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The Students' Problem-Solving Abilities in Mathematics and English at the Secondary School Level

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ABSTRACT

This paper investigates the perspectives of secondary school teachers of both mathematics and English on students' abilities in problem solving in both subjects. Thus, the following objectives are intended to be achieved: identifying the students' skills in problem-solving in both mathematics and English; and are there significant differences in both English and mathematics teachers' perspectives on students' problem-solving skills according to school, stage, and gender?

The quantitative, analytical, and descriptive methods used in the collection, classification, and processing of the study's data. The target population of the study was all secondary school math and English teachers in Erbil.

A sample of 72 teachers—26 male and 46 female—were selected from seven secondary schools using a random sampling technique for the academic year 2023–2024. Two questionnaires, one with 14 items for math teachers and another with 13 items for English teachers, were used to collect the data. Teachers' responses were scored on a scale of 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree. The questionnaire's reliability, validity, and

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consistency were examined. and the validity and reliability of the questionnaire were checked. SPSS was used, mean, standard deviation, correlation, and ANOVA were used to analyze the data.

The study's findings confirmed similarities in problem-solving abilities that were shared between mathematics and English students, and there are no significant differences between the two areas due to the averages of students' performance in problem-solving in both disciplines, which are fairly close to each other

1. Introduction

Generally speaking, problem-solving entails handling, assessing, and coming up with a solution for problems (Heppner & Petersen, 1982). According to the findings of recent research, one of the important aspects of the problem-solving process is to differentiate the known from the unknown (DeBellis & Goldin, 1997; Goldin, 1988; 1998). The notion that there isn't a single, correct approach to solving a problem has been explored by numerous scholars. D'zurilla and Goldfried (1971) asserted that people's problem-solving strategies are often shaped by their social environments, past experiences, and personal traits. Problem-solving skills are crucial for both formal and informal learning processes. This can be achieved by understanding the steps involved in solving problems. Polya (1945) separated the process of solving problems into four steps: comprehending the issue, choosing the best course of action, carrying out the chosen course of action, and assessing the resolution. A table or diagram can be drawn, a connection can be made, a list can be made methodically, an equation can be written or used in it, solutions to related problems can be consulted, assumptions can be made and verified, and calculations can be made, and so on.

There are many efforts have been done in order to improve students' abilities in solving problems in formal and informal learning. One of the primary objectives of the NCTM Standards (1989) is to improve students' problem-solving abilities (MoNE, 2009, 2013a, 2013b).

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Taher, N. A. H., Nagaraju, G., & Eslavath, K. D. N. (,2019) state that people deal with a variety of issues on a daily basis. It is expected of them to be able to resolve these issues, only with improved problem-solving abilities is this possible. Problem-solving abilities can be readily improved if they are integrated into daily school activities.

Mathematics and English language learners (ELLs) are a large number of students in schools today. As a result, it is important to adopt methods of learning that improve student abilities in effective learning, including problem solving, which can help students achieve learning qualities in each subject area (Clancy, M. E., & Hruska, B. L., 2005). Going along with this line, this study attempts to examine the abilities and skills of secondary school students in problem solving in both mathematics and English subjects.

2. Research framework

2.1 Problem Statement

Since logic forms the fundamental basis of both mathematics and English problem solving, this paper investigates the perspectives of secondary school math and English teachers on the skills required to improve students' abilities as problem solvers in both subjects. Thus, the following questions are intended to be answered in this paper:

1. What level of skills do secondary school students' have in problem-solving in mathematics?
2. What level of skills do secondary school students have in problem solving in English?
3. Do mathematics and English teachers' perspectives on their students' problem-solving skills differ significantly according to some variables?

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2.2 The Significance of the Study

The way mathematics is viewed and how it relates to other sciences has evolved recently, as has the way the sciences are integrated and linked to each other. The previous perspective stated that the goal of mathematics education is to develop people who understand and apply mathematical principles (Soylu, Y., & Soylu, C. ,2006).

In the twenty-first century, constructivist and integrative education have replaced this approach to education, so emphasis is placed on the interrelationships between the sciences and the commonalities between different disciplines. Accordingly, this study attempts to explore how it works in the teaching and learning environment in Kurdistan and highlight the relationship between students' understanding and problem-solving in both mathematics and English.

