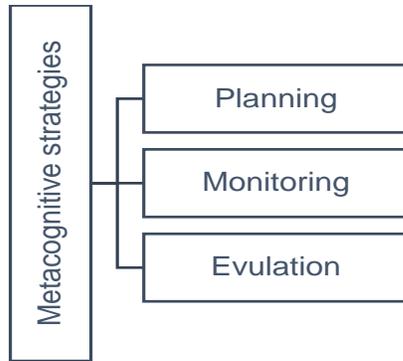


Figure 1. Metacognition strategies.

regulate individuals' own cognitive activities and cognitive strategies, Winne and Perry (2000) define it as the awareness of students' academic strengths and weaknesses.

Metacognition is individuals thinking about their own learning and making an assessment of what they know. In this evaluation, it is important to understand information correctly and to infer which information should be used (Taylor, 1999). Metacognition consists of three strategies (Zimmerman, 1989; Zimmerman and Poulsen, 1995; Schraw and Moshman, 1995; Pintrich, 1999; Schunk, 2009; Thronsen, 2011): planning, monitoring and regulation strategies.

Figure 1 shows that metacognitive strategies are metacognitive activities that help a student to control his or her own learning and thinking (Schraw and Moshman, 1995). In other words, it refers to the dynamic aspects of turning information into action.

1. Planning: It is a process of planning to solve a problem or completing a task, selecting and organizing relevant materials. In the planning strategy, students are expected to set goals, analyze tasks, select appropriate materials and make arrangements.

2. Monitoring: It is a cognitive process where the realization of the objectives is reviewed; self-evaluations guiding for future studies are made, and feedback is given. In the monitoring strategy, students are expected to distinguish between their effective and ineffective performances and to choose the necessary and appropriate strategies.

3. Evaluation: It is the assesment of students' own learning process, compliance with cognitive activities and its outcome. At the same time, it is the decision an individual made about the usefulness of the learning products and the strategies used in the learning process. In the evaluation strategy, students are expected to re-evaluate their learning goals, revise and correct their predictions, and reinforce their intellectual achievements and acquisition.

It is known that metacognitive strategies that enable

students to question and evaluate what they know, what they want to know and what they can do, provide students with awareness of their own learning, and also provide learner-centered information (Darling et al., 2003). Metacognition is a thinking system. Student is an active participant who has a say in learning by interacting with the external environment in the learning process. In this process, what makes the student active is being aware of his or her own cognition.

Metacognitive awareness is defined as a clear awareness of the strategies employed to control, organize and plan understanding (Grabe and Stoller, 2002). As metacognitive awareness gives individuals the opportunity to plan, explore and monitor learning it directly affects performance development (Schraw and Dennison, 1994). Therefore, metacognitive awareness is vital for cognitive effectiveness (Gourgey, 1998). In addition, metacognitive awareness refers to the conscious control of students' knowledge, learning processes, affective and cognitive states, and students' regulation (Papaleontiou-Louca, 2003; Garcia et al., 2016). Thanks to this awareness, they can reflect and monitor their cognitive activities. Moreover, being aware of their mental activities, they also have the opportunity to use the right strategies to meet the needs at the point of reviewing and organizing the activities. When evaluated in this respect, it is understood that it is important to improve students' metacognitive awareness.

It is thought that one of the innovations to increase students' metacognitive awareness is phenomenon-based learning approach. The phenomenon-based learning approach is defined as a student-led, multidisciplinary model based on inquiry and problem solving skills. The phenomenon-based learning approach is an education movement launched in Finland in 2016. Instead of passive learning approaches, it seeks to expand students into learning experiences that apply knowledge and skills from multiple disciplines while further deepening them into environmental situations that are compatible with real-life problems.

While exploring observable phenomena and developing evidence-based knowledge to help explain and predict the phenomenon, students develop key skills such as communication, critical thinking, problem solving, and teamwork (Fields and Kennedy, 2020).

Silander (2015) states that the phenomenon-based learning approach consists of five dimensions (holisticity, authenticity, contextuality, problem-based inquiry learning, open-ended learning processes). These are:

1. The holisticity dimension refers to the diverse discipline of phenomenon-based learning that is not integrated into traditional school lessons, but rather focuses on a systematic, comprehensive review of current events in the real world.

2. Authenticity dimension refers to the use of methods, tools and materials necessary for students to solve

problems that are important both in their lives and in society. While the theory and knowledge have immediate benefit, experts and professionals from many different fields are included in learning activities and students are encouraged to take part in real expert culture and practice. Classroom environments are considered to be a real and authentic learning environment rather than a traditional classroom.

3. The contextuality dimension is considered as a meaningful and systemic learning of the phenomenon in a natural environment.

4. Problem-based inquiry dimension, students develop hypotheses and theories of work. In the learning process, they ask their own questions and create information collaboratively.

5. Open-ended learning processes, students plan their learning process themselves by creating their own learning tasks and tools and they make an effort for learning. The aim is to make it easier for students to learn something new.

The student is in the center of phenomenon-based learning. The student is free to start learning about a topic of his or her interest (Symeonidis and Schwaz, 2016). No subject is taught in lessons where this approach is used, and there is no predetermined learning goal. Instead, students investigate and solve their own questions by applying them in problem-related lessons (Bobrowsky et al., 2014).

In the lessons where the phenomenon-based learning approach is used, students contribute and learn from the subject as active participants (Raahan, 2016). In this approach, the student does not readily learn the knowledge and skills in advance. Knowledge and skills are acquired as a result of a more meaningful learning experience by actively engaging the student in the problem-solving process in a real world context. In this process, the student discovers knowledge and skills by himself or herself. (Zhukov, 2015). The most important aim of the phenomenon-based learning approach is deep learning and understanding. It is aimed for students to study in depth on a subject they are curious about, in cooperation with different ways and perspectives (Silander, 2015). In addition the phenomenon-based learning approach always gives students a new learning experience. It supports self-perception, interpretation, interpretation with action and understands what has been learned. Learning by this way becomes a meaningful and effective activity for the student. (Kivelö, 2015).

The purpose of the phenomenon-based learning approach is to provide students with a life experience to provide learning opportunities that will increase their desire to study (Zhukov, 2015). These features of the phenomenon-based learning approach emphasize the necessity of creating appropriate social environments as well as curiosity, motivation, self-control and personal observations, coinciding with the tendencies of metacognitive awareness. Therefore, it is important to

investigate the effect of fact-based learning approach on developing metacognitive awareness. For this reason, it is important to investigate the effect of the fact-based learning approach on improving metacognitive awareness.

Purpose of the research

The purpose of this study is to determine the effects of the learning activities conducted in accordance with the phenomenon-based learning approach on the metacognitive awareness level of the students. For this purpose, answers were sought for the following trials.

1. Is there a significant difference in favor of the post-test between the metacognitive awareness scale pre-test and post-test scores of the experimental group?
2. Is there a significant difference in favor of the post-test between the metacognitive awareness scale pre-test and post-test scores of the control group?
3. When the metacognitive awareness scale pre-test scores of the experimental group and the control group are taken under control, is there a significant difference in favor of the experimental group between the post-test scores?

METHOD

This section includes explanatory information about the research model, study group, application process of the research, data collection tools and data analysis.

Research design

This research was carried out according to the "pretest-posttest control group model". Pre-experiment measurement and post-experiment measurement were made in both groups. The pre-tests included in the model and applied to the groups before the applications helped to determine the similarity levels of the groups before the experiment, and the post-tests helped to interpret the results (Cohen et al., 2007). The experimental design of the research is given in Table 1.

When Table 1 is viewed, it is seen that the dates of the applications performed during the experimental procedure and the pre-test and post-tests applied to the groups in the experimental and control groups are included.

Study group

The research carried out during the teaching process of the 7th grade social studies lesson "Individual and Society" learning area lasted 4 weeks in both the experimental group and the control group. The sample of the study consists of 60 students of two different classes of same grades in 2019-2020 education year that are educated in the West Black Sea Region in Turkey. The distribution of students in the sample group is given in Table 2.

When Table 2 is viewed, it is seen that there are 16 female and 14 male students in the experimental group, and 13 female and 17

Table 1. The experimental design of the research.

Groups	Pre-tests	Experimental process	Post-tests
Experimental	Metacognitive awareness scale	Teaching activities within the scope of the phenomenon -based learning approach	Metacognitive awareness scale
Control	Metacognitive awareness scale	Teaching activities based on traditional teaching approaches	Metacognitive awareness scale

Table 2. Distribution of students in the experimental and control groups.

Groups	Female		Male		Total	
	N	%	N	%	N	%
Experimental	16	53.3	14	46.7	30	50
Control	13	43.3	17	56.7	30	50

Table 3. Comparison of the metacognitive awareness scale pretest scores of the experimental and control group.

Groups	N	\bar{x}	Ss	sd	t	p
Experimental	30	40.82	8.47	58	0.34	0.82
Control	30	42.02	8.68			

$P < 0.05$.

male students in the control group.

Equalization of groups

In the equalization process of the subjects within the scope of the research, it is aimed to be careful about having students with similar characteristics in both experimental and control groups. Thus, other variables that could affect the experimental and control groups were tried to be controlled.

For this purpose, in adjusting the subjects within the scope of the research;

1. From the data obtained from the metacognitive awareness scale pre-test scores,
2. The lesson teachers' ideas about the cognitive and affective characteristics of students were used.

Comparison of the metacognitive awareness scale pretest scores of the experimental and control group

Information on whether the experimental and control groups are equivalent in terms of the metacognitive awareness scale before the experimental procedure or not is presented in Table 3.

When Table 3 is examined, it is seen that the pre-test scores of the metacognitive awareness scale of the experimental and control groups were compared before the application. The pre-test average score of the experimental group ($\bar{x} = 40.82$), the standard deviation value ($Ss = 8.47$), the average of the pre-test scores of the control group ($\bar{x} = 42.02$), the standard deviation value ($Ss = 8.68$) were

found.

Whether there is a significant difference between the pre-test average scores of the experimental and control groups was calculated with the unrelated samples t-test technique [$t(58) = .34$; $P < 0.82$] and the difference was not statistically significant. According to the result, it can be said that the experimental and control groups are equivalent in terms of the "The Metacognitive Awareness Scale" pre-test scores.

Application process

In the process of teaching the learning area "Individual and Society" in 7th grade social studies lesson, the practice was carried out in the experimental group 3 h a week. The research was carried out in three stages: preparation, implementation, data collection and evaluation.

Preparation phase

A 4-week daily lesson plan in which the teaching based on the phenomenon -based learning approach will be applied were prepared for the students in experimental group. The lesson plans were prepared according to the phenomenon based learning approach. Lesson plans were prepared according to the principles of planning, monitoring and evaluating learning, which will include independent study elements of the students and increase their metacognitive awareness.

"The Metacognitive Awareness Scale" was administered to the student as a pretest before the experimental procedure was started.

Implementation Phase (11 October - 01 November 2019)

Lessons are taught based on creating learning questions, research, project preparation, problem solving and application. The implementation was made in the process of teaching the subjects "The way that goes from human to human, the power of communication, fast communication, strong society, freedom of communication". The teacher starts the lesson by presenting questions or problems. The lesson begins with the students seeking answers to the questions or problems posed about a phenomenon that concerns them in cooperation. During the process, students were asked to prepare questions about concepts and phenomena in accordance with the content of the subject, (What is communication? What is fast communication? Etc.) With this implementation, the holistic dimension of the phenomenon-based learning approach is applied.

Students are divided into heterogeneous groups in order to formulate answers to the questions or problems they prepared about a phenomenon according to their interests before each lesson. With this implementation, it is aimed that students have deep learning experiences. At this stage, students are encouraged to benefit from other courses, library, technological tools and communication tools and students are given time. They are asked to make connections with the aims and topics of different courses. In this process, an authentic learning environment is created by providing various tools regarding the questions. Students are enabled to gain knowledge and skills as a result of a more meaningful learning experience by activating themselves through the process of solving the questions they put forward. In this process, the student discovers the facts with the group friends. At this stage, students also use know-want-learn activities in order to gain the skills of determining their own learning goals, self-perception, interpretation. With these implementations, the contextuality dimension and the problem-based inquiry-based learning dimension are applied. In addition, at this stage, it is aimed for students to acquire monitoring strategies from metacognitive strategies.

Students plan the learning process themselves by creating their own learning tasks and tools. Students are asked to write their learning plans, which are determined by them or by the group, on their worksheets. The aim is to make it easier for students to learn something new in a systematic way. Students present the solutions of the questions they form about the facts in the way they want and make self-evaluation. With this application, the learning process dimension of the phenomenon-based learning approach is applied. In addition, it is aimed that students will gain planning, monitoring and organizing strategies from metacognitive strategies due to planning for the process of solving a problem or completing a task, selecting and organizing relevant materials.

