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Developing a Mathematical Achievement Instrument for the 7th Grade Students in Saudia Arabia

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Abstract

text The main purpose of this study was to develop a valid and a reliable mathematical achievement instrument that measured students' academic achievement in mathematics for Saudi Arabian students in grade 7th (second semester) that was based on the content of the mathematics curriculum in Saudi Arabia. A content analysis and a pilot study were conducted. A total of 32 students from Saudi Arabia participated in the study to measure the reliability. The development of the instrument involved: a) analyzing the content and the goals of the mathematics curriculum, b) designing a table of specification and a blue print based on the analyses, c) generating the items of the instruments, d) examining the appropriateness of the administration instructions and the items' phrasing, e) checking for the validity and reliability of the test. The analysis of the instrument indicated that the test had an acceptable level of content validity, and Cronbach's alpha was 0.82, which was an acceptable level for the internal consistency of reliability.

Key words: Mathematical, Achievement, Instrument, Measurement, 7th grade, Saudi Arabia.

INTRODUCTION

The main purpose of this study was to develop a mathematical academic achievement instrument. This instrument is a research quality and can be used by future researchers in mathematics education on the same population. The valid and reliable instrument was utilized in the 1st author's dissertation study at Florida Institute of Technology as pre-test. The research question of the dissertation was; *what is the effect of teaching middle school student's math using the gifted supplementary curriculum "Mawhiba" on students' academic achievement and attitude toward math in public schools in Saudi Arabia*? The independent variable in the dissertation was the use of the supplementary math curriculum "Mawhiba", and the dependent variables were the students' academic achievement and attitude toward math. A valid and reliable test was used to measure the attitude toward math (Aiken, 1979). While an instrument for the attitude toward math was readily available, no similar instrument was available to measure mathematical academic achievement. As far as the authors knew, there were no instruments for academic achievement that measured the contents of the 7th (second semester) grade math curriculum in Saudi Arabia that was checked for validity and tested for reliability. Therefore, it was necessary to develop a valid and a reliable instrument that serve as a pre-test of the researcher's dissertation, and to be utilized in future research.

RELATED LITERATUR

According to Saeed, Abdel Hamid, & al-Shalhoub (2011), the Ministry of Education in Saudi Arabia has been working to improve the curriculum, especially the mathematics and science curricula. Curriculum development has been designed to achieve the goals set by the Ministry of Education. According to the Ministry of Education (2006), the development of the mathematics curricula in Saudi Arabia was an important part of a larger project to develop and improve the curriculum of mathematics and science in the country. Ali & Alshehri (2016) indicated that the content of the newly developed math textbook for grades 3-5 in Saudi Arabia matched about 93.7% with NTCM standards in 5 mathematical topics: number and operations, algebra, geometry, measurement, and data analysis and probability, which was not the case with the old math textbook. According to Al-Assaf (2008) study results indicated that about 43.24% of the content in geometry and 25% in measurement of the math textbook in grades 3-5 in Saudi Arabia matched the NCTM standards while the content in algebra in middle school focused on only 3 standards of the NCTM standards (Hilal, 2009). According to Abbas & Al-Absi (2007), the issuing of NCTM documents in 1989, reissued in 2000, emphasized the importance of what students should learn. Learning mathematics is important for all students. Students have the right to be given opportunities to develop their skills and abilities. Mathematics curriculum should be presented at different levels of learning, so it can meet the needs of all students.

According to Ali & Alshehri (2016) the NCTM standards document NCTM (2000) mentions six principles for school mathematics: equity, curriculum, teaching, learning, assessment, and technology. Moreover, there are 10 standards for grades pre-k-12, which can be separated into 2 parts. First, content standards, which describe what should

be learned, covering standards for "number and operations, algebra, geometry, measurement, and data analysis & probability"; second, process standards, which describe how the material can be learned, and covered standards for "problem solving, reasoning and proof, communication, connections, and representation" NCTM (2000). These standards play an important role in the development of learning and teaching, which helps learners to increase their capacity of learning and the chances to be successful. Another role of these standards is to describe what must be learned and how it can be taught (Almaghrabi, 2005).

METHODS

Population and Sample

The target material of the pretest covered the content of the developed mathematics textbook of the 7th grade-second semester in Saudi Arabia in the academic year 2016. The pilot study of the pretest included 32 students who just finished the 7th grade and moved to the 8th grade.