Since both learning mathematics and the English language have comparable communicative and logical structures, cooperation among instructors of both disciplines is crucial and should be encouraged. In order to ensure that teachers in both mathematics and English in Kurdistan schools can collaborate more effectively, it will be necessary to investigate the abilities and skills of students in making use of commonalities between these two disciplines through some common activities, such as problem solving.

Moreover, it is also important to know how to apply logic to problem solving in both disciplines in order to help secondary school students in the Kurdistan Region of Iraq develop and improve the abilities needed for problem-solving in both mathematics and English. The study's conclusions can help with problems such as how to integrate and coordinate teachers from both disciplines to improve students' problem-solving skills, which is one of the basic goals of modern education. The findings of this research paper may also contribute to a richer theoretical background by providing new information about the skills and aptitudes of secondary students in the KRG in problem solving in both mathematics and English.

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2.3 The objectives of the study

This study aims to reveal the perspectives of secondary school mathematics and English language teachers regarding the improvement of students' problem-solving skills through the following sub-objectives:

1. Identifying the students' skills in problem-solving in mathematics at the secondary level.
2. Identifying the students' skills in problem-solving in English at the secondary level.
3. Are there significant differences in both English and mathematics teachers' perspectives on students' problem-solving skills according to school, stage, and gender?

2.4 The study's limitations

The study's scope includes the following:

1. Secondary school teachers
2. Secondary schools in Erbil city, Kurdistan Region of Iraq
3. The academic year 2023-2024

2.5 Terms definition

Problem: A problem is "a situation that individuals may encounter anytime throughout their lives." (Incebacak, B., &Ersoy, E., 2016).

Also, a problem is "a cognitive and behavioral process that the individual encounters in everyday life under his or her specific conditions." (D'Zurila, N., & Maydeu-O., 2002).

Olkun and Toluk (2004) define a problem as "a situation where the individual is enthusiastic about solving it but does not know how to reach the solution, yet may solve it with the knowledge and skills that he or she possesses."

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Problem-solving: Problem-solving is defined as" a method or process by which a solution is found to a problem." (Mayer, 2002; NCTM, 2000).

Problem-solving can be defined as "deciding what to do in cases where what to do is not known." (Altun, 2015).

Problem-solving proficiency: "Problem-solving **proficiency** is "the ability to identify problems, brainstorm and analyze answers, and implement the best solutions" (Wiest, L. R., 2008).

Problem-solving **proficiency** is defined as "a person's ability to engage in cognitive processes when understanding and solving problems for which the method of solving is not readily" (Case, R., Williams, G., & Cobin, P., 2019).

Secondary school: W. James Jacob and Stephanie Lehner (2011) define secondary school as a school that is "widely believed to provide the optimum setting to prepare young people, predominantly adolescents, for healthy and productive adult lives, including participation in social, political, and economic spheres. In addition, for countries to compete in the global economy, a significant number of their citizens need a secondary education in order to acquire the specific skills and aptitudes necessary for an increasingly technology-driven market."

3. Theoretical background

Commonalities between the mathematical language and the English language:
Mathematics is the universal language of science, technology, and business. Most people in the world often use the same writing, expressions, and meanings, like English, which is the most widely used language for cross-cultural communication, trade, business, and international interaction.

Abstract symbols and writing are used in mathematics to represent numbers, factors, and connections. Similar to this, the English language describes things, concepts, and actions using symbols (like letters, words, and signs). Formal expression and summarization of ideas are common in both mathematics and the English language.

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Mathematical terms and symbols with particular mathematical meanings and implications are part of the mathematical language. Like all other languages, English has a variety of semiotic formulas unique to mathematics, including its opening words, relational expressions, and the exact meanings of conjunctions, relations, and implicit terms that go into mathematical expressions (Schleppegrell, 2007). Consequently, language is used to express mathematical content. (Leith, C., Rose, E., & King, T., 2016).

Contrary to the general agreement that language influences mathematical achievement, Lucero (2012) contends that school mathematics education programs have not clearly addressed the linguistic requirements that make it easier for math teachers to communicate mathematical knowledge to students. As a result, many math teachers are ignorant of the complexity of language that can be used to convey information to their students.

Mathematicians who are conversant in the language of the mathematical discipline find that the language of mathematics becomes intuitive (Gough, 2007). Conversely, many teachers have trouble teaching mathematics because they lack knowledge of aspects of the language.