Data collection and evaluation phase

After the experimental process was completed, "Metacognitive Awareness Scale" was applied as a post-test to determine the effect of the application using the phenomenon-based learning approach on the metacognitive awareness levels.

Data collecting tools

Metacognitive awareness scale

In order to measure the metacognitive awareness level of the students, form B metacognitive awareness of the scale which was developed by Sperling et al. (2002) and was used adaptive optimized reliability and validity study done in Turkey by Karakelle and Saraç (2007) was used. The scale consists of 18 items as a

five-point Likert type (never, rarely, sometimes, often, always). The reliability of the scale was examined through test-retest and internal consistency coefficients, and its validity was examined through the lower-upper group method and item total score correlation, and it was found that the scale was valid and reliable at an acceptable level. The Cronbach's Alpha value for the scale was calculated as 0.80, which showed that the scale was reliable. The lower upper group method was used to determine the item validity of the scale. The difference between the mean scores of the participants in the 27% slice of the lower upper and lower scores of the scale was examined with the t test and ($t = 46.11, P < 0.001$) it was found that there was a significant difference. It was also stated that the scale should have a single factor structure and it would be appropriate to use it as a single total score (Karakelle and Saraç, 2007). The highest score that can be obtained from the scale is determined as 90, and the lowest score is determined as 18.

Analysis of data

Arithmetic mean (\bar{x}), standard deviation (Ss), frequency (f), percentage (%) t-test were used in the analysis of the data obtained. In addition, for each relationship, effect size (Cohens' d) values were calculated in order to explain the strength of the relationship. Effect size (Cohen's d) is the statistical value calculated according to the difference of Group averages showing the deviation of the results obtained from the sample from expectations (Cohen, 1994). The meanings given to the effect size score values are as follows; The range up to 0.2 has been interpreted as no effect, 0.2 to 0.5 range of small effect, 0.5 to 0.8 medium effect, and over 0.8 large effect. In addition, when the pre-test scores of the students in the experimental group and the control group were taken under control, covariance analysis was conducted to determine whether there was a significant difference according to the post-test scores. When significant difference was found between the groups, the eta squared (η^2) value was checked for the effect size of the difference. Accordingly, it has been interpreted as no effect up to 0.01, small effect between 0.01 and 0.06, medium effect between 0.06 and 0.14, and large effect above 0.14 (Green et al., 2000). 0.05 level and 95% confidence interval were used in the interpretation of the data.

RESULTS

The results regarding the findings obtained from the research are as follows. The first hypothesis of the study is "Is there a significant difference in favor of the post-test between the pre-test and post-test scores of the metacognitive awareness scale of the experimental group?" in the form. While obtaining the findings regarding this hypothesis, t-test was used for dependent groups. The findings obtained are presented in Table 4.

When Table 4 is examined, it is seen that the experimental group students have the metacognitive awareness scale as follows: pre-test mean score ($\bar{x} = 40.82$), standard deviation (Ss = 4.27), post-test mean score ($\bar{x} = 84.56$), standard deviation (Sd = 4.76). The difference is in favor of the final test. Whether the difference between pre-test scores and post-test scores is significant or not was interpreted with the t test obtained [$t(29) = 2.64; P < 0.02$] value and the difference was found to be statistically significant.

The effect size of the difference between pre-test

Table 4. Comparison of the experimental group's cognitive awareness scale pre-test and post-test mean scores.

Tests	N	\bar{x}	Ss	sd	t	p	Cohen's d
Pre-test	30	40.82	4.27	29	2.64	0.02	2.06
Post-test	30	84.56	4.76				

Significant level: $P < .05$.

Table 5. Comparison of the control group's cognitive awareness scale pre-test and post-test mean scores.

Tests	N	\bar{x}	Ss	sd	t	p	Cohen's d
Pre-test	30	42.02	3.72	29	1.64	0.00	0.04
Post-test	30	58.56	2.78				

Significant level: $P < .05$.

Table 6. The results of the covariance analysis regarding the comparison of the metacognitive awareness scale post-test average scores of the experimental and control groups.

Source	Sum of squares	Sd	F	P	η^2
Group	625.449	1	42.54*	0.00	0.27
Error	866.413	57			

Significant level: $P < .05$.

scores and post-test scores of the experimental group was calculated as (d: 2.06). It is seen that the experimental procedure performed had a great effect on the metacognitive awareness of the experimental group.

The second hypothesis of the research is; "Is there a significant difference in favor of the post-test between the pre-test and post-test scores of the metacognitive awareness scale of the control group students?" While obtaining the findings regarding this hypothesis, a t-test was used for dependent groups. The findings obtained are given in Table 5.

When Table 5. is examined, it is seen that the students in the control group have the metacognitive awareness scale as follows: pre-test average score ($\bar{x} = 42.02$), standard deviation (Ss = 3.72), post-test average scores ($\bar{x} = 58.56$), standard deviation (Sd = 2.78). The difference is in favor of the post test. Whether the difference between pre-test scores and post-test scores is significant or not was interpreted with the t-test; the difference with the value [$t(29) = 3.72$; $P < 0.00$] obtained was found to be statistically significant. The effect size of the difference between pre-test scores and post-test scores of the control group was calculated as (d: 0.02). It is seen that using traditional methods in teaching has a low effect on their higher cognitive awareness.

The third hypothesis of the research is; "Is there a significant difference in favor of the experimental group

between the metacognitive awareness scale post-test scores of the experimental group and the control group students?" Covariance analysis was used while obtaining the findings regarding this hypothesis. The findings obtained are given in Table 6.

In Table 6, when the metacognitive awareness scale pre-test scores of the experimental group and the control group are taken under control, there is a significant difference in favor of the experimental group in terms of post-test scores [F (1,57):42,54; $P < 0.00$]. Accordingly, it can be said that teaching based on the phenomenon-based learning approach has a great effect on increasing students' metacognitive awareness compared to traditional teaching.

DISCUSSION

According to the findings, the following results were obtained:

In the study, when the findings obtained from the metacognitive awareness scale of the experimental group were examined, it was observed that the teaching activities carried out in accordance with the phenomenon-based learning approach were effective in increasing the metacognitive awareness of the students. When the

findings obtained from the metacognitive awareness scale of the control group were examined, it was found that using traditional methods in learning activities could significantly increase students' metacognitive awareness levels. When the findings obtained from the metacognitive awareness scale of the research were examined, it was concluded that; this increase had a low level of effect on the metacognitive awareness scale and that the learning activities carried out in accordance with the phenomenon-based learning approach was more effective in increasing students' metacognitive awareness levels than teaching based on traditional method.

The significant difference in the results related to metacognitive awareness, that is, the phenomenon-based learning approach positively affected the metacognitive awareness can be explained as follows; this approach is based on questioning and problem solving skills. In addition, this approach can be considered as an important factor in making the difference meaningful since it enables the student to plan, perceive and interpret. In the origin of the phenomenon-based learning approach, curiosity, motivation, self-control and personal observations are important for students to examine a real holistic phenomenon related to their environment (Silander, 2015). In this respect, it can be accepted as normal that the students' metacognitive awareness level is high in the group in which the phenomenon-based learning approach is used. The purpose of the phenomenon-based learning approach is to provide students with a life experience in order to increase their desire to study and provide learning opportunities. In this learning approach, students are required to actively acquire and process information, use the necessary skills, draw conclusions, reach learning outcomes, and be versatile active learners (Linturi, 2014; Zhukov, 2015). Metacognitive awareness plays a critical role in the student's learning process as well as being independent and autonomous and performing more effective learning (Livingston, 1997). Because students with high metacognitive awareness know where and when to use the knowledge (Wilson and Conyers, 2016) According to Raahan (2016), in a classroom in which the phenomenon-based learning approach is used, they are not seen as a passive receivers of knowledge, but as learners and active participants that contribute to their own learning. The phenomenon-based learning approach is a multidisciplinary approach based on inquiry and problem solving skills (Symeonidis and Schwaz, 2016). Learning culture, which is tried to be created through the strategies and activities used specific to this approach, has positively reflected in metacognitive awareness, the development of operational knowledge and planning fields. As a matter of fact, according to Wakil et al. (2019)'s result of the research, they stated that the phenomenon-based learning approach facilitates learning and the learned information is more permanent. According to the study of Adaktylou (2020) in determining the effects of phenomenon-based teaching, students stated that they

behave like real scientists, improve their scientific literacy, obtain the necessary data, analyze and evaluate them. Similarly Wakil et al. (2019) stated that the phenomenon-based learning approach facilitates learning and the learned information is more permanent.

In summary, this study shows that the phenomenon-based learning approach contributes to the development of students' metacognitive awareness. As the results of the research reveal, since the applications supported by the phenomenon-based learning approach have a positive effect on the metacognitive awareness of the students, it should be ensured that the lessons are structured in accordance with the phenomenon-based learning approach and the metacognitive awareness of the students is increased by using the activities supported by the phenomenon-based learning approach in different courses.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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Full Length Research Paper

A resource recommendation for improving musical expression and narration in piano education: An examination of Loeschhorn op. 65 etudes

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This current study primarily focuses on the contribution of the etudes, which have a significant role in piano education, to musical expression and narration improvement. Starting from this point of view, Op. 65 etudes by Albert Loeschhorn which were released as studies for improving technical and musical expression and with the aim of being used in different stages of piano education were investigated. According to Loeschhorn, the term etude was not considered to be an exercise to overcome a specific technical difficulty. Instead, he constructed etudes that were intended for clearing technical problems and that gave particular importance to students' expressing the musical sentences by composers, which can be considered among the main factors in music and music education. In this research, the studies that were designed to increase awareness on these issues were analyzed. The etudes that were analyzed in this study were limited to the first Op. 65 book. Several pedagogues and researchers in the field along with parallel views with educators on the importance of musical expression and narration concluded that the etudes by Loeschhorn could be beneficial to resolve various problems by prioritizing musical expression and narration.

Key words: Music education, piano education, musical expression.

INTRODUCTION

Etudes, which are used as educational resources in instrument education, possess an essential place in music education. This certain type of resource considered for increasing competence with an instrument and resolving technical issues has been used by instrumentalists, music educators, pedagogues and composers in a wide range from basic exercises to concert parts with higher levels of difficulty. The French originated word etude means a thorough analysis, research or a pre-study on a certain topic. In its use in

music, etude refers to generally short but demanding musical compositions intended to be played by a solo instrument to improve a musician's technical skills. In time, etudes have become richer in terms of melody, harmony and rhythm. While etudes can focus on a single technical issue, they can also deal with several different technical problems (Bilir, 2016:1). Etudes are pieces of music which are generally short and noteworthy challenging and written to master technical skills and help to improve the performance (Akar, 2013:1).

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In Turkey and actually in the world, educators generally use the etudes in the literature to help students resolve technical difficulties they encounter and gain certain skills in all stages of professional music education and in private institutions such as private art centers or courses. Furthermore, besides technical skills, musical expression and narration are also among the skills that are aimed to be taught in instrument education processes. Therefore, certain pieces representing different periods in music history are used by the educator by classifying these pieces from the easiest to the most challenging and systematically introducing these to learners' repertoire.

In instrument education process, the etudes are written in different categories to overcome the technical difficulties, the learners may encounter and to allow them learn various skills. Among these categories, the etudes that are constructed for teaching and developing technical skills are considered as a completely different process. By analyzing, it is easier to perceive and internalize the etudes. Especially, examining and analyzing, and making beneficial conclusions from these undoubtedly contribute positively to the education processes (Kurtuldu, 2009:29). If a new piece is to be studied, it is significant and beneficial to start with summarizing the structural and stylistic features of the piece such as musical features, style and the period it belongs to. Analyzing the new piece and understanding its musical factors and complementarians in general terms enables the learners to get musical ideas and make basic deciphering (Ercan, 2008:73 quoting Kurtuldu, 2009:29).

Every single etude has an important role in resolving several technical difficulties that the student may encounter in pieces he adds to his repertoire (Cüceoğlu and Berki, 2007:228). Etudes are used widely especially in beginning level and in the first three years of instrument education in all areas. Some educators plan their training for students' musical skills development by providing a methodological etude book at the beginning of the education process. In piano literature, the term etude began to be defined as pieces requiring advanced technical knowledge rather than exercises for technical skill development by composers like Chopin, Liszt, Moszkovsky, Arensky, Rachmaninof and Scriabin in the 19th and 20th centuries.

In piano education process, the main course materials could be considered to be etudes and pieces existing in piano literature. When compared to other instruments, the piano has a lot more extensive literature. Several composers, pianists and pedagogues have produced numerous pieces of music for the piano. At this point, it is vital to create an appropriate repertoire for the students from this rich and extensive literature (Yılmaz, 2018:11). In order to play a piece on the piano, it is highly important to have strong technical skills and to use them appropriately. The more advanced these technical skills are, the better and easier it is to perform musical

expressions. All in all, it is of the essence to give the etudes written or developing technical skills the place (Kalkanoğlu, 2020:1).