Procedure

The development of the instrument involved five stages; (1) analyzing the content and the goals of the 7th grade textbook, (2) creating a table of specification and blueprint based on the first stage and guided by the levels of Bloom's Taxonomy, (3) writing the first draft of the instrument based on the first and second steps, (4) examining the appropriateness of the administration instructions and the items' phrasing by sending the test to specialists in measurements and language, and (5) checking for the validity and reliability of the test by sending the test to experts and piloting it.

Stage 1: analyzing the content and the goals of the 7th (second semester) grade mathematics textbook.

The Ministry of Education in Saudi Arabia pays special attention to mathematics education and considers it a very important subject. Saudi Arabia spends billions of dollars every year on education. In 2014, the government of Saudi spent 56 billion dollars on education (Ministy of Finance, 2014). A few years ago, the math curriculum was developed by the Ministry of Education. Curriculum developers believed that the new math curriculum should be enjoyable and should require higher skills that encourage students to think more about the tasks with the aim of helping them connect math to the real world. According to Ali & Alshehri (2016), the content of the newly developed mathematics curriculum for grades (6-8) was about 96.3% compatible with, and based on, the NCTM standards. As described in table 1, the second semester of the 7th grade math curriculum in Saudi Arabia had four units: Applications on Percentage and Ratio, Statistics and Probability, Engineering (Polygons) and Measuring Units. These four units had 45 objectives, which were taken from the 7th grade math textbook and were then mapped into the corresponding first four levels of thinking based on the Bloom's Taxonomy. Students completed 70 class sessions during the semester.

Table 1: Analysis of the 7th grade math text-book (2nd semester) - Ministry of Education in Saudi Arabia

Units, topics and goals of the 7th grade 2nd semester math curriculum in Saudi Arabia		
Topics	Lesson objectives	Level (Bloom's Taxonomy)

Unit1	1- A Percentage of a Number	*1-*	*Know the concept of percentage*	Knowledge
		2-	*Find the percentage by using sheets*	Knowledge
	2- Estimating the Percentage	*3-*	*Understand the concept of percentage*	Comprehension
		4-	*Find the percentage*	Knowledge
	3- Problem Solving Strategy	*5-*	*Estimate the percentage by using decimals*	Knowledge
	4- Percentage Ratio	*6-*	*Solve a problem by using logic*	Comprehension
	5- Applications on Percentages	*7-*	*Solve problems by using percentage*	Comprehension
		8-	*Solve applications problem using percentage*	Application
Unit2	1- Point representation	*1-*	*Describe data by using points*	Knowledge
	2- Center Tendency measurements	*2-*	*Show and analyze data by using points*	Comprehension
		3-	*Know Central tendency measurements*	Knowledge
	3- Graphs & Columns Representation	*4-*	*Describe a set by using Central tendency measurements*	Knowledge
	4- Uses of Graphical Representations for Estimations	*5-*	*Describe data by using charts*	Knowledge
		6-	*Describe and analyze data by using charts*	Comprehension
		7-	*Analyze the line representation to reach an answer*	Analysis
	5- Problem Solving Strategy	*8-*	*Use software to describe data by charts*	Comprehension
	6- Probabilities	*9-*	*Use charts to solve a problem*	Application
	7- Count of Outputs	*10-*	*Find the probability of event*	Comprehension
	8- Basic Counting Principle	*11-*	*Find sample space and probability*	Comprehension
		12-	*Use multiplication to find probability*	Application
Unit3	1- Relationships between angles	*1-*	*Know and describe angles*	Knowledge
		2-	*Identify Integrated and complementary angles*	Knowledge
	2- Integrated and complementary angles	*3-*	*Find the angle*	Comprehension
		4-	*Draw & describe a circle*	Application
	3- Representation in circular sectors	*5-*	*Know & describe the triangles*	Knowledge
		6-	*Solve a problem by logic*	Application
	4- Triangles	*7-*	*Deduct some chararistics of the Quadrilateral shapes*	Knowledge
	5- Problem Solving Strategy			
	6- The Quadrilateral shapes	*8-*	*Know the Quadrilateral shapes*	Knowledge
	7 - Similar Shapes	*9-*	*Identify similar shapes*	Comprehension