According to Fuchs et al. (2012), students' mathematics achievement levels decrease when they are unable to comprehend a mathematical subject, even though they still have an opportunity to perform well.

3.1 Problem solving

According to Fatma Z. K., and B. D. (2023) “problem solving is using existing knowledge and skills to address an unanswered question or troubling situation”, while problem-based learning is approach to instruction in which students acquire new knowledge and skills while working on a complex problem similar to those in the outside world.

Problem-solving is “a process of understanding the discrepancy between current and goal states of a problem, generating and testing hypotheses for the causes

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of the problem, devising solutions to the problem, and executing the solution to satisfy the goal state of the problem." (Hung et al., 2008).

Cohen and Manion (1994) "suggest that when a problem is diagnosed in a specific context, an attempt should be made to solve the problem within that context. They list 8 stages and 8 steps that may be followed when carrying out action research:

Stage one-Identification, evaluation and formulation of the problem.

Stage two-Preliminary discussion and negotiations among the interested parties.

Stage three-A review of the research literature.

Stage four-A modification or redefinition of the initial statement of the problem at stage one.

Stage five-Selection of research procedures.

Stage six-The choice of the evaluation procedures to be used.

Stage seven-Implementation of the project.

Stage eight-Overall evaluation of the project." (Belinda Ho, 2011).

As Wertheimer (1985) says: ". . . Solution becomes possible only when the central features of the problem are clearly recognized, and paths to a possible approach emerge. Irrelevant features must be stripped away, core features must become salient, and some representation must be developed that accurately reflects how various parts of the problem fit together; relevant relations among parts, and between parts and whole, must be understood, must make sense".

After the above brief definition and explanation, one can say that in real life we deal with a variety of issues and problems on a daily basis, each requiring a particular approach that is in line with its nature to be solved, and finding solutions is a complex process that requires an appropriate level of creativity. According to Hao et al. (2016), the principles of creativity and inspiration that are applied when solving a particular problem determine how effective a

behavior is in solving it. These concepts should be taught in schools in all subject areas, not just language and math, in order to foster students' curiosity about the world and their capacity for autonomous thought and problem-solving.

Since learning and teaching both seek to help students become more adept at adjusting to their surroundings and self-expression, the main objectives of the teaching and learning process should be independent thought, research, and problem solving (Atmatzidou et al., 2018).

Due to the twenty-first-century conditions brought about by globalization—which include the quick dissemination of knowledge, advances in technology, and the creation of means of communication among people in different parts of the world—having creative problem-solving skills is now necessary for people to acquire competitive skills. One of the fundamental requirements for a person to be able to adapt to the modern way of life, whether in the workplace or in social situations, is having problem-solving skills. Teaching students how to solve problems is a crucial component of contemporary education in the twenty-first century (Taher, N. A. H., 2019).

In order to prepare students for a future that will develop more quickly and complexly than what we currently experience, educational bodies must use effective teaching strategies that enable students to be independent and investigative thinkers. One of the most important tasks in modern education in the twenty-first century is to foster the characteristic of teaching learners how to solve problems (Taher, H., & Abdul, N., 2019).

According to some researchers, problem solving is a type of creative thinking that frequently calls for original thought. The problems require flexible thinking to connect them to a rational solution. At first, it might appear to be structurally and conceptually very different from the problem's structure and nature. In this instance, coming up with a solution requires creativity (Hayes, J.R. ,1989). Consequently, a large body of research supports the belief that creativity and problem solving are closely related, with the requirement for creativity increasing with the difficulty of the problem (Nickerson, 1999).

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3.2 Problem solving in mathematics

Problem solving is one of the five main topics in the teaching of mathematics, according to the National Council of Teachers of Mathematics in the United States (NCTM 2000), and considered it as "the central focal point of the mathematics curriculum," However, it is not a stand-alone topic; rather, it is included in all of the mathematics topics (Gökkurt & Soylu, 2013).

According to Jader et al. (2020), it is essential to expose students to non-routine problems that cannot be solved with established algorithms in order to enhance their capacity for problem-solving.

Liljedahl, P., & Cai, J. (2021) state that problem solving is the core of the teaching and learning process in mathematics, due to which the learner can link mathematical concepts to real-life applications He believes that when the teacher presents a mathematical problem to his students and asks them to solve it, he will make them participate in solving word problems related to understanding and defining the problem. Through this activity, the students will learn to translate the problem situation into mathematical sentences through appropriate mathematical operations.