In instrument education, the educators generally focus on developing technical skills and resolving technical problems. Etudes can be considered to be as back-ups especially for students in the beginner level. In piano education, etudes are used for developing a lot of techniques such as left/right hand finger development, scale technique, playing double voices, trill vocalization, rapidity, development of octave and moving to different positions on the keyboard. There are studies in the literature to enable the learners to describe, express or be aware of the musical phrases by a composer. However, eliminating the challenges mentioned above and teaching skills are the primary goals of the educators.

While the etudes are being studied, it is important to pay attention to musicality as well. Including etude studies correctly in the curriculum will help the students to analyze, decipher and perform difficult pieces. At the same time, studying etudes is crucial as it improves the deciphering ability, analysis ability, piano technique and musicality (Yılmaz, 2018:15).

It is essential to have a balance between structuring and interpretation in teaching, as well as in practice. Emphasizing solely on the interpretation elements might lead to neglecting technical skills. On the other hand, paying special attention to technical skills might also damage the imagination and the ability of making spontaneous music. The balance between these two factors should show variation at different stages in students' development. In the early years of education, the teacher should consider creating instrumental knowledge as his main task. However, he should not ignore musical development; the configuration factor should be at the forefront. There is no age limit for the development of a musician but the early youth is the period in which the technique develops the fastest. At a later stage, when the technique is firmly established on solid foundations, the balance can be shifted towards the interpretation (Galamin, 1962:106-6 quoting Doğanay, 2011:10).

While giving more importance to technical studies than it deserves may prevent musicality, a teaching style that ignores the technical skills and emphasizes musicality may also leave technical skills development in the background (Doğanay, 2011:10).

In the first half of the Romantic Period, composers such as Clementi, Cramer, Hummel and Czerny presented their technical and musical approaches pedagogically and formed the foundations of piano technique. The approach of these composers, which is a continuation of the 18th century understanding of piano technique, was inadequate in practice and was not able to go beyond asserting what should be for an effective musical performance. Therefore, this mechanical technical

approach reached its peak with the work of these composers and in the end, there was not much left to do. From this point on, the development of the piano technique was undertaken by younger composers of the period such as Chopin, Liszt and Thalberg, and their liberal and distinctive approach reshaped the piano technique (Yahşi, 2017:7).

Prior to Chopin, the concept of etude, which only aimed at technical development and did not go beyond being an exercise, was completely changed with the etudes he wrote, and became artistic works with deep musical expression. However, Chopin has realized the musical technical understanding which composers like Clementi and Czerny put forward as an approach that should be in the piano techniques and with the etudes he wrote, he demonstrated the first examples of an approach that would continue after him (Yahşi, 2017, s.8).

Generally, the approach on etude in performing arts state that a style focusing on continuous technical exercises might cause the students' musical expression and expression skills not to develop. As mentioned previously, based on this point, distinctive composers in the literature have created works by combining work with deeper musical expression and the concept of etude, instead of writing pieces only for technical skills development and daily exercise.

Learning to play the piano is a multifaceted and complex process which mainly involves the development of mental, psychomotor and affective skills. The main objective of piano education is to provide the musical development of the students with a solid technique. The technical skill is a means of reaching musical expression power and the main aim is to develop musicality. However, in order to reach the desired and expected level in musical sensitivity, the student must overcome some technical problems (Ertem, 2011:646). In piano education, it is important to gain and develop musical expression skills as well as correct technical skills (Çimen et al., 2013:1 quoting Yılmaz, 2018:10).

German composer, pianist and pedagogue Albert A. Loeschhorn (1819-1905) was a composer as well as a piano educator and pedagogue. A. Loeschhorn is generally known for his etudes and exercises for the piano. Albert A. Loeschhorn gave priority to musical expression in his piano studies. He included phrase works for musical technique and expression to the explanation section at the beginning of his book. For A. Loeschhorn, the priority in his etudes in general is to provide the awareness of expression, narration, musical phrases and period; and to combine and overcome the technical difficulties that are considered in the concept of the etudes with musical expression.

According to Fenmen (1997, p.21), expressing a piece of music means stating the character, spirit and the meaning of that work and making the audience understand it. The musician must first understand and reveal musical phrases in order to make others feel it.

According to Margulis (2011, p.51) the appropriate finger number is written after finding the correct articulation of a musical phrase. Correct articulation and phrasing can be said to bring the correct finger number.

Musical works also consist of sentences like literary texts, periods formed by integrating musical phrases. By expanding these periods and creating the sections, musical phrases shape the work. Along with the Romantic period with Sonata, Rondo, Fugue and Variation forms, the composer also produced different types of works using the general structures of these forms.

The expression of a music sentence is called a phrase. In order to express a sentence, it is necessary to see the structure of it and determine its parts. After the parts of the sentence, i.e., the periods, are revealed, the highest point is marked and an exit is prepared towards that high point. This is done to know the parts of the sentence and to clearly see where a comma, semicolon or a period would come because a linguistic sentence is similar to a musical sentence: both contain important parts, stops, important words or sounds (Fenmen, 1997:23). According to Pamir (1983), the ups and downs of the small motifs that make up the sentence should be known, which timbre color and type of articulation they require, and their breathing should be formed. The beginning of the sentences, their expansion, their exhalation at their climax should be heard and sung with the ear, and the lines of these sentences should be considered exactly like a picture. First of all, it is important to know what is being played. The quality of "how" reveals the subject and all the details of the work (Pamir, 1983:178). As can be seen, important pianists in the field also underlined the importance of this subject.

A musical work has a periodic style and playing style depending on the instrument, with a characteristic form and the content of the form consists of motifs with parts, sentences or periods which are the smallest musical expressive tools that reflect the perspectives of the composers. Musical expression and performance of the perspective of the composer are among the goals expected from the students in professional education and in all process in this education such as concerts or exams. To summarize, these processes are in general correct performance, musical phrasing and representation of the melodic line, awareness of sentence links, harmony and sensation (cadences and chord transitions), style and style representation. Loeschhorn Op 65 piano etudes consists of 48 pieces. The composer listed these 48 pieces in three groups of 16 (first, second and thirds books) from the easiest level to the difficult. When A. Loeschhorn's etude writing method is examined, it can be seen that piano techniques such as scale, arpeggio, trill, octave was planned and used to contribute to the musical interpretation and expression skills of the students systematically from beginner to intermediate level. The teacher can choose the appropriate etude from this

collection within the framework of the technical and musical of the student. For this reason, the composer has a very important place in the piano education literature.

Problem

The problem of this study is that the technical and narrative features of the etudes to improve musical expression and narration for beginner level piano education by Loeschhorn are not widely known.

Objective

This study aims to analyze the etudes written for piano education by Loeschhorn and the way they contribute to the improvement of musical expression and narration in technical exercise context by the composer in beginner level piano education.

Significance of the study

This study is of great importance in terms of introducing an alternative educational resource and a composer at the same time. In addition, this study can be considered to be leading for educational music composers who aims to demonstrate both musical expression and technical skills improvement. It is also significant as it is an analysis of an alternative resource that can be used in secondary instrument education for students in professional music education institutions.

Limitations

This study is limited to sixteen etudes in beginning level from A.Loeschhorn's first book of Op.65.

METHODS

This study was designed as a qualitative research. It is a descriptive study based on field research in instrument education. Descriptive studies describe a certain situation thoroughly and carefully. This method is widely used in educational research (Büyükoztürk et al., 2016).

Universe and sample

The universe of the study consisted of Loeschhorn Op,65 piano etudes. The sixteen etudes in the first book of Op.65 were chosen as the sample of the study.

Data collection and analysis

Qualitative data collection can be classified into two main groups. These are basic data collection methods and supportive data

collection methods. Among basic data collection methods are participant observation, natural observation, documents and interviews (Özdemir, 2010:327). The research uses documents such as diaries, letters, field notes to search about the topic and analyze (Hodder, 2002 quoting Özdemir, 2010:327). On the other hand, content analysis is a method to determine to what extent certain terms, events or assessments are mentioned in a specific document (Arslanoğlu, 2016). In this study, content and document analyses were employed. The sixteen etudes in the first book of Opus 65 by Loeschhorn, which was published by Schirmer Edition, were analyzed via content and document analyses within this research and how technical skill development issues and musical expression elements were integrated in the etudes was interpreted in the study.

FINDINGS

When the etude given in Figure 1 was analyzed, a study that supports musical expression and narration for a beginner level piano student can be seen. The melodic movement in the right hand is supported with the accompaniment figure in the left hand. The main area of development expected in this etude is to focus on playing a musical phrase with the right hand. Another important issue to focus on in this part is that the composer did not write any musical dynamic terms in the first eight etudes. The main objective of this etude for learners is to concentrate on sentences and narration.

As seen above, in Figure 2, Etude No.2 is in the form of a song. By demonstrating the ties between musical phrases and melody split points, the player is supposed to focus on playing sentences in the right-hand part. In Etude No.3, musical phrase links are added to the accompaniment figure for the left hand. In this way, it is desired for the left hand to rest at some points along with the right hand. The priority is again on the melodic expression and narration in the right hand. These two etudes are more advanced when compared to the Etude No.1.

Etude No.4 given in Figure 3 has counterpoint style as well. In the second period following the first eight measures, a pattern was produced by separating the figures and chord sound that contain harmony chords in the left hand in general and it was supposed to rest at the end. Musical phrasing and expression in both hands are again given particular importance here. Using the patterns at the end of antecedent and consequent phrases in the right hand is instructive for musical expression and narration.

As seen in Figure 4, Etude No.5 is constructed as a finger exercise for the right hand. The aim in this exercise is to play the musical phrases softly not in a fast beat, but rather slowly and to have equal phrase integrity from the beginning to the end of the etude. The accompaniment figure in the left hand is also connected in all dimensions, imitating the right-hand figure at the end of some phrases and prepares the player to the next phrase. This etude is important in terms of achieving the development of phrase integrity and expression.

Studies for Piano.

by

A. LOESCHHORN.

Part I. For Beginners. Op. 65. Book I.

Nº 1. Moderato.

Piano.

Figure 1. A. Loeschhorn Op 65. 1st book etude no.1 (Loeschorn, 1950)

As seen in Figure 5, Etude No.6, the accompaniment figure is given to the right hand at beginning and a restricted melodic movement repeating in the left hand is used. In this way, it is aimed to preserve the integrity of the nuance in the phrase and to play all the notes in the phrase softly and with equal loudness. In the second part of the etude, the motifs used in the first part are imitated and repeated in the right hand and by going to different places on the keyboard, it is aimed to gain control of the instrument by preserving the loudness and integrity.

As seen in Figure 6, Etude No.7, A. Loeschhorn thought of the melodic movement in the left-hand part and wrote with the right and accompaniment figure. In this way, he thought of this etude to play the theme, which is very common in the literature, by changing its

place to the left hand and to develop the awareness of this style.

As can be seen in Figure 7, Etude No. 8 includes the melodic movement in the right hand and the scale study. The composer mainly provided harmonic support to the melodic movement in the left-hand part. As seen in the 11th and 13th measures above, he wrote figures that enable the left hand to work and provide phrasing awareness.

As seen in Figure 8, from Etude No. 9 on, the composer started to add nuances to his works. The first eight etudes in the book, which has 16 etudes in total, can be given to the students by spreading over a year after the beginning of piano education. Etude No.9 and No.16 can be considered as a support in the second year

Nº 2. Moderato.

Nº 3. Allegretto.

Figure 2. A. Loeschorn Op 65. 1st book etudes No. 2 & no.3 (Loeschorn, 1950).

Nº 4. Allegretto.

Figure 3. A. Loeschorn Op 65. 1st Book Etude no.4 (Loeschorn, 1950).

Nº 5. Andantino.

The image shows the musical score for Etude No. 5, Andantino, by A. Loeschhorn. It consists of two systems of music, each with a treble and bass clef staff. The first system has four measures, and the second system has four measures. The music features a steady eighth-note accompaniment in the bass and a melodic line in the treble with various fingerings and slurs. The tempo is marked 'Andantino'.

Figure 4. A. Loeschhorn Op 65. 1st book etude no.5 (Loeschhorn, 1950).

Nº 6. Allegro moderato.

The image shows the musical score for Etude No. 6, Allegro moderato, by A. Loeschhorn. It consists of four systems of music, each with a treble and bass clef staff. The music features a steady eighth-note accompaniment in the bass and a melodic line in the treble with various fingerings and slurs. The tempo is marked 'Allegro moderato'.

Figure 5. A. Loeschhorn Op 65. 1st book etude no.6 (Loeschhorn, 1950).

Nº 7. Allegro.

Figure 6. A. Loeschhorn Op 65. 1st book etude no.7 (Loeschhorn, 1950).

Nº 8. Allegretto.