	8. Tiling and Polygons	*10- Find the length of the unknown side*	Comprehension
	9 - Tiling	*11- Classified different shapes & identifying which once work for tilling*	Comprehension
		12- Do tiling	Comprehension
Unit4	1- Area of triangle and trapezoidal	*1- Deduct triangle and trapezoidal area*	Analysis
		2- Find triangle and trapezoidal area	Knowledge
	2- Circumference of a Circle	*3- Find the relationship between Circumference and area of a Circle*	Knowledge
	3- Area of a Circle		
	4- Problem Solving Strategy	*4- Find the Circumference of a Circle*	Knowledge
	5- Area of composite shapes	*5- Find the area of a Circle*	Knowledge
	6- 3 Dimensions	*6- Solve a strategy problem*	Application
	7- Drawing 3D shapes	*7- Find an Area of composite shapes*	Comprehension
	8- prism Volume	*8- Use papers to calculate an areas of surface shapes*	Application
	9- Cylinder Volume	*9- Built a 3D shape when knowing its sides*	Application
		10- Draw a 3D shape when knowing its sides	Comprehension
		11- Find volume of Parallel rectangle	Comprehension
		12- Find volume of prisms	Comprehension
		13- *Find volume of a cylinder*	Comprehension
Total	31 Topics	45 objectives	

Stage 2: creating tables of specifications and blueprints based on the first stage.

Lesson objectives in table 1 were based on the 7th grade math curriculum (2nd semester). The first four levels of Bloom's Taxonomy: Knowledge, Comprehension, Application and Analysis were used as a guide, and math problems in the instruments were developed to correspond to these four levels in a manner proportional to how the course objectives

mapped on each level.

A- Knowledge.

Knowledge represents the lowest level of learning in Bloom's Taxonomy and is defined as "Retrieving relevant knowledge from long-term memory" (Krathwohl, 2002). This may require recall of information from specific events, such as knowing terms, facts, definitions, methods, and concepts. There are some verbs that can be used for knowledge: define, describe, list, and identify (Herr N, 2007).

As described in table 6, 17 out of 45 lesson objectives (38%) required the knowledge level of learning. As listed in table 2, 4 out of these 17 lesson objectives (23%) were in the first unit (Applications on Percentage). Another 4 out of these 17 lesson objectives (23%) were in the second unit (Statistics and Probability). Five out of these 17 lesson objectives (29%) were in the third unit (Engineering 'polygons'). The last 4 out of these 17 lesson objectives (23%) were in the last unit (measuring unit (2D and 3D)).

Table 2: 7th grade math textbook-2nd semester lesson objectives (knowledge level) in 4 units

Lesson objectives reach the knowledge level in the 4 units		
Units	**Objectives**	**Reason of level**
Unit 1	*1- Know the concept of percentage* *2- Find the percentage by using sheets* *3- Find the percentage* *4- Estimate the percentage by using decimals*	1, 2 & 3- Require knowing the *concept of percentage* 4 Require knowing the *concept of decimals*
Unit 2	*5- Show and analyze data by using points*	5 Require knowing how to

	6- Know Central tendency measurements *7- Describe a set by using Central tendency measurements* *8- Describe data by using charts*	*describe the data* 6 & 7 Require knowing the *CTM* 8 Require knowing how to *describe charts*
Unit 3	*9- Know and describe angles* *10- Identify Integrated and complementary angles* *11- Know & describe the triangles* *12- Deduct some characteristics of the Quadrilateral shapes* *13- Know the Quadrilateral shapes*	9 & 10 Require knowing *angles* 11 Require knowing *triangles* 12 & 13 Require knowing *characteristics of the Quadrilateral*
Unit 4	*14- Find triangle and trapezoidal area* *15- Find the relationship between Circumference and area of a Circle* *16- Find the Circumference of a Circle* *17- Find the area of a Circle*	14, 15, 16 & 17 Require knowing the *area & Circumference equation*

B- Comprehension

Comprehension represents the lowest level of understanding in Bloom's Taxonomy and is defined as "Determining the meaning of instructional messages, including oral, written, and graphic communication" (Krathwohl, 2002) which is an upper level that is beyond simple remembering, such as understanding principles, facts, and interprets charts and graphs. There are some terms that can be used that relate to Comprehension, such as estimate, explain, give examples, and summarize (Herr, 2007).

As described in table 6, 18 out of 45 lesson objectives (40%) required the Comprehension level of learning. As listed in table 3, 3 out of these 18 lesson objectives (17%) were in the first unit (Applications on Percentage). Five out of these 18 lesson objectives (28%) were in the second unit (Statistics and Probability). Five out of these 18 lesson objectives (28%) were in the third unit (Engineering (polygons)). The last 5 out of these 18 lesson

objectives (28%) were in the last unit (measuring unit (2D and 3D)).