The problem-solving activities in mathematics will engage students in using the mathematical concepts they have learned in other cases and situations, and in this way, the problem-solving approach will help deepen understanding in mathematics.

There is a close connection between solving problems of a linguistic nature and understanding mathematical concepts, as the linguistic understanding of mathematical problems supports the student's understanding of mathematical concepts in their mathematical contexts, and on the contrary, the inability to understand mathematical problems linguistically will confuse the understanding of those problems, thus solving word problems precedes solving mathematical problems (Chamberlin et al., 2022).

Problem solving in mathematics forms the basis of mathematical modeling, which is emphasized in secondary and higher education (Evans, J. R., 1980).

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According to Sriraman, B., & English, L. D. (Eds.). (2010) the development of abilities and problem-solving skills in mathematics begins in the early stages of the student's learning of basic mathematical concepts, followed by solving routine linguistic problems, which become an exercise and reinforcement activity for the learner that helps him solve non-routine verbal problems.

Many studies have been conducted in the field of problem solving to deepen the understanding of its impact in the field of learning, and there is a consensus on the part of mathematics teachers that the problem-solving method contributes greatly to developing students' ability to solve mathematical problems at various levels of complexity, and therefore it is one of the educational goals that institutions are keen to pursue (Mezel, J. A., Khaleel, A. F., & Taher, N. A. H., 2021).

Education is needed to achieve it, as there is a consensus that it is an effective educational strategy that contributes to developing students' abilities in the field of mathematics, which requires more studies in this field (Hansen, E. K. S., 2022).

Many studies concerning the importance of improving student aptitudes in problem solving are conducted. For example, Yildiz, C. (2016) examined the mathematics textbooks used in Turkish public schools in order to reveal teachers' opinions about the textbooks. The study concluded that the mathematics textbooks contain a sufficient number of problem-solving tasks, which are evenly distributed under each heading in the textbooks. On the other hand, it was found that textbooks contain a limited number of problematic tasks, which are not evenly distributed under each heading. Furthermore, the researcher determined that no textbook contained different types of problem-posing tasks.

To ascertain the degree of impact of teacher interventions aimed at enhancing students' performance in solving mathematical problems Lei et al. (2020) employed the meta-analysis method to estimate the impact of interventions aimed at improving problem-solving skills on the performance of English language learners who have difficulty with both language and math learning.

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They analyzed ten studies involving students with difficulties in both English and mathematics from kindergarten to twelfth grade. The study included a set of instructional strategies that teachers had implemented to help students become more skilled at applying problem-solving techniques in order to overcome the difficulties they suffer from in language and mathematics.

3.3 Problem-solving in the English language

Doghonadze, N., & Gorgiladze, G. (2008) state that the "problem solving in teaching a foreign language means:

- avoidance of giving ready-made answers in the process of presentation of new grammar and vocabulary, involvement of students in the formulation of grammatical rules and elicitation of vocabulary meanings from the given examples,
- ability of students to overcome independently the language problems arising in the process of communication,
- discussing / solving non-professional, everyday life problems through communication in the foreign language,
- discussion of texts dealing with problems,
- discussing / solving professional problems through communication in the foreign language.

According to the findings of many studies on the development of students' ability to overcome foreign language problems independently, we can emphasize the necessity of spending several lectures by teachers on developing students' strategies for linguistic problem solving through appropriate activities conducted by both students and teachers, such as a well-organized and encouraging atmosphere, positive relationships between teachers and students, more opportunities to interact with peers, customized and small-group instruction, and a structure that is suited for the learner in terms of language instruction delivery (Mezel, J. A., Khaleel, A. F., & Taher, N. A. H. ,2021).

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4.Research Methodology

The quantitative, analytical, and descriptive methods used in the collection, classification, and processing of the study's data

4.1 Population of the study

The target population of the study was all secondary school math and English teachers in Erbil, KRG.

4.2 The study samples

A sample of 72 teachers (26 male and 46 female) were selected from seven secondary schools by using a random sampling technique for the academic year 2023-2024 in the city of Erbil in Kurdistan, Iraq. The following tables illustrate the study's sample according to the schools, stages, gender, and subjects.
Students' ability to solve problems in both mathematics and the English language for students in secondary school

Table (1): Illustrates the teacher sample according to the secondary schools.