Figure 7. A. Loeschhorn Op 65. 1st book etude no.8 (Loeschhorn, 1950).

Nº 9. Andante con moto.

Figure 8. A. Loeschhorn Op 65. 1st book etude no.9 (Loeschhorn, 1950).

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Nº 10. Allegro.

Figure 9. A. Loeschhorn Op 65. 1st book etude no.10 (Loeschorn, 1950).

Nº 11. Allegretto.

Figure 10. A. Loeschhorn Op 65. 1st book etude no.11 (Loeschorn, 1950).

of piano education for the repertoire of a student who had completed his first year. Etude No.9 was written in a style with right hand melodic intensity and embellishments. The accompaniment figures that support the melody in the left hand are frequently used in the second parts of the classical period sonata sections.

As seen in Figure 9, Etude No.10 consists of melodic expression in the right hand and accompaniment figure in the left hand with the styles of classical and romantic periods. Contrast is used in each of the four-measure antecedent and consequent phrases. Contrast is

preferred for loudness expression and strong (forte) and light (piano) nuance are used.

As can be seen in Figure 10, the most striking elements in Etude No.11 are the motifs consisting of quatrains and eighth notes connected by an extension tie. At the end of the period, the composer aimed to improve the gamut technique and crescendo skills with the scales he used at the end of the period.

As seen in Figure 11, in Etude No. 12 the melodic movement supported by chord figures in the left hand is in the foreground. There are crescendo and diminuendo

Nº 12. Allegro.

Figure 11. A. Loeschhorn Op 65. 1st book etude no.12 (Loeschhorn, 1950).

Nº 13. Allegro moderato.

Figure 12. A. Loeschhorn Op 65. 1st book etude no.13 (Loeschhorn, 1950).

Nº 14. Tempo di Valse.

Figure 13. A. Loeschhorn Op 65. 1st book etude no.14 (Loeschhorn, 1950).

playing marks existing with rising and descending sequences in the etude. The composer aimed to ensure the dominance of the nuance over the lifting and descending movement.

As seen in Figure 12, Etude No.13 consists of Alberti bass accompaniment figure with support made on the melodic line on the right hand. It is aimed to Show broad phrases and nuance signs written for the right hand with dynamic accompaniment to the left hand.

As seen in Figure 13, Etude No. 14 was written with

three-quarter rhythm accompaniment for the melodic movement in the right hand. The right-hand melody accompanied by this way aims to introduce this rhythm to the students and to gain musical expression experience on the rhythm.

As seen in Figure 14, in Etude No.14, the general purpose is to be able to play the nuances on the melodic lines shown with phrase ties along with fast and lively performance.

It can be seen in Figure 15 that the important point that

Nº 15. Allegro vivace.

Figure 14. A. Loeschhorn Op 65. 1st book etude no.15 (Loeschhorn, 1950).

Nº 16. Allegro.

Figure 15. A. Loeschhorn Op 65. 1st book etude no.16 (Loeschhorn, 1950).

draws attention in Etude No.16 is the two-party accompaniment pattern seen in the 3rd and 5th measurements in the left-hand accompaniment. By dividing the left hand into two, it further developed the musical narration. The playing style here is based on showing the expression inside the part shown in left hand with an eighth note upwards, along with melodic narration in the right hand. This structure, which is also included in a lot of medium and advance level works and piano accompaniment, has a very important place in piano performance. The introduction of this technique to the students has been considered at this level with technical compliance. Although this acquisition is an important piano technique, it is an important form of musical expression and something that students encounter in many baroque, classical and romantic period pieces.

DISCUSSION

Musical expression and the awareness of musical

phrases, which several researchers, educators, pedagogues and educators who contribute to the literatures generally focus on, are among the important skills that the students are expected to gain in musical education and therefore in instrument education. Written for this purpose, the sixteen etudes in the first book of A Loeschhorn Op. 65 Studies for Technical and Musical Development provide support for educators and students for this objective.

The etudes written by Loeschhorn in this book are important in terms of being a resource that be used in accordance with the repertoire and as technical exercises for students who learn the piano as the secondary instrument in their own branches in institutions providing vocational art education as well as for students who start piano education at the beginning level in these institutions.

Ekinci (2004), in his study on 324 candidate music teachers studying at education faculties concluded that 51.3% of the candidates who participated in the questionnaire exceeded their level in piano education

thanks to the technical practice method they used. The fact that the etudes examined in the book as an alternative study resource starting from the beginner level, from easy to difficult pieces, is important in terms of being able to eliminate the deficiency pointed out by Ekinci.

Loeschhorn's second and third books of Op. 65 and his Op.66 piano etudes should also be examined and analyzed. Based on these studies written by A. Loeschhorn for musical expression and narration, etudes that support development in this direction can be written for the instrument training repertoire. In addition to the exercises essential to overcome the technical difficulties encountered, these etudes, which predominantly emphasize the awareness of melody and musical phrases, are useful for education and for the musical development of the student.

Kalkanoğlu (2020) stated that in the conclusion part of Czerny's Op. 718 etudes written for the left hand, he observed that the melody in the right hand has fewer musical expressions among the other etudes written by the composer.

However, he stated that the chord technique, which has an important function in the left hand, is not included in the work in the etudes written for the left hand. The sixteen etudes of Loeschhorn examined in this research entirely focused on the development of expression and phrase awareness; and etudes numbered 8,12 and 15 support musical expression by putting emphasis on chord accompaniment in the left hand. These studies are also significant in terms of resolving the technical problems observed by Kalkanoğlu (2020).

The first book of Loeschhorn Op.65 is not a methodological piano training approach. The etudes in this book are exercises that support both musical and technical development and they can be used by the instructors throughout the training process. Instructor can use these etudes by observing their students' progress. In addition to this, it can be said that the instructor may have their students to play the etudes in this book by increasing awareness of musical phrases and expression to allow them gain a wide repertoire. Performance, which has a very important place for the art of music, and musical expression, which has a supportive place for its development, have been presented by Loeschhorn with exercises that enable to overcome the technical difficulties encountered by giving priority to a different difficulty in each etude.

Compared to composers such as Czerny, Cramer, Duvernoy and Bertini, who composed for the beginner and intermediate level piano education literature, Loeschhorn based its etude composition strategy primarily on musical expression. In addition to solving a technical challenge of a study, it also aims to develop the narrative capability, which is the true purpose of music, by focusing on the musical expression of the student. This goal is the composer's main goal in all his pedagogical works. In

Turkey, except for students playing the piano as the main instrument in professional music training schools, all students receive training for one or two years of undergraduate study of the piano. For example, a teacher candidate who plays the violin takes piano training for a year. A singer studying in the opera department takes piano training for two years. During these processes, it is not easy for students to study works from the literature, apart from the exam repertoires given to them. Due to the importance given to technical development and the concern of passing an exam, the necessary importance is not given to musical expression and narration. The pieces written by Loeschhorn for musical development provide great support to the educators working in the field in terms of solving this problem. In addition, these studies are very important resource for amateur piano instructors in music education.

Recommendations

In instrument education, it is essential to work with students on exercises for musical expression and musical phrase performance as well as specific etudes aimed at eliminating certain technical difficulties in beginner and intermediate level studies. In this study, based on the piano special, the same suggestion is given for all the instruments. Therefore, it is vital for educational music composers who compose for educational repertoire and musicians who receive composition education to work towards this development. Furthermore, the dissemination of the works of composers who write etudes for this aim in the literature is important for the development of the repertoire in educational institutions that provide vocational music education.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Full Length Research Paper

Teachers' concerns about the implementation of the standard-based curriculum in Ghana: A case study of Effutu Municipality

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The successful implementation of a school curriculum depends significantly on the extent of how stakeholders address the concerns of teachers. This study, therefore, investigated the concerns of basic school teachers in the Effutu Municipality towards the implementation of the standards-based curriculum. The explanatory sequential design of the mixed-method approach was adopted. The study randomly selected 197 primary school teachers for the quantitative research method, whilst six teachers were purposively sampled for the qualitative phase of the study. The quantitative data were analyzed through means and standard deviation. The qualitative data were analyzed thematically. The study found that the primary highest concern of the basic school teachers was collaboration and their second-highest concern and lowest concern were focusing and management, respectively. The study further found that age and experience statistically predict the stages of concern of the teachers in the implementation of the standard-based curriculum. However, the gender and educational qualifications of the teachers were not statistically significant predictors of their concerns towards the implementation of the standard-based curriculum. The study recommends that the district training officers should train and sensitize teachers in the various districts to create enabling environments within the different schools for teachers, school authorities and parents to collaborate among themselves in the implementation of the standard-based curriculum.

Key words: Concern, curriculum, implementation, standard-based curriculum.

INTRODUCTION

The best legacy that a country can offer its citizens is a quality education. Malaysia and Singapore show that the development of a nation depends mainly on the calibre of education it provides to its citizens. The United Nations Educational, Scientific and Cultural Organization (UNESCO), the lead agency for the United Nations

Decade for Education for Sustainable Development (DESD) has reiterated the vital role education can play in achieving the Millennium Development Goals. These roles include eradication of extreme poverty and hunger, redressing social inequities, and dealing with other sustainability issues such as health and environmental

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degradation (Down, 2011). Education is, therefore, seen as the vehicle on which the survival and development of an under-developed country rest on.

Irrespective of the above, globalization and modernization are rapidly posing new and demanding challenges to individuals and societies alike (Organization for Economic Cooperation and Development [OECD], 2019). Given this, countries are increasingly poised to produce students with knowledge that will put them at a competitive advantage over others in the job market. All over the world, educational systems have resorted to curricular changes to realize these educational aims. Countries such as the United States of America, Kenya, Rwanda and others have all undertaken reforming their educational system to ensure the production of highly sophisticated individuals who possess the knowledge and skills necessary for the job market in the 21st Century (Waweru, 2018). It is to this end that the Ministry of Education through the National Council for Curriculum and Assessment (NaCCA) introduced the Standard-based Curriculum to replace the objective-based curriculum since the introduction of formal education.

In 2017, the Government of Ghana tasked NaCCA to review the pre-tertiary curriculum in Ghana to respond to international best practice. In February 2019, the President of Ghana announced in his Nation Address that a new Standard-based Curriculum was to be introduced in September 2020. Expectedly, the Standard-based Curriculum presents a paradigm shift from the Objective-based Model that the country has adopted since the introduction of formal education in Ghana. According to the Ministry of Education (2018), there was a need for a paradigm shift from the objective based-curriculum to the standard-based approach. The former was fraught with problems such as preparing students for examination at the expense of the acquisition of essential skills for human capital development, content overload and the inability of the assessment system to help improve teaching and learning.

The focus of this new curriculum model, therefore, was to reinforce the acquisition of the 4Rs – Reading, Writing, Arithmetic and Creativity as fundamental skills for lifelong learning and national development (Kpedator, 2019). This new curriculum also intended to promote the acquisition of 21st Century skills such as critical thinking and problem-solving, creativity and innovation, communication and collaboration, cultural identity and global citizenship, personal development and leadership as well as digital literacy (Addai-Mununkum, 2020). Values such as respect, diversity, equity, and commitment to achieving excellence have been incorporated in the curriculum to facilitate the raising of literate, confident, engaged and critical-thinking citizens. Apart from the introduction of new subjects such as History and Our World Our People which hitherto were not part of the primary school curriculum, the new

paradigm also introduced national assessment examinations at Basic two, four and six to replace the Basic Education Certificate Examination (BECE) and this occurs after the final year in the junior high school.

The introduction of an educational innovation often leads to the arousal of concerns among teachers who are often regarded as the critical determinant of the success or otherwise of the innovation. Various studies report mixed findings concerning the stages of concerns of the teachers during the implementation of an innovation. In Turkey, for instance, a survey conducted by Çetinkaya (2012) revealed that teachers' concerns focused mainly on the personal and collaboration stages of the Concern-Based Adoption Model (CBAM). Arguably, the Turkish teachers used in the study were not resistant to the change, even though they had some confusion about the curriculum; they wanted to learn from what others knew and were doing to increase their knowledge and skills about the implementation of the reformed curriculum. In the same jurisdiction, Gokcek and Baki (2013) found that teachers were mainly concerned about becoming sufficiently informed about the programme; organization and timing issues; and inadequate school conditions and students' backgrounds. They were also concerned about the new instructional materials, although the intensity of their concerns changed over time. Kwok (2014)'s study in Hong Kong revealed that teachers showed intense concern on all the six stages: Informational, Personal, Management, Consequence, Collaboration and Refocusing of the Concern-based Adoption Model. In Lesotho, Tafai (2017) found that the teachers were aware of the new curriculum with their concerns being most substantial in collaboration, refocusing and personal adequacy.