Table 3: 7th grade math textbook-2nd semester lesson objectives (comprehension) in 4 units

Lesson objectives reach the Comprehension level in the 4 units		
Units	**Objectives**	**Reason of level**
Unit 1	*1- Understand the concept of percentage*	1 & 3- Require *Understanding* the
	2- Solve a problem by using logic	*concept of percentage*
	3- Solve problems by using percentage	2 Require *Understanding of problem*
Unit 2	*4- Describe data by using points*	4 & 5 Require a description
	5- Describe and analyze data by using charts	6 Require *Understanding of using*
	6- Use software to describe data by charts	*software*
	7- Find the probability of event	7 & 8 Require *Understanding of sample*
	8- Find sample space and probability	*space and probability*
Unit 3	*9- Find the angle*	9 Require understanding *angles*
	10- Identify similar shapes	10 & 12 Require understanding
	11- Find the length of the unknown side	*characteristics of shapes*
	12- Classified different shapes & identifying which	11 Require understanding of *equation*
	once work for tilling	13 Require understanding *tilling*
	13- Do tilling	
Unit 4	*14- Find an Area of composite shapes*	14 Require understanding *different*
	15- Draw a 3D shape when knowing its sides	*shapes*
	16- Find volume of Parallel rectangle	15 Require understanding *3D*
	17- Find volume of prisms	16, 17 & 18 Require understanding the
	18- Find volume of a cylinder	*volume of rectangle, prisms, cylinder*

C- Application

Learning outcomes in the application level represents a higher level of understanding than that in the comprehension level. Application is defined as "Carrying out or using a procedure in a given situation" (Krathwohl, 2002), which may include applications of rules, principles, methods, and theories. There are some questions that reach the application level, such as solve mathematical problems and draw charts and graphs.

There are some terms that can be used that require application, such as discover, modify, operate, predict, solve, and use (Herr, 2007).

As described in table 6, 8 out of 45 lesson objectives (18%) reached the application level of learning. As listed in table 4, only 1 out of these 8 lesson objectives (12%) were in the first unit (Applications on Percentage). Two out of these 8 lesson objectives (25%) were in the second unit (Statistics and Probability). Two out of these 8 lesson objectives (25%) were in the third unit (Engineering (polygons)). The last 3 out of these 8 lesson objectives (37%) were in the last unit (measuring unit (2D AND 3D)).

Table 4:7th grade math textbook-2nd semester lessons objectives (application) in 4 units

Lesson objectives reach the application level in the 4 units		
Units	**Objectives**	**Reason of level**
Unit 1	*1- Solve applications problem using percentage*	*Application work*
Unit 2	*2- Use charts to solve a problem*	*Application work*
	3- Use multiplication to find probability	*Application work*
Unit 3	*4- Draw & describe a circle*	Require *Drawing*
	5- Solve a problem by logic	Require *solving a problem*
Unit 4	*6- Solve a strategy problem*	Require *solving a problem*
	7- Use papers to calculate an areas of surface shapes	*Application work*
	8- Built a 3D shape when knowing its sides	Require deep understanding of 3D

D- Analysis

Learning outcomes in this level require a higher level of intelligence than in the previous levels because it requires a deep understanding of both the content and the structural form of material. Analysis is defined as the "Breaking material into its constituent parts and

detecting how the parts relate to one another and to an overall structure or purpose" (Krathwohl, 2002). Lesson objectives such as distinguishing between facts and inferences, evaluating the relevancy of data, and analyzing problems are good examples of objectives that reach the analysis level. Verbs such as differentiate, point out, distinguish and break down are good examples of terms that reach the analysis level (Herr, 2007).

As described in table 6, only 2 out of 45 lesson objectives (4%) in the 7th grade (2nd semester) mathematics textbook reached the Analysis level of learning. As described in table 5, 1 out of these 2 lesson objectives (50%) was in the second unit (Statistics and Probability). The last lesson objective was in the last unit (measuring unit: 2D and 3D).