School	Frequency	Percent
Shakholan	10	13,9
Quchablbas	8	11,1
Sarbani	14	19,4
Gara	19	26,4
Zanyari privit	7	9,7
Kurdistani Gawra	8	11,1
Nana Kaly	6	8,3
Total	72	100,0

Table (2): Illustrates the teacher sample according to the stages.

Stage	Frequency	Percent
Fourth	25	34,7
Fifth	31	43,1

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Sixth	16	22,2
Total	72	100,0

Table (3): Illustrates the teacher sample according to gender.

Gender	Frequency	Percent
Male	26	36,1
Female	46	63,9
Total	72	100,0

Table (4): Illustrates the teacher's sample according to the subject (mathematics and English).

Type (Math, English)		
	Frequency	Percent
MATH	43	59,7
Eng.	29	40,3
Total	72	100,0

4.3 The study's instruments

The data for this study were collected through a questionnaire prepared by the researchers in order to clarify the perspectives of English and mathematics teachers on their students' skills in problem-solving.

Two questionnaires were used to collect data: one was directed at mathematics teachers to identify their views on solving mathematics problems and benefiting from English and to what extent the English language was used to solve mathematics difficulties for secondary school students. The first questionnaire consisted of 14 items for mathematics teachers, and the second contained 13 items for English language teachers. The following scale was used for teachers' responses: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree. The validity and consistency of the questionnaire were checked.

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4.4 Reliability of the Research Instruments:

The researchers checked the questionnaire reliability by using Cronbach's alpha; the value of Cronbach's alpha for mathematics teachers was (alpha = 796) and the value of Cronbach's alpha for English teachers was (alpha = 809), which are both acceptable.

The following tables illustrate the reliability of the questionnaire in general and the reliability of the English and mathematics learning items.

Table (5): Illustrates the reliability of mathematical items.

Cronbach's Alpha	N of Items
,796	14

Table (6): illustrates the reliability of English items.

Cronbach's Alpha	N of Items
,809	13

4.5 Statistical Analysis:

The Statistical Package for Social Sciences (SPSS) was used for the processing of the study's data.

The data were analyzed via SPSS (2024, version 22). Both descriptive and inferential statistics were employed to gain answers to the questions of the current study. SPSS software was used to find the mean, standard deviation, correlation, and ANOVA for data analysis, as well as the questionnaires' validity and reliability.

5.Study's Findings

The perspectives of secondary school mathematics and English language teachers regarding the improvement of students' problem-solving skills are demonstrated through the following sub-objectives:

5.1 Identifying the students' skills in problem-solving in mathematics at the secondary level.

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The study found that the mean of students' skills in problem-solving in mathematics at the secondary level is 3.70, which means that their skills are acceptable because they are above the theoretical mean (3), but they are still moderate. The following table illustrates the mean of students' skills in mathematics:

Table (7): Illustrates the mean and standard deviation of students' problem-solving skills in mathematics.

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item 10	Item 11	Item 12	Item 13	Item 14
N	72	72	72	72	72	72	72	72	72	72	72	72	72	72
Mean	3,75	3,67	3,61	3,72	3,33	4,08	3,56	3,53	3,93	3,72	3,79	3,58	3,88	3,85
Std. Deviation	1,184	,888	1,095	1,165	1,061	,931	1,033	1,048	,983	,953	1,113	,931	,918	1,057
Variance	1,401	,789	1,199	1,358	1,127	,866	1,067	1,098	,967	,908	1,238	,866	,843	1,117

Table (8): Shows the overall percentage of teachers' responses to students' problem-solving skills in mathematics.

Items skills of problem solving	Strongly disagree	disagree	neutral	agree	strongly agree
1. My students like to solve a problem in Math.	%5,6	%8,3	%26,4	%25,0	%34,7
2. My students enjoy solving a problem in Math	%11,1	%0	%27,8	%44,4	%16,7
3. My students love solving numerical problems in Math.	%2,8	%13,9	%27,8	%30,6	%25,0
4. My students do their best to be successful in solving problems in Math.	%4,2	%11,1	%26,4	%25,0	%33,3
5. My students are interested in solving problems in Math.	%6,9	%9,7	%40,3	%29,2	%13,9
6. My students love to struggle to solve problems even if they can't solve the problem in Math.	%1,4	%2,8	%22,2	%33,3	%40,3
7. My students like to solve problems in Math from different sources.	%4,2	%6,9	%38,9	%29,2	%20,8
8. My students try hard when they can't solve a problem in Math.	%2,8	%15,3	%26,4	%37,5	%18,1