In Ghana, various studies (Ani-Boi, 2009; Ankomah and Kwarteng, 2010; Cobbold and Ani-Boi, 2011; Kwarteng, 2016; Kwarteng, 2018) have been conducted on teachers' concerns on the implementation of the objective-based curriculum at various levels of the Ghanaian educational system. However, these studies often reported different findings on the concerns of the teachers in the implementation of the objective-based curriculum. For instance, whilst Ani-Boi (2009) said that the primary school teachers in the Cape Coast Metropolis had significant concerns at personal, management, consequence and refocusing stages of the concern-based adoption model, Kwarteng (2018) on the other hand found that the senior high school Accounting teachers were mainly non-users of the curriculum. However, they had both the primary and secondary concerns at the awareness and informational stages of the accounting curriculum. There are inconsistent findings as far as teachers' concerns in the implementation of the objective-based curriculum at different levels of education in Ghana are concerned. The success or otherwise of an educational innovation depends significantly on the extent to which stakeholders

address the concerns of other stakeholders such as teachers. It is therefore essential that data is collected on the concerns of teachers in the implementation of innovation to furnish curriculum development agencies with information that can be relied on to address the concerns of teachers.

Besides, studies have also reported inconsistencies concerning how teachers' demographic characteristics affect their concerns towards the implementation of an innovation. For example, Çetinkaya (2012)'s study in Turkey revealed that teachers' level of education and experience in implementing a reformed curriculum do not predict the concerns of teachers with the new curriculum. However, teachers' concerns change across teaching experience and gender, though these differences are not significant. Tafai (2017)'s study also found that their stage of concern differed by gender, teaching experience and educational qualification. Donkoh (2016) found that concerns were independent of their level of education, subject specialization and teaching experience. Agormedah et al. (2019) also reported in their study that characteristics (gender, age and teaching experience) of business teachers have no association with their concerns. It, however, appears that with the introduction of the standard-based curriculum for primary schools in Ghana, no empirical studies have been conducted to ascertain the stage of concerns of the primary school teachers in the implementation process and the extent to which their concerns could be predicted by the demographic characteristics. It is against this background that this study adopted the Concern-based Adoption Model to fill the identified lacuna in the literature.

Statement of the problem

To prepare teachers adequately for the implementation of the standard-based curriculum, the Government of Ghana organized five days training workshop for 152000 primary school teachers across the country. Even though the workshops were generally successful, Kpedator (2019) postulates that various unfortunate incidents characterized the government's refusal to listen to the multiple complaints of the teachers during the training. The most scathing criticism of the teachers related to lack of learning materials to support the implementation of the curriculum as well as a limited congenial atmosphere that would enhance the successful implementation of the curriculum. Even though the government promised to supply the needed teaching and learning materials within the shortest time to support the teachers in the implementation process, anecdotal records and narratives from teachers in the classrooms indicate that the teaching and learning materials have not been provided.

Extant literature also suggests that the success of an educational innovation depends on the degree to which

teachers embrace and adopt it in the classroom (Adentwi and Sarfo, 2011; Nnabuike et al., 2016). However, teachers are often neglected when designing the school curriculum in centralized jurisdictions such as Ghana (Carl, 2005; Oloruntegbe et al., 2010; Abudu and Mensah, 2016). The neglect of teachers to the periphery in curriculum design enterprise often leads to the development and arousal of concerns (Kwarteng, 2009). The results of various studies point to the fact that the concerns of the implementers of the innovation are critical to the success of the implementation process (Fuller, 1969; Richardson, 1990). Van den Berg and Ros (1999) indicate that though the characteristics of innovation such as the cooperative network and financial arrangements are necessary for the achievement of the objectives of the innovation, the more pressing factors that might affect the implementation are the concerns of the actors involved in the implementation and their characteristics.

Substantial research exists on the concerns of teachers in the implementation of various innovations in the Ghanaian school system. For example, Ani-Boi (2009), Ankomah and Kwarteng (2010), Cobbold and Ani-Boi (2011), Kwarteng (2016) used the Concern-based Adoption Model to track teacher concerns on the 2007 educational reform whilst Donkoh (2016) followed social studies, Kwarteng (2009) – Accounting teachers, Agormedah et al., (2019) – Business Studies teachers. With the introduction of the Standard-based Curriculum, however, it appears that little or no empirical study has been conducted to ascertain the concern of primary school teachers in Ghana. It is this dearth in the knowledge that has necessitated this study to address the following research questions.

1. What are the stages of concerns of the Basic School teachers regarding the standards-based curriculum?
2. What is the relative contribution of teachers' demographic characteristics on the Stages of Concern in the Implementation of the Standard-based Curriculum?

THEORETICAL FRAMEWORK: CONCERN-BASED ADOPTION MODEL (CBAM)

The study adopted the Concern-Based Adoption Model (CBAM). CBAM is used as a blueprint to gauge staff concerns on the implementation of educational innovation. Though the CBAM has three diagnostic dimensions: Innovation Configuration (IC), Levels of Use (LoU) and Stages of Concern (SoC), this study is grounded in the latter (SoC). The SoC in the CBAM enables developers of innovation to identify teachers' attitudes and beliefs towards an educational innovation: CBAM.

In Figure 1, the SoC model classifies and distinguishes seven different stages of concerns that the implementers

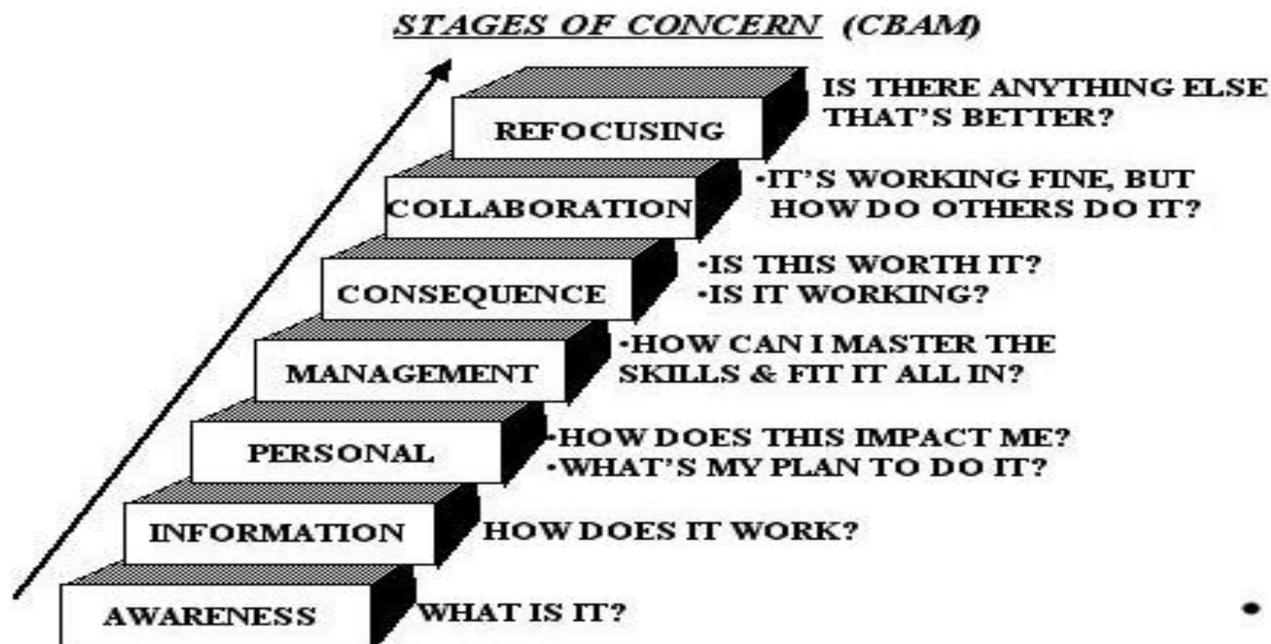


Figure 1. The Concern-Based Adoption Model (Hall, 1979).

of an educational innovation are likely to have (van den Berg et al., 2000). These stages are:

1. *Awareness* (Stage 0): At the awareness stage, teachers may not have any knowledge about innovation. Therefore, they may not be ready to use the innovation in the classroom or even show interest in the innovation. At the extreme, teachers may even resist innovation.
2. *Informational* (Stage 1): At this stage, teachers show the desire to know more about the innovation. Openly, teachers may become curious about what the innovation entails. Teachers may further seek opportunities to discuss innovation and how their colleagues in the common room are doing and feeling.
3. *Personal* (Stage 2): Teachers at this stage may know how the innovation would affect their work and the kind of changes that may occur in their practice as a result of the innovation.
4. *Management* (Stage 3): The implementers of the innovation devote their attention to solutions to the problems that regularly occur in the implementation process. Teachers become more concerned with practical solutions on how innovation can best be utilized for its purpose.
5. *Consequences* (Stage 4): At this stage, teachers become interested in how innovation would benefit students. Teachers begin to consider how innovation can be refined to have more impact on the students.
6. *Collaboration* (Stage 5): At this stage of the Model, teachers begin to consider how they would share lessons with other teachers about innovation. Interestingly, teachers become concerned with how they can offer

technical support to other teachers to enhance the implementation of the innovation.

7. *Refocusing* (Stage 6): At this stage, users of innovation are interested in other alternatives to the programme. Generally, teachers implementing a new curriculum begin to think about how the curriculum could be modified or replaced with a more effective and robust one. In the case of the standard-based curriculum, the teachers might consider the use of other innovations that are more powerful than what is being used currently.

As a theoretical lens for this study, it is argued that the stage of concern of teachers is pertinent to achieving the rationale of the curriculum as it would enable the developers of the Standard-based curriculum to develop strategies that would address the concerns of the implementers of the curriculum.

RESEARCH METHODOLOGY

Research design

The study adopted the pragmatist philosophy drawing data from both quantitative and qualitative paradigms to help evaluate and interpret results (Johnson and Onwuegbuzie, 2004) obtained via the two approaches (Creswell and Creswell, 2017). This approach helped the researcher to obtain different but complementary data on the concerns of the teachers towards the implementation of the standard-based curriculum (Morse, 1991). Again, the researcher chose the mixed-methods approach in order to address the weaknesses of the quantitative method with the strengths of the qualitative method (Patton, 1990). The mixing occurred at three

stages: sampling, instrumentation and data analysis. Specifically, the study employed the explanatory sequential (QUAN + qual) design. Data collection and analysis were done in a sequence where the quantitative data were collected first and analyzed for which the outcome informed the qualitative dimension of the study.

Population

The target population for the study was public primary school teachers in the Effutu Municipality who are involved in the implementation of the standard-based curriculum. The accessible population was 240 basic school teachers at the primary school level (Kindergarten and Basic 1-6).

Sample and sampling procedures

In this study, 197 Basic school teachers were involved. According to Krejcie and Morgan (1970), it is appropriate to sample 148 participants when the population is about 240. The study increased the sample size to 197 to increase the external validity of the findings. For the qualitative phase of the study, six participants were enough to reach saturation in the interview. These teachers were purposively sampled for the study.

Data collection methods

The Stage of Concern (SoC) questionnaire adapted from George, et al. (2008) was used to gather data on the SoC of the Basic School teachers. Subsequently, a semi-structured interview guide was designed based on the findings of the quantitative data to collect an in-depth explanation from the teachers. After the quantitative data had been analyzed, a qualitative instrument (semi-structured interview guide) was administered to selected teachers. The quantitative data and results provided a general picture of the concerns of the teachers towards the implementation of the standards-based curriculum and through the qualitative data enabled the researcher to explain the general picture (Subedi, 2016). Again, the in-depth data collected via the interview guide enhanced and enriched the findings that emerged from the quantitative data (Mason, 2006).

The questionnaire was administered to the respondents from May to June 2020. During this period, the COVID-19 was peaking in Ghana. The researcher, therefore, created a digital version of the questionnaire using Google Forms. The sampled respondents were sent the digital instrument of which they were required to fill and return instantly. Subsequently, the researcher interviewed the six selected teachers via telephone. The participants for the qualitative data were given prior notice of the interview. They were as well informed that the interview was going to be recorded for just an academic purpose. Each of the telephone interviews lasted three hours and 30 min for each participant.

Data analysis

The quantitative data collected from the field were first collated, sifted and cleaned up. After winnowing, the data were coded and entered into the Statistical Package and Service Solutions (SPSS) software version 25. With the aid of the software, the data were analyzed using descriptive (Means and Standard Deviations) and inferential Statistics (Multiple Linear Regression). In the second stage, the researcher studied the field notes, transcribed the audio recordings of the interview and analyzed the data thematically. The

integration of the data was achieved by using the qualitative results to support the quantitative results in the discussion phase of the study.

RESULTS

This section deals with the results of the data collected from the field. The demographic characteristics of the respondents were first presented, followed by the data to answer the research questions that guided the study.

Demographic characteristics

Data were collected on the sex, age, teaching experience as well as educational qualification of the respondents. The results are presented in Table 1.