Table 5: 7th grade math textbook-2nd semester lesson objectives (analysis) in 4 units

Lesson objectives reach the analysis level in the 4 units		
Units	**Objectives**	**Reason of level**
Unit 2	*1- Analyze the line representation to reach an answer*	*Require analyzing the line*
Unit 4	*2- Deduct triangle and trapezoidal area*	*Require analyzing both triangle and trapezoidal area and deduct*

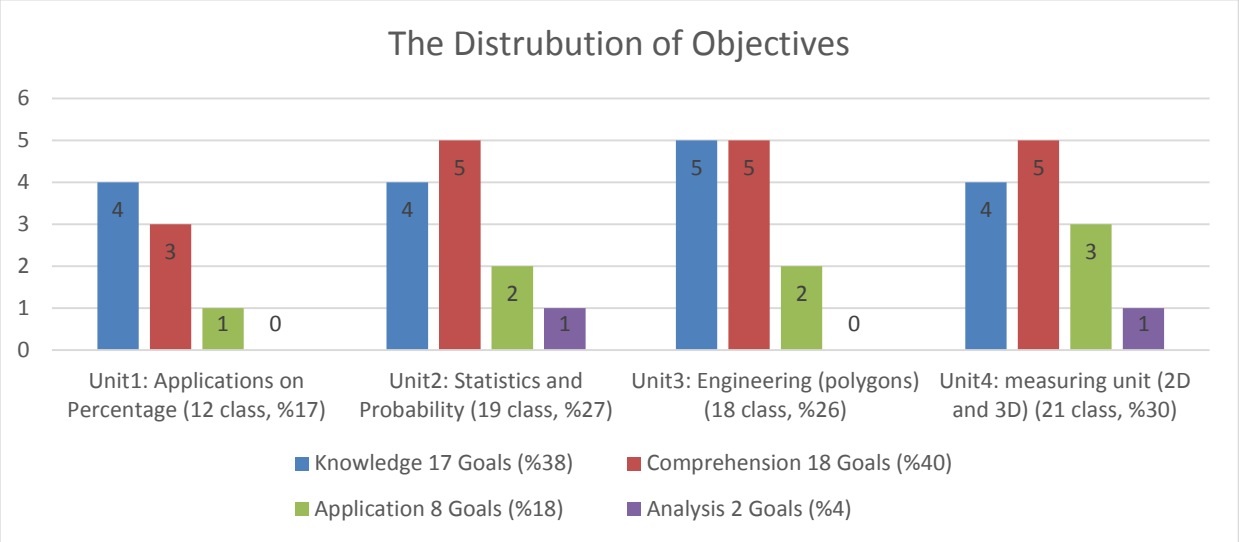
Table 6: Blue Print for the 7th grade (2nd semester) math text-book

Blue Print, 70 Class, 45 Class Objectives, 45 Items, out of 100 points					
Units/levels	Knowledge 17 Goals (%38)	Comprehension 18 Goals (%40)	Application 8 Goals (%18)	Analysis 2 Goals (%4)	Total
Unit1: Applications on Percentage (12 class, %17)	4	3	1	-	8 (%17)

Unit2: Statistics and Probability (19 class, %27)	4	5	2	1	12 (%27)
Unit3: Engineering (polygons) (18 class, %26)	5	5	2	-	12 (%27)
Unit4: measuring unit (2D and 3D) (21 class, %30)	4	5	3	1	13 (%29)
Total 70 class %100	17	18	8	2	45 Items

The following figure represents the distribution and the percentage of objectives in every unit categorized by four levels as described in the blueprint provided above. As described in the figure, there are 17 goals (38 %) represent the knowledge level distributed in four units. The figure also shows that there are 18 goals (40 %) represent the comprehension level. There are 8 goals represent the application level and only 2 goals represent the analysis level.

Figure 1: the distribution of objectives



Stage 3: writing the first draft of the instrument based on the second step

According to Devine & Yaghlian, (n.d) there are three steps of building a test: a) planning of the test, where objectives, outcomes, table of specifications, and content of a subject should be analyzed, b) preparing the test, where the writing, choosing, arranging, and reviewing of items take place, c) analyzing and revising the test, where testing of reliability take place. The development of the pretest involved several steps: First, analyzing the content and the goals of the 7th grade-2nd semester mathematics textbook (see stage 1). The second step was designing a blueprint guided by the level of Bloom's Taxonomy (see table 6) and then designing a table of specifications (see table 7), which was mentioned earlier in stage 1 and 2. The third step was writing the first draft of the test based on the blueprint and the table of specifications. Finally, the test was sent to professors who have PhDs in math education, teachers and advisors and creating the final draft after making the adjustments provided by these experts. As described in table 7, the test consists of 45 items from 4 units, which were divided into four different levels of

learning. The test had 10 items of true and false (2 items from the first unit, 2 items from the second unit, 2 items from the third unit and 4 items from the last unit), 15 items of multiple choice (4 items from the first unit, 4 items from the second unit, 3 items from the third unit and 4 items from the last unit), 10 items of short answers (2 items from the first unit, 5 items from the second unit and 3 items from the last unit), 5 items of linking (1 item from the second unit, 2 items from the third unit and 2 items from the last unit), and 5 items of short answers and completing a graph (5 items form the third unit.