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9.	My students are sure they can solve a problem in Math.	%0	%6,9	%30,6	%25,0	%37,5
10.	My students are confident in solving problems in Math	%0	%9,7	%33,3	%31,9	%25,0
11.	My students are sure that they can solve a difficult problem in Math.	%1,4	%16,7	%15,3	%34,7	%31,9
12.	My students do their best to solve the problems in Math no matter how difficult the problem is.	%1,4	%9,7	%34,7	%37,5	%16,7
13.	My students lose track of time while solving a problem in Math.	%0	%5,6	%31,9	%31,9	%30,6
14.	My students like to solve a problem in Math.	%0	%13,9	%22,2	%29,2	%34,7

5.2 Identifying the students' skills in problem-solving in English at the secondary level.

The study found that the mean of students' skills in problem-solving in English at the secondary level is 3.51, which means that their skills are acceptable because they are above the theoretical mean (3), but they are still moderate. At the same time, the result shows that the performance of the mathematics students in problem solving is better than the performance of the English students. The following table illustrates the mean of students' skills in the English language:

Table (9): Illustrates the mean and standard deviation of teacher responses to students' problem-solving skills in the English language.

	Item 01	**Item 02**	**Item 03**	**Item 04**	**Item 05**	**Item 06**	**Item 07**	**Item 08**	**Item 09**	**Item 010**	**Item 011**	**Item 012**	**Item 013**
N	72	72	72	72	72	72	72	72	72	72	72	72	72
Mean	3,40	3,44	3,44	3,61	3,68	3,75	3,35	3,61	3,51	3,33	3,61	3,33	3,65
Std. Deviation	1,016	1,221	1,174	1,145	,947	,931	,995	1,108	1,035	,964	1,133	1,199	1,064

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Table (10): Shows the overall percentage of teachers' responses to students' problem-solving skills in the English language.

Items skills of problem solving	Strongly disagree	disagree	neutral	agree	strongly agree
1. My students like to solve a problem of reading skills in English	%6,9	%9,7	%27,8	%47,2	%8,3
2. My students enjoy solving a problem in grammar	%8,3	%15,3	%20,8	%34,7	%20,8
3. My students love solving problems in writing skills	%6,9	%13,9	%27,8	%30,6	%20,8
4. My students do their best to be successful in solving some problems in pronunciation	%5,6	%9,7	%29,2	%29,2	%26,4
5. My students are interested in solving problems with talking skills.	%2,8	%6,9	%27,8	%44,4	%18,1
6. My students love to struggle to solve problems even if they can't solve the problem in English linguistics.	%1,4	%8,3	%25,0	%44,4	%20,8
7. My students like to solve problems of some English linguistics from different sources.	%6,9	%6,9	%40,3	%36,1	%9,7
8. My students try hard when they can't solve any problem in English linguistics.	%5,6	%6,9	%33,3	%29,2	%25,0
9. My students are sure they can solve some problems in English linguistics.	%4,2	%12,5	%26,4	%41,7	%15,3
10. My students are confident in solving some problems in reading English	%5,6	%12,5	%30,6	%45,8	%5,6
11. My students are sure that they can solve difficult problems of communication skills.	%5,6	%12,5	%19,4	%40,3	%22,2
12. My students do their best to solve the problems in written skills no matter how difficult the problem is.	%8,3	%16,7	%26,4	%30,6	%18,1
13. My students like to solve a problem of reading skills in English	%1,4	%16,7	%20,8	%37,5	%23,6

5.3 Are there significant differences in both English and mathematics teachers' perspectives on students' problem-solving skills according to school stage and gender?

The ANOVA analysis found that there are no significant differences among the responses of both mathematics teachers and English teachers on students' skills in problem solving in all variables between groups and within groups because the values of sig. are larger than 0.05 (in mathematics, they are:.701,.191,.058; in English, they are:.898,.893,.742). The following tables illustrate the ANOVA results.

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Table (11): Shows ANOVA results for mathematics teacher responses on students' skill in problem-solving according to all three variables, between groups and within groups.