From Table 1, it is evident that 115(58.4%) of the respondents were females, whilst 82(41.6%) were males. This means that more males participated in the study than females. Impliedly, the Ghanaian educational system continues to show inequality in gender distribution even in the Colleges of Education as more males are trained for the teaching profession than females. The table further shows that 39(19.8%) of the respondents were between 25-30 years, 60(30.5%) were between 31-35 years, 43(21.8%) were between 36-40 years, 31(15.7%) were between 41-45 years, 14(7.1%) were between 46-50 years whilst 10(5.1%) were 51-50 years. It is clear from the results that none of the respondents was above 55 years, even though the retirement rate for civil servants is 60 years. Irrespective, the age distribution of the respondents means that they are in the prime years of their lives. At this stage in their lives, their concerns are very crucial in determining the success or otherwise of the curriculum. Their age affects their experience. The results from this study show that 2(1.0%) of the respondents had taught for less than a year, 52(26.4%) had taught for 1-5 years, 55(27.9%) had taught 6-10 years, 48(24.3%) had taught for 11-15 years, 17(8.6%) had taught for 16 years and 23(11.7%) had taught for either 20 years or more. Research has shown that teachers gain skills and knowledge through experience (Olivia, 1988). It is envisaged that the majority of these teachers who are involved in the implementation of the standard-based curriculum possess enormous experience under their long service in the teaching profession that would place them at a vantage in the implementation of the standard-based curriculum (Muroto, 2001). The qualification of the respondents also shows that all the teachers involved in the study had obtained the minimum qualification required to teach at a primary school in Ghana. The table shows that 6(3.0%) of the respondents had "Cert A", 96(48.7%) had Diploma, 78(39.6%) had a degree whilst 17(8.6%) had a Master's Degree.

Table 1. Demographic characteristics of the respondents.

Variable	Sub-scale	N (%)*
Sex	Male	115(58.4)
	Female	82(41.6)
Age (years)	25-30	39(19.8)
	31-35	60(30.5)
	36-40	43(21.8)
	41-45	31(15.7)
	46-50	14(7.1)
	51-55	10(5.1)
Experience (years)	<1	2(1.0)
	1-5	52(26.4)
	6-10	55(27.9)
	11-15	48(24.)
	16-20	17(8.6)
Highest qualification	>20	23(11.7)
	Cert A	6(3.0)
	Diploma	96(48.7)
	Degree	78(39.6)
	Master's	17(8.6)

Source: Field Data, 2020 *Percentages in parenthesis.

SoC of basic school teachers in the implementation of the standard-based curriculum

Research question one sought to find out the stages of concern of the primary school teachers in the Central Region of Ghana in the implementation of the standard-based curriculum. The views of teachers are presented in Table 2.

Table 2 presents the views of the teachers on their concerns in the implementation of the standard-based curriculum. It is evident from Table 2 that the teachers find themselves at the collaborative stage (Mean = 4.31, SD = 1.11) of the Concern-based Adoption Model. The teachers confirmed from the interview that they need many collaborative activities to achieve the objective of the curriculum. For instance, a Classroom Teacher (CT) 1 said:

I always seek support from other teachers and community members to implement most of the contents in the standard-based curriculum.

CT 3 remarked:

Most of the contents in the standard-based curriculum require the efforts of parents, teachers and other stakeholders for their achievement. Without their support,

Table 2. Teachers' concerns about the Standard-based Curriculum.

Stages of concern	Mean	Std. deviation	RPI	Rank
Collaboration	4.31	1.11	62	1 st
Focusing	4.30	1.20	61	2 nd
Personal	4.05	1.15	58	3 rd
Awareness	4.03	1.10	58	4 th
Consequence	3.92	1.12	56	5 th
Information	3.80	1.39	54	6 th
Management	3.69	1.31	53	7 th

Source: Field Data, 2020;RPI = Relative percentile Intensity.

I cannot achieve much.

CT 4 commented:

As for me, I understand everything in the curriculum. The only problem I have is how to harness the support of parents, colleague teachers and administrators in the implementation of this new curriculum.

It is seen from these views of the teachers that without support from the stakeholders in the communities on the implementation of the curriculum, there is the likelihood that the curriculum might not achieve its intended goals.

The second-rated stage of concern of the teachers was refocusing (Mean = 4.30, SD = 1.2). The teachers are at the stage of exploring more universal benefits from the innovation, including the possibility of significant changes or replacement with more powerful alternatives (Jalinus and Abrian, 2015). However, the interview with the teachers revealed that some alternatives could have strengthened the curriculum. For instance, CT 2 said:

This curriculum is good. However, I think some elements could have been taking off to pave the way for new features that are adopted in advanced countries.

In support, CT 4 mentioned:

Though there is an attempt to shift the pedagogical practices of teachers from the teacher-centered to learner-centered, I still believe that we could have done a lot more. Most of the resources that were suggested in the curriculum are not available in most schools. I think the curriculum is practically impossible for most schools.

It is seen from the views of CT 2 and CT 4 that programme alternatives exist that align with the resource demands of the schools than the standard-based curriculum that the nation has adopted.

The third highest-rated concern of the teachers was personal (Mean = 4.05, SD = 1.15). Figure 2 is an illustration of the teachers' Relative Percentile Intensity (RPI) of concern about the implementation of the standard-based curriculum.

From Figure 2, the teachers' most intense concern towards the implementation of the standard-based curriculum was at Collaboration (PRI = 62) and Refocusing (PRI = 60). However, since the CBAM

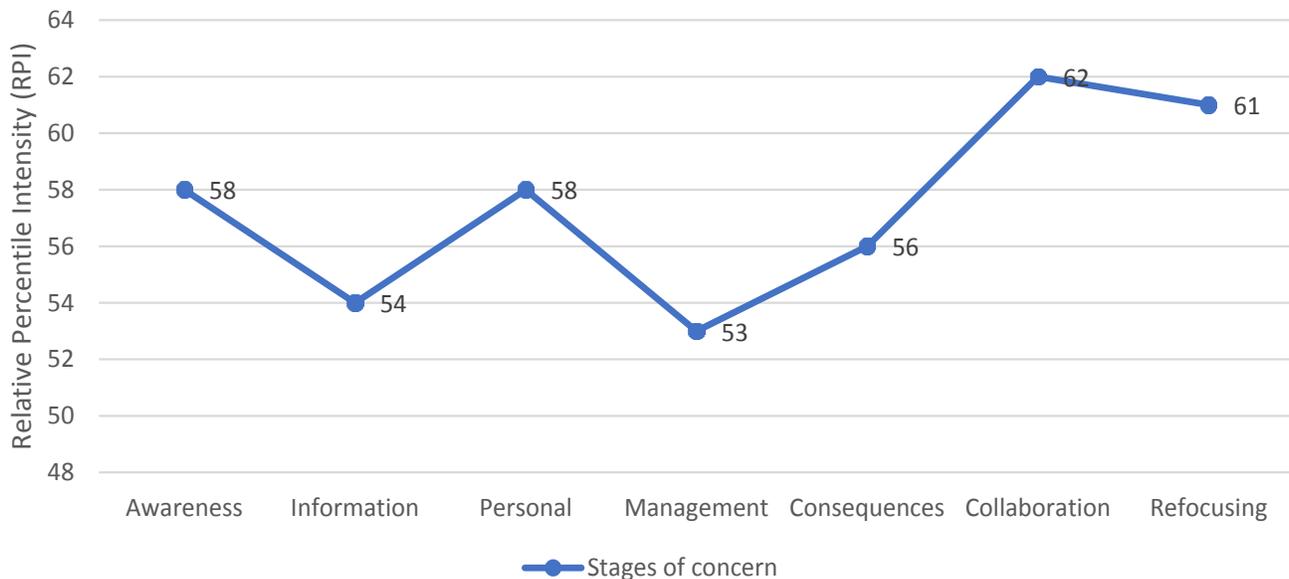


Figure 2. Teachers' relative percentile intensity of concern about the implementation of the standard-based curriculum.

Table 3. Model summary of demographic characteristics that predict teachers stages of concern.

Model	R	R ²	Adjusted R ²	Std. error of the estimate	Change statistics				
					R square change	F Change	df1	df2	Sig. F change
1	.244 ^a	.060	.040	.93444	.060	3.042	4	192	.018

*P<0.05 significant.

categorizes the stages as Self-Concern (Awareness, Information and Personal), Task Concern (Management) and Impact Concern (Consequences, Collaboration and Refocusing), it is argued that the majority of the teachers had Impact Concern about the standard-based curriculum. This was followed by Self-Concern about the Implementation of the standard-based curriculum.

The relative contribution of teachers' demographic characteristics on their SoC in the implementation of the standard-based curriculum

The second research question sought to establish the extent to which the primary school teachers' demographic characteristics could predict their Stage of Concern (SoC) in the Implementation of the Standard-based Curriculum. A Multiple Linear Regression was conducted to establish the predictive power of each demographic characteristic in the Model. The results are presented in Tables 3 and 4.

Table 3 shows that the demographic characteristics of the primary school teachers such as age, gender, teaching experience and highest educational qualification

collectively contributed 6% of the variance in the stage of concern which was found to be statistically significant [F (4, 192) = 3.042, p<0.05]. Impliedly, other factors not included in this study were responsible for 96% of the concerns of the teachers in the implementation of the curriculum. Irrespective, the demographic characteristics of the teachers were good predictors of the concerns. Given this, the study further examined the relative effect of each demographic feature on the concerns of the teachers. The results are presented in Table 4.

It is seen in Table 4 that age ($\beta = 0.205$, $t = 2.134$, $p < 0.05$) and teaching experience ($\beta = -0.257$, $t = -2.688$, $p < 0.05$) predicted the stage of concern of the basic school teachers in the implementation of the standard-based curriculum. However, sex ($\beta = 0.95$, $t = 1.338$, $p > 0.05$) and teacher qualification ($\beta = 0.118$, $t = 1.616$, $p > 0.05$) did not significantly predict the stage of concern of the basic school teachers in the implementation of the standard-based curriculum.

DISCUSSION

The results of this study have shown that the first Stage

Table 4. Relative contribution of teachers' demographic characteristics on their concerns.

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	3.613	.352		10.260	.000
1 Sex	.183	.137	.095	1.338	.183
Age	.140	.066	.205	2.134	.034
Experience	-.187	.069	-.257	-2.688	.008
Highest qualification	.162	.100	.118	1.616	.108

a. Dependent Variable: Stage of Concern (SoC).

of Concern (SoC) of the teachers in the implementation of the standard-based curriculum is the collaborative stage. This means that most of the teachers have an interest in relating what they are doing in their classrooms with the Standard-based curriculum to what their colleagues are also doing with it (El-Saleh, 2011). The teachers may therefore seek opportunities to coordinate and cooperate with others in their use of the standard-based curriculum in their classrooms. This rating from the teachers also presupposes that there is a cooperation between the teachers and parents in the implementation of the standard-based curriculum. It is therefore argued that the success or otherwise of the curriculum depends significantly on the strength of the triad relationship between parents, teachers and school authorities (Kostadinova, 2012).

The second-rated stage of concern of the teachers was refocusing. It is evident from the results that the teachers accept the fact that the standard-based curriculum places a premium on the development of students' way of thinking. The standard-based curriculum was adopted to replace the objective-based curriculum due to its propensity to offer the students to develop higher-order thinking skills that have always been lacking in the Ghanaian educational enterprise. Judging from the results, however, the teachers may have other alternatives in mind that could have been more appropriate to Ghanaian classrooms than what the current curriculum provides. This situation is expected given that most teachers are often neglected in the curriculum development discourse (Abudu and Mensah, 2016).

The third highest-rated concern of the teachers was personal. This means that the teachers are focused on the impact of the standard-based curriculum and how it would affect them at their level, their limitations and the changes they are expected to make. This is entirely likely given the fact that the successful implementation of an educational innovation requires a critical assessment of the extent to which the innovation might affect one's personal development. In the case of the classroom, teachers are expected to consider how innovation would affect their classroom practices. The issue may even be that teachers have to seek professional development programmes to match the demands of the innovation.

Undoubtedly, the one-week training workshops organized for the primary school teachers in Ghana might not be enough to adequately prepare them for the needs of the standard-based curriculum especially in the case where the majority of the teachers who attended the training from the early childhood centres were mostly not qualified (Kpedator, 2019). The findings of the study are in line with that of Alshammari (2000), who found that teachers in Kuwait had four high stages of concerns (collaboration, personal, refocusing and informational stages).

The study has established that the majority of the teachers had Impact Concern about the standard-based curriculum. This was followed by Self-Concern about the Implementation of the standard-based curriculum. This means that the teachers are highly concerned about the impact of the implementation of the standard-based curriculum on themselves, their colleagues and their students. The findings of this study collaborate on the results of previous that established that the intensity of teachers concerns in the implementation of the curriculum in Ghana mostly revolved around consequences, collaboration, refocusing, informational and awareness stages (Amankwah et al., 2016; Agormedah et al., 2019).