Table 7: Table of specifications of the pretest

Table of specifications of the pre-test (7th grade, 2nd semester math textbook)

Unit	Class sessions	Percentage	Numbers of items	points	Items location
Unit1: Applications on Percentage	12	17%	8	18	type of Question: items / points True and False questions: 2 Multiple choice questions: 4 short answers: 2 Linking: 0 Complete answers: 0 total: 8 — points: 18
Unit2: Statistics and Probability	19	27%	12	26.5	type of Question: items / points True and False questions: 2 Multiple choice questions: 4 short answers: 5 Linking: 1 Complete answers: 0 total: 12 — points: 26.5
Unit3: Engineering (polygons)	18	26%	12	26.5	type of Question: items / points True and False questions: 2 Multiple choice questions: 3 short answers: 0 Linking: 2 Complete answers: 5 total: 12 — points: 26.5
Unit4: Measuring unit (2D & 3D)	21	30%	13	29	type of Question: items / points True and False questions: 4 Multiple choice questions: 4 short answers: 3 Linking: 2 Complete answers: 0 total: 13 — points: 29

Stage 4: examining the appropriateness of the administration instructions and the items phrasing.

The test included true or false questions, multiple choice questions, short answers, and linking questions. According to Bothell (2001) there are rules for writing multiple choice questions: The answers should be homogeneous, distracting, and realistic while the questions should be clear and in a question format (not in a complete sentence format); the questions should vary and emphasize different level of learning; lengths of options should be similar and placed in different and balanced options (not tied to a specific choice); questions and answers should be clear, understandable, and grammatically correct; test's writer should avoid negative questions and clues that lead to correct answers. Rules for making an assessment were reviewed and followed when designing questions. Clear instructions were given to students before starting the test. After the final drafts of the test were done, the test was sent to evaluators who have experience in measurements, math, and language to make sure that the phrasing of the items was clear. Adjustments and changes were made based on their reviews.

Results and Discussion

The data analysis in this section involves quantitative and qualitative data analysis. Qualitative analysis was conducted to assess content validity evidence while quantitative analysis was conducted to test reliability of the instruments which will be explained in stage 5. JMP® for Mac, Version *Pro12*.SASInstituteInc., Cary,NC,1989-2007 (http://www.jmp.com/support/notes/35/282.html) was used for these statistical analyses.

Stage 5: checking for the validity and reliability of the test.

Validity.

To establish an acceptable level of content validity of the test, the test involved the stages

mentioned in this paper (stage 1-5). Experts' evaluation sheet for the test was created (see figure 2 as an example), and sent to evaluators who have experience in measurements, language, and mathematics. Most of these evaluators are teachers or professors who have Ph.Ds. in mathematics education. The evaluation sheet involved three parts: First, the research question and information about the dissertation to give evaluators an idea about these measurements. Second, a blueprint, a table of specifications and instructions for the test. Finally, each question and item was presented in a table (see figure 2 as an example). As shown in the table, each item had six sections. First, each item was written with its objective. Second, evaluators read each item and the objective associated with it and checked whether these items fit the objectives. Third, evaluators read each item and checked whether the item matched the level of the objective. Forth, evaluators checked whether these items fit the content of the subject. Fifth, evaluators also checked whether these items were written in an appropriate and clear language. Finally, each item had a suggestion box in case evaluators wanted to add, adjust, or remove any item.

Figure 2: Experts evaluation sheet example

#	Objective	Question	level	Expert opinion								
				Appropriateness of question to the objective		Appropriateness of question to the level		Appropriateness of question to the content		Clarity of question		suggestions
				Appropriate	Not Appropriate	Appropriate	Not Appropriate	Appropriate	Not Appropriate	clear	Not clear	
Q1	**Put (T) front of the correct answer and (F) front of the wrong answer:**											
1	*Remember the total measurement of a triangle angles*	The total measurement of a triangle angles is 150	Knowledge									
2	*Solve a problem related to percentage*	If Rami gave his brother 35% of his income and gave his sister 25% and still has 42$. We can say that Rami's income is 84$	comprehension									
3	*Estimate square roots*	If Sami has 196 plants and he wants to plant them in a square shape. There will be 13 plants in each side.	comprehension									

The 7th grade mathematical achievement test (pretest) was sent to 7 professors who