		Sum of Squares	df	Mean Square	F	Sig.
Stage	Between Groups	13,375	27	,495	,823	,701
	Within Groups	26,500	44	,602		
	Total	39,875	71			
Gender	Between Groups	7,494	27	,278	1,340	,191
	Within Groups	9,117	44	,207		
	Total	16,611	71			
School	Between Groups	114,253	27	4,232	1,697	,058
	Within Groups	109,733	44	2,494		
	Total	223,986	71			

Table (12): Shows ANOVA results for English students' skill in problem solving according to all three variables, between groups and within groups.

		Sum of Squares	df	Mean Square	F	Sig.
Stage	Between Groups	7,543	20	,377	,595	,898
	Within Groups	32,332	51	,634		
	Total	39,875	71			
Gender	Between Groups	3,171	20	,159	,602	,893
	Within Groups	13,440	51	,264		
	Total	16,611	71			
School	Between Groups	51,605	20	2,580	,763	,742
	Within Groups	172,381	51	3,380		
	Total	223,986	71			

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4. Conclusion

Learning mathematics and the English language share many similarities, as we mentioned in the theoretical background of this study. Both disciplines rely on logic in their structure, and they are both used as a language of communication for information exchange. Accordingly, this study's findings confirm and support these similarities. There are no significant differences between the two areas due to the averages of student's performance in problem-solving in both disciplines, which are fairly close to each other (although students' averages in math are higher than the students average in English, but both are at the same level), and there are also no significant differences in the variables between and within groups. Consequently, the study's findings provide support for the assumption that students' abilities for problem-solving are influenced by the relationships and interactions between both disciplines. The study's findings highlight the need for collaboration and interaction between the study of mathematics and English through both subjects' instructional activities and curriculum design. Teachers and educational administrators must work collectively to put this conclusion into practice.

5. Recommendations

The researchers recommend the following:

1. The educational authorities should provide specific training courses for teachers to improve their skills in problem-solving and other topics in both English and mathematics in secondary schools in the Kurdistan Region of Iraq.
2. The educational authorities should support and facilitate cooperation between the instructors of two disciplines through the need for collaboration and interaction between the study of mathematics and English through both subjects' instructional activities.
3. The educational authorities in the Ministry of Education should take the similarities and communalities between the two disciplines into consideration when designing the curricula of both disciplines.

4. Secondary school administration should create common group activities in which the English and mathematics teachers could interact and share experiences.
5. Secondary school administration should emphasize student-centered approaches as the main methods of teaching and learning mathematics and English.

6. Suggestions for advanced research:

1. Conducting a similar study in primary schools.
2. Conducting a comparative study on the skills of both English and mathematics teachers at the university level.
3. Conducting similar studies in other related disciplines such as physics, information technology, etc.

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تواناکانی قوتابیان له چارەسەرکردنی کێشەکان له بیرکاری و زمانی ئینگلیزی له قۆناغی ئامادەیی

پوختە:

ئەم توێژینەوەیە بەدواداچوون بۆ ئەو لێهاتووییانە دەکات کە پێویستن بۆ بەرزکردنەوەی تواناکانی قوتابیانی قۆناغی ئامادەیی له بیرکاری و زمانی ئینگلیزی بۆ چارەسەرکردنی کێشەکان لەسەر بنەمای دیدگای ماموستایانی بیرکاری و زمانی ئینگلیزی، بۆ بەدیهێنانی ئەمەش ئامانجی توێژینەوەکە بریتییە لە: دەستنیشانکردنی تواناکانی قوتابیان له چارەسەرکردنی کێشەکان له بیرکاری و زمانی ئینگلیزیدا. ئایا جیاوازییەکی ئاماری بەرچاو له ڕوانگەی هەردوو ماموستای بیرکاری و ئینگلیزیدا هەیە سەبارەت بە ڕادەی توانای قوتابی بۆ چارەسەرکردنی کێشەکان لەسەر بنەمای ئەم گۆڕاوانەی خوارەوە: جیاوازی قوتابخانە، ئاستی ئەکادیمی و ڕەگەز؟

شێوازی توێژینەوەی چەندایەتی، وەسفکەر و شیکاری بەکارهێنرا بۆ کۆکردنەوە، پۆلێنکردن وچارەسەرکردنی زانیارییەکانی توێژینەوەکە. کۆبۆوانی توێژینەوەکە سەرجەم ماموستایانی بیرکاری و ئینگلیزی له قوتابخانە ئامادەییەکانی شاری هەولێر لەخۆگرتبوو.

نمونەیەکی هەڕەمەکی له ٧٢ ماموستا - ٢٦ له ڕەگەزی نێر و ٤٦ مێ - له حەوت قوتابخانەی ناوەندی بۆ ساڵی خوێندنی ٢٠٢٣-٢٠٢٤ هەڵبژێردرا، هەردوو توێژەرەکە دوو پرسیارنامەیان ئامادەکرد بۆ کۆکردنەوەی زانیاری، یەکێکیان ١٤ بڕگەی بۆ ماموستایانی بیرکاری تێدابوو، ئەوی دیکەیان ١٣ بڕگەی لەخۆگرتبوو بۆ ماموستایانی زمانی ئینگلیزی. ئەم نمرانەی خوارەوە بۆچارەسەری کارەکانی وەڵامی ئەندامانی نمونە بەکارهێنران: 1 ئاماژەیە بۆ ناکۆکییەکی توند، 2 ئاماژەیە بۆ ناکۆکی، 3 ئاماژەیە بۆ بێلایەن، 4 ئاماژەیە بۆ ڕازیبوون، و 5 ئاماژەیە بۆ

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ڕازیبوونێکی تونڈ. هەروەها جەخت کرا لەسەر متمانەپێکراوی و ڕەوایی و یەکدەنگی ناوخۆیی پرسیارنامەکە.

ئەنجامی توێژینەوەکە جەختی کردەوە کە لێکچوونێک لە تواناکانی چارەسەرکردنی کێشەکان لە نێوان قوتابیانی بیرکاری و قوتابیانی زمانی ئینگلیزیدا هەیە، هەروەها هیچ جیاوازییەکی ئاماری بەرچاو لە نێوان ئەو دووانەدا نییە - و تێکڕای ئاستی ناوەندی قوتابیان لە چارەسەرکردنی کێشەکان لە هەردوو پسپۆڕیەکەدا تا ڕادەیەک لە یەکتر نزیکن.

قدرات الطلاب على حل المشكلات في الرياضيات واللغة الإنجليزية في المرحلة الثانوية

ملخص

تبحث هذه الورقة المهارات المطلوبة لتحسين قدرات طلبة المرحلة الثانوية في مادتي الرياضيات واللغة الانكليزية على حل المشكلات استنادا الى وجهات نظرمدرسي كل من الرياضيات واللغة الإنجليزية, وتحقيقا لذلك تهدف الدراسة الى: التعرف على مهارات الطلاب في حل المشكلات في كل من الرياضيات واللغة الإنجليزية. وهل توجد فروق ذات دلالة إحصائية في وجهة نظر كل من مدرسي الرياضيات واللغة الإنجليزية عن مدى قدرة الطلاب على استراتيجية حل المشكلات استنادا الى المتغيرات الاتية: اختلاف المدرسة, المرحلة الدراسية, والجنس.

تم استخدام طريقة البحث الكمية والوصفية والتحليلية في جمع بيانات الدراسة وتصنيفها ومعالجتها. لقد اشتمل مجتمع الدراسة على جميع مدرسي الرياضيات واللغة الإنجليزية في المدارس الثانوية في أربيل..

تم اختيار عينة عشوائية مكونة من 72 مدرساً - 26 ذكرًا و46 أنثى - من سبع مدارس ثانوية للعام الدراسي 2023- 2024. أعد الباحثان ا استبيانين لجمع المعلومات، أحدهما يحتوي على 14 فقرة لمدرسي مادة الرياضيات، والآخر يحتوي على 13 فقرة لمدرسي مادة اللغة الإنجليزية. وتم استخدام الدرجات الاتية لمعالجة اجابات افراد العينة: 1 يشير إلى غير موافق بشدة، و2 إلى غير موافق، و3 إلى محايد، و4 إلى موافق، و5 إلى موافق بشدة. وقد تم ايضا التأكد من ثبات وصدق الاستبيان واتساقه الداخلي..

أكدت نتائج الدراسة وجود تشابه في قدرات حل المشكلات بين طلاب الرياضيات وطلبة اللغة الإنجليزية، وعدم وجود فروق ذات دلالة إحصائية بين الاثنين - كما ان متوسط أداء الطلاب في حل المشكلات في كلا التخصصين. قريبة من بعضها البعض إلى حد ما..