Undoubtedly, the more teachers teach, the more they gain experience in the field. It is expected that the relatively longer years of service of the teachers involved in the study might correlate positively with their ages. Even though the standard-based curriculum is new in the Ghanaian educational enterprise, the pedagogical and classroom practices of the teachers are not entirely new from the classroom activities and practices that the teachers are already accustomed to. Given this, the teachers might bring to bear the experiences they already have from the implementation of the objective-based curriculum to implement the new curriculum. This position of the teachers disproves the general notion in the literature that old and experienced teachers often resist change in the school (Tůmová, 2012). This result contradicts the findings of Janík et al. (2018) who found that that age and teaching experience did not contribute significantly towards teachers' acceptance of curricular reform. The results of this study, however, show that the gender of the teachers, as well as the educational

qualifications of the teachers, do not contribute significantly to the concerns of the teachers in the implementation of the standard-based curriculum. Arguably, the standard-based curriculum does not demand males and females to perform gender-specific tasks. Similarly, the teachers are supposed to implement the same curriculum irrespective of their qualifications in the school. Therefore, their gender and qualifications might not affect the concerns.

CONCLUSION AND IMPLICATIONS FOR POLICY AND PRACTICE

The current study investigated the concerns of primary school teachers in the Effutu Municipality towards the Implementation of the Standard-based Curriculum in Ghana. The study found that the primary highest concern of the basic schoolteachers was stage collaboration and their second-highest concern and third-highest concern were Focusing and Management respectively. The study further found that age and experience statistically predicted the stages of concern of the teachers regarding the implementation of the standard-based curriculum. However, the gender and educational qualifications of the teachers were not statistically significant predictors of their concerns towards the implementation of the standard-based curriculum. The study, therefore, concluded that though the teachers have adopted and are implementing the curriculum, they would like to develop working relationships with administrators and other change facilitators to bring about the expected changes.

The study recommended that the district training officers should train and sensitize teachers in the various districts to create enabling environments within the different schools for teachers; school authorities and parents to collaborate among themselves in the implementation of the standard-based curriculum. Future workshops and seminars for teachers in the implementation of a curriculum by NaCCA and Ghana Educational Service should consider the age and teaching experience of the implementers of the curriculum since these teachers' characteristics are significant predictors of the concerns of the teachers. This study was limited to the Effutu Municipality of the Central Region, it is suggested that similar studies should be conducted for unique districts and regions and further studies should be expanded to include other neighbourhoods and areas in Ghana. Again, further studies should focus on the different factors that were not included in the class but have the potential to predict teachers' concerns in the implementation of the curriculum.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Listen to the voices of street children: A case study in Trinidad and Tobago

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This research was conducted at Sunshine in Trinidad and Tobago and highlights the voices of seventeen street children. Although they live at Sunshine many of them continue to frequent the streets. Published research indicates that there exists a paucity of information about the lives and experiences of these children. It is important that professionals and policy makers pay particular attention and consideration to the voices of these children especially when they formulate policies that pertain to their lives. A case study was conducted to carefully ascertain as accurately as possible their experiences. Semi-structured interviews and open-ended questionnaire were also employed. Data revealed that listening is necessary to try to understand the lives and perspectives of these children. Although it is difficult and demanding, it is strongly suggested that professionals, policy makers and indeed all citizens listen carefully to the voices of these children to bring about some meaningful change.

Key words: Street children, listen, voices case study.

INTRODUCTION

Trinidad and Tobago comprises two main islands and several smaller ones. It lies close to the Northeast of Venezuela and Northwest of Guyana. Trinidad, the larger of the two, has about 4,800 square km. The presence of street children in Trinidad and Tobago is a relatively new phenomenon. This is probably because there is a dearth of information as well as very little is known about their lives.

“Ah want to work in ah´chicken & chips place.”

“Ah doh no wah ah really want.”

“De government an´ dem, Ah do no.”

“It should have less violence in Trinidad.”

“A lot ah fighting wit´ de youths and dem.”

These voices clearly represent some of the perspectives of these seventeen children who live at Sunshine, a center for homeless children. Although they live at Sunshine some of them still return to the streets. Their voices and experiences are of paramount importance since there is a dearth of information about their experiences in the local context. It is also strongly felt that their experiences must be given proper consideration by policy makers especially when they create programmes that govern their lives.

Too often, policies, pertaining to street children are

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implemented with little or no consultation with them. Thus, the principal objective of this study is to allow these children to express their opinions freely and honestly. In this way, their experiences could influence and assist policy makers. Hence, this study could point a possible way forward especially if the presence of street children continues to increase. This research carefully investigated the lives and situations of these children during the semester August to December 2020, at Sunshine in Trinidad and Tobago. They attend various secondary schools, whenever they can and participate in all aspects of daily life. During these five months these children participated in their schoolwork which was offered via Google Classroom. Keeping this focus carefully in mind, which is to try to understand their lives, this study seeks to answer the research question: What are your experiences of street life? Data revealed that these children are acutely aware of their own situation and are also quite competent in presenting their issues. It also revealed the significance of listening to their experiences.

LITERATURE REVIEW

This review demonstrates the complexity in trying to arrive at a precise definition for street children. It also explains the actual life that many of them endure daily on the streets.

Definitions of street children

It is seemingly difficult to formulate an accurate definition of street children. This is largely because this scenario is extremely complex and contentious. Furthermore, various countries choose to define them in several ways. The street children phenomenon has been explored across several disciplines and there are several meanings attached to it (Dladla and Ogina, 2018). Daba et al. (2020) also corroborate this fact and further claim that street children have a variety of definitions in different scenarios. Extensive research also reveals that street children is a socially constructed concept and is described in different ways by different social actors, depending on the context in which the phenomenon takes place (De Moura, 2002; Stephenson, 2001). Setiawatia and Syafarib (2020) state that: "Street children are a public ongoing problem that has not been resolved..." Since they view street children in such a manner, they further claim that: "The management of street children is of paramount importance and has to become the center of attention for both formal and informal organizations..." Thus, a review of the literature clearly reveals that street children are often described in a purely negative manner. Scheper-Hughes and Hoffman (2016) offer a different perspective. They believe that

street children are poor children who lack proper guidance and direction in their lives. Similarly, Action for the Rights of Children (2001-2021) states that: "Children and adolescents are not short adults - they are qualitatively different. They have physical, psychological and social needs that must be met to enable healthy growth and development." Action for the Rights of Children (2001-2021) further mentions that: "Children and adolescents are not a homogenous group. While they share basic universal needs, the expression of those needs depends on a wide range of personal, social and cultural factors." Action for the Rights of Children (2001-2021) also posits the firm view that there cannot be any universal definition of children. This is largely because childhood is both a cultural and social construct.

The seventeen children who participated in this research sometimes referred to themselves as "street children" but did not like to be classified as such. Thus, the researcher referred to them as children and often called them by their respective names. Using the perspective presented by Action for the Rights of Children (2001-2021) the researcher did attempt to coin a definition for street children. This was deliberate since the chief purpose of this research is to present their experiences and not try to categorize or even view them as different from the rest of citizens. To try to get their experiences of life is vital. Sofiya and Sitota (2019) states that: "Every day, I see these children either begging at the traffic intersections or working in the capacity of daily wage labourers, and I have always been curious about their perspective on life." It is important that people try as far as possible to understand how these children live. Sofiya and Sitota (2019) also state that: "...oftentimes, the question of how they deal with their lives and cope with grievous experiences – has plagued me."

Street life

The term "streets" does not exactly convey the same meaning for street children as it does for the public (Aptekar and Stoecklin 2014). For many street children the streets form an integral part of their life. It is on the streets that some of them make friends and find happiness. Aptekar and Stoecklin (2014) believe that they eat, sleep, and permanently dwell on the street. In summary they do almost everything on the streets.

It is important to note that street children live in a constant strive and battle to survive (Hills et al., 2016). They are utterly weak and vulnerable. This is largely because most of them live in dehumanizing physical environments. Some of them live in the marketplaces, bus terminals, rum shops, busy streets and at traffic intersections. Thus, they are prone to several risks and diseases. In addition, they are susceptible to various social hazards and diseases. Thus, it is not surprising that they become engulfed in all sorts of illegal

practices, like burglary, prostitution, the sale of drugs, and performing lewd acts (Ogunkan and Adebeyejo, 2014). Verma et al. (2020) conducted extensive research among street children in Delhi. She noted that: "It was found that approximately one-sixth of the children living at home and more than one-fourth of the street children were involved in the sexual behavior under the effects of the substance use." Derivois et al. (2019) conducted a research among street children in Haiti. They claim that despite the numerous adversities that surround street children they remain resilient. With great courage and tremendous fortitude, they continue to survive amid tribulations. This is a remarkable quality of street children.

Chowdhury et al. (2017) suggest that street children are susceptible to all types of abuses and exploitation. They endure tremendous oppression and work in perilous situations. Chowdhury et al. (2017) also believe that are often with disdain and scant courtesy. Action for the Rights of Children (2001-2021) add that: "Violent conflicts, severe socio-economic crises like displacement, distraction of normal life, and separation from family and/or community are crucial factors in causing lifelong effects on children."

Humanium-Together for Children's Rights (2011) think that the causes for the presence of street children are multifaceted. Some of these factors include family life, poverty, social and political issues. Although it is difficult to single out a particular cause, Humanium-Together for Children's Rights (2011) mention that: "Children who have been questioned say that family, poverty, abuse, war, etc. are often why they left for the streets." United Nations (2020) and United Nations Children's Fund (2015) admit that whenever there is a conflict or a crisis, children are affected the most because they are vulnerable. In this regard, they launch a strong appeal to end this crisis since children have a right to be protected. United Nations (2020) further states that on a global perspective, children are engaged in several types of activities.

WHO (2000) believes that this continuous exposure to dangerous situations makes street children defenseless and practically helpless to such degree that many of them engage in substance abuse, promiscuity and begging in order to survive. This type of illicit behaviour only seeks to diminish their mental, physical, social and spiritual wellbeing. Moreover, they live a transitory lifestyle and are susceptible to inadequate nutrition, physical injuries, substance use, and health problems including sexual and reproductive health problems. The Independent (2016) also supports this position. They are of the firm view that because street children are defenseless, they sometimes become an easy target into a life of sexual abuse, physical torture and even drugs and human trafficking. According to Raju and Sharmin (2016), this is because: "Extensive criminal networks make substantial profits by engaging children in commercial sex work, smuggling, stealing, and the distribution of drugs and weapons." This situation is further compounded since many of them have

limited educational opportunities while others are totally illiterate (Scheper-Hughes and Hoffman, 2016). Consequently, they are unable to make informed decision and take full control of their lives.

From the literature, it is abundantly explicit that street children often experience abuse of all types. They are vulnerable, oppressed and rejected. This type of scenario sometimes causes members of the public to discriminate against them and regard them as social outcasts.

MATERIALS AND METHODS

This study utilized a case study which incorporated semi-structured interviews and open-ended questionnaire. This case study also involved a cyclical process of data collection, reflection, and analysis. Semi-structured interviews and open-ended questionnaire provided a clearer understanding of the experiences of these seventeen children. Interviews and questionnaires were specifically selected because it was felt that they would allow these children to speak freely and without inhibition and thus, address the research question: What are your experiences of street life? To collect data the researcher chose times and days that were most convenient for the children.

Case study

As noted in the introduction, the main goal of this research was to arrive at an accurate and thoughtful insight of the experiences of these seventeen children. As a result, a case study was specifically selected because it was felt that it could provide a more comprehensive picture, deep insights and would be better able to investigate complex issues that were anchored in real-life situations (Yin, 2009). Case studies are holistic inquiry that principally seeks to investigate a specific phenomenon within its natural environment. Creswell (2018) holds the firm position that qualitative research is significant because researchers can explore and comprehend in greater detail what respondents convey. Likewise, Smith (1978, cited in Merriam and Tisdell, 2016) adds that case studies are also versatile and dynamic and provide a thorough and detailed examination of a phenomenon. Furthermore, they are intensive, and holistic. They also describe and analyse a single unit. Cohen et al. (2018) also describe case studies as an inquiry into precise scenarios within a real-life situation.

Interviews

Semi-structured interviews are suitable instruments for collecting data. This is chiefly so because they are flexible. Furthermore, researchers can capture nuances and non-verbal cues. They can also probe for better understanding, according to Cohen et al. (2018). Interviews are great data collection tools, but they are time consuming. They are susceptible to the bias of interviewers. They are also inconvenient for the interviewees and difficult to maintain anonymity. Keeping these issues in mind, the interviews addressed the social, academic, and emotional issues.

The interviewer used WhatsApp and Google Classroom and requested permission from the interviewees to make detailed notes of their statements during the interviews. The interviewer employed the qualitative thematic data analysis process offered by Creswell (2018). After interviews, data were transcribed and analyzed verbatim. They were also coded and arranged into themes. This was done with the research question in mind: What are your

experiences of life? First, they were transformed from word document into the Excel (Version 2014). Then, they were carefully analyzed, reviewed, and thoroughly read to accurately represent the voices of these children. They were finally documented into two major themes:

1. Listening: what it entails
2. Listening: sensitive and complex scenarios

Questionnaires

Open-ended questionnaires allow participants to freely express themselves and confirmed what was mentioned in the interviews. These children responded to questionnaires as deemed appropriate. They were not forced nor compelled to produce the "right" answer. The researcher maintained that getting their perspectives was far superior that whether or not they responded appropriately to the questionnaires. Creswell (2018) confirms that this instrument also allows them to state their perspectives and opinions objectively and unconstrained by any biases of the researcher or past research findings. Open-ended questionnaires are also cost effective and allow for structured responses. Therefore, they were chosen as an apt method of data collection and respondents were assured of anonymity. Open-ended questionnaires included areas that were related to their experiences of life. Cohen et al. (2018), together with Leedy and Ormrod (2018), mention that researchers ought to be aware of the various advantages and limitations of the use of questionnaires. Where there are advantages associated with this method, Cohen et al. (2018) hold the view that this instrument does not allow participants the ability to explain and develop their responses. Bearing this in mind, semi-structured interviews try to address this deficiency and simultaneously served to triangulate data (Connelly, 2016). Creswell (2018) noted that credibility is evident when researchers validate their findings. According to Denzin (1978, cited in Danny, 2014) triangulation is the use of more than one method to gather data, such as semi-structured interviews, and open-ended questionnaires.

The seventeen children

The children are all boys since girls are not permitted to stay at Sunshine. The girls are accommodated at other centers. These boys live at Sunshine intermittently since many times they return to continue to live on the streets. The ages range from 15 to 17 years. Most of them are unable to read, write, spell, and even speak properly. It must be mentioned that all seventeen spoke in the vernacular or used jargon. Their attendance at school is also infrequent. Sometimes they attend classes for a period of time with varying periods of interruption and thus, they seem to lack motivation for learning.

RESULTS AND DISCUSSION

The seventeen children for this research were purposely chosen from Sunshine in Trinidad and Tobago because they were readily available, accessible and willing to participate in this study. Their articulation of speech is extremely poor and some of them stammer and stutter and mispronounce many words. Prior to coming to Sunshine, they practically lived on the streets and from time to time continue to do so. Whenever they are at

Sunshine, they continue to go to school but even at that time their attendance is very sporadic.

It is extremely difficult and seemingly impossible to present accurate demographic information about these children. This is because most of the information that they provide often seem to be inconsistent and difficult to verify. Some of them were raised by their grandmother or an aunt. Some grew up with their respective mothers and stepfathers. For example, during interviews and questionnaires, they usually responded simply using one-word answers such as "yes," "no," "I don't know." Many times, in response to certain questions, they merely nodded their head to either indicate yes or no and avoided eye contact. Sometimes during the interviews there were short pauses as well as prolonged silence. They also took a long time to answer the questionnaires. In addition, they would either draw, use a symbol or write their names.

Although it was very complex and challenging to analyze and interpret their voices as well as their handwriting, integrity was always maintained. Many times, the data collected and analyzed were intertwined and this provided an excellent foundation for understanding their diverse experiences and culture. The analysis was presented in a narrative form. This reflected the ever-developing nature and the various components of their experiences. Data were collated, analyzed, triangulated, and documented in a narrative form with the use of two thematic headings: Listening: what it entails and listening: sensitive and complex scenarios. Sometimes the data collected and analyzed were intertwined and this also provided an excellent base for understanding their diverse experiences.

Listening: What it entails

Listening is an art. It is a skill. It is a discipline. It is a way of life. Listening does not mean giving advice and good counsel. It does not mean criticizing feelings. Listening does not try to solve problems and troubles. According to Delpit (1993), listening to young people is intricate and sensitive and it involves paying very close attention to their utterances. Listening is an integral part of the process in trying to understand the lives of adolescents. When young people feel that other are listening to them, they are more willing to communicate their thoughts, emotions, and feelings. As mentioned before, listening is very active and demanding process. Although it is difficult and demanding once it is done properly it can create and maintain positive relationships.

These six children from Sunshine underscore the significance of listening:

1. "Sir, we does be glad when yuh listen an'talk to we."
2. "We like it because we feel we learning something."
3. "Yuh cool with us."

4. "Dem odders an' dem only farse."
5. "When yuh started to talk wit we, we didn't use to trust yuh at all."
6. "Now we feel comfortable, and we could tell yuh anything."

Listening to the tone of children, and observing their manner of behaviour, in response to certain questions are critical. The emotional overtones demonstrated when some statements can be extremely helpful to researchers to clarify the perspectives of children. They did not only verbally express their sentiments but also documented them in response to the questionnaires. During this discussion, seven of them, different from the six noted above stated:

"Ah doh know wah Ah wan' to be, pause for about twelve (10) min."

Then another child continued:

"De studies an' ting too hard, pause, for about fifteen (15) min."

Another stated that:

"Ah, feel Ah iz Ah real failure in life, 'cause Ah fail de Science exams.

De work hard fuh so. (Another long pause). Ah, tink Ah want to work in a Chicken an' Chips Place, yes."

Similarly, this child mentioned that:

"Ah does study hard, but Ah does still fail all de exans an' ting."

In a very loud voice, this child remarked that:

"De English exams was hard fuh so. (He continued in a very soft tone, after a long pause of about twelve (13) minutes) "Ah sure Ah fail. Dat mean dat Ah car' be a policeman again."

Sharing about his career he noted that:

"Life hard fuh so, yes. But Ah, go continue to study hard an' Ah go be de bes' policeman in de country one day."

This child concluded that:

"Me ah know wh ah really want"

In the foregone examples the children claimed that although the studies were hard and difficult, they were brutally honest with themselves. Moreover, they were unafraid of expressing themselves even their failures. They admitted that they did not achieve well in their studies and are aware of the possible consequences that such a performance could bring.

Thus, the voices as well as their written scripts of these children clearly demonstrate that it is imperative that adults listen with a positive attitude. When this is done, it gives credit to the perspectives and voices of children. To listen with a positive attitude may include the following:

take proper notes, make frequent eye contact, and react with appropriate facial expression, give nonverbal cues and stay focused on the conversation. Sometimes adults may have to try to mentally paraphrase the salient issues and keep questions or points of disagreement until an appropriate moment. Most of all, adults should give prominence to the listening relationship and see it as an opportunity to learn.

Listening can expose adults to certain language usage such as: similes, metaphors, and idioms and assist them in understanding certain jargon that children use. Words like "hadded," "had was" and "uses" were used to convey the past tense of the verbs to have and to use. Words like "ting" and "ting nah" were used when there was an inability to elaborate on a particular issue. It was also usually used to describe personal, sensitive and delicate issues that relate to physical or sexual abuse. Sometimes, to describe a case of sexual abuse some children would probably state: "Meh fadder uses to do ting and ting nah wit meh." However, if they were describing a sexual encounter with a woman, they would not use the word "ting." They might more likely say: "Ah jam she good, or Ah gih she good it in she sweatbox or ah fxxx she." The word "sweatbox" refers to the vagina. Their description of sexual intercourse with a woman would be often accompanied with gesticulation of the body and with hand movement to be more explicit. During the questionnaires some of them depicted their emotions and feeling by drawing.

Therefore, to listen with heart and mind is more than being attentive and discreet. It is more than merely suspending morals and beliefs (Pervin et al., 2005). It is even more that mastering the jargon of children. Listening means being sincere, honest, truthful, and genuine. It means getting into children's lives and seeing the world from their perspective. Listening is a necessary tool in trying to fully comprehend the views and perspectives of adolescents. Consequently, more prominence ought to be given to this discipline. Too often listening is undervalued, underestimated, and oversimplified. In this contemporary society many adults are preoccupied with their jobs and personal pursuits. They sometimes have to work for long hours, and this could hamper and obstruct their capacity and enthusiasm for listening.

Although it is difficult adults should dedication more time and effort to listening to their children. Even if during this process the mind may wander adults should try to listen for a word or phrase that alerts attention. Although listening is difficult and demanding it must not be burdensome. Listening could incorporate the following: learning, relating, influencing, playing, and helping.

Listening: sensitive and complex scenarios

Giving an account of an experience with deep tremor in the voice can sometimes be a symptom of nervousness. One day, during conversation, this particular child began

to shake nervously, and he uttered something. It was too faint for me to hear, but I realized that something was bothering him. It seemed to be an extremely sensitive issue in his life. He eventually asked to speak with me in private. In a very soft tone of voice, he uttered: "It had, it had, it had (long pause) wen, wen, wen, we did, em, em, em, wen (very long pause) he, he, (very, very soft tone of voice)." As I was about to conclude the session, he shouted: "Ah eh finish talkin' to yuh yet, so weh yuh going." They he continued: "He, he, he is the kin ah feller (very soft tone) who, who, who is always, always (long pause) hugging yuh up (his head slightly bowed) and hugging yuh up an all kind ah ting an' ting." This experience made me realize the tremendous difficulty and great pain that some children experience when they try to explain something that is sensitive and complex.

Sometimes during interviews that concerned sensitive issues the children normally remained quiet for lengthy periods of time, sometimes from about forty-five (45) to fifty (50) min. After that prolonged silence they might start with comments such as: "Ah hate meh father," "police is de worse, yes, and "de farse and does only want to know yuh business." Such statements are clear indications that they have some animosity for their fathers or for some police officers. Sometimes the twelve children might ask general and seemingly unrelated questions such as: "Yuh like dem people who does live in dat kinda house?" or: "Ent it wrong to beat women an' ting?"

Very often, when they spoke about sexual abuse where a male person was involved, they usually assumed the following posture: head generally bent, hand usually in the face and the tone of the voice extremely low and incomprehensible at times. Frequent stuttering and display of rage and irritation often accompanied such delivery. Thus, listening to sensitive and complex issues often facilitated an appreciation that the meaning, emphasis and value that children attach to certain behaviours may be quite different from that of adults. Children are sometimes eager to share their testimony and experiences, but they do so if people are genuinely interested in them.

Therefore, the need to clearly understand what they want to convey must not be underestimated. Sometimes they may not be able to describe precisely what has happened because some of them may lack the necessary vocabulary. In Trinidad, to eloquently describe a case of sexual abuse and call certain parts of the body by their correct names are still sometimes associated with a high degree of shame and embarrassment. Furthermore, to call the private parts of the body by their proper names is often seen as "rude," "dirty" and "inappropriate." This occurs since children may feel embarrassed to speak about sexual abuse. Some of them may even view this as being "rude" or "inappropriate" activities. This scenario is heightened in cases where males abuse boys. In Trinidad, sexual abuse perpetrated against young boys is considered taboo and implies that something is wrong with the

perpetrator or the child.

In a small society as Trinidad, a breach of confidentiality could be very painful because it does not take very long for information to spread around the island. In this society, sensitive issues like abuse, especially among males, are viewed with a high level of disapprobation. Children are acutely aware of this taboo and to avoid being stigmatized they may prefer to say nothing. Thus, adults must not be unwilling to believe the stories of children until and unless investigation proves otherwise. Murray (2019) holds the firm view that: "...those who listen actively to children's voices come to know and understand the children's needs and interests..."

Conclusion

The researcher tried as far as possible to keep the focus and thus answered the research question: What are your experiences of street life? By adequately addressing the research question the perspectives and voices of these children were brought to the forefront. Action research afforded the researcher the great flexibility to interact informally with these children in their natural environment and it also allowed them to speak freely about their own experiences. The use of a combination of informal structured interviews and semi-structured questionnaires also permitted the researcher to maintain validity and readability. Data were collected, collated, triangulated, and documented in a narrative form using two major thematic headings: Listening: what it entails and Listening: sensitive and complex scenarios.

Thus, listening helps to identify properly: the needs, the feelings, the goals, the ideals and the vision of children. Listening also helps people to obtain a better and clearer understanding of the perspectives of children as they pertain to the: social, moral, ethical and educational issues and how these areas affect them. Most of all, listening can help in the formulation of recommendations and the consequent implementation of proper programmes. Listening will better inform governmental and non-governmental agencies who often construct programmes without the input of the people they are intended to help. Through the process of listening and discernment, social architects would be better able to design programmes that would meet the needs of children and thus, enhance the quality of their lives in some of the following areas: social life skills, literacy and numerical skills, coping strategies and spiritual development. It is strongly recommended that professionals and citizens should begin to listen carefully to the voices of these children.

Recommendations

From all that was stated the following recommendation is

suggested:

1. Policy makers ought to listen attentively to children.
2. Policy makers should incorporate street children in their decision-making process.
3. All citizens should heed the voices of children.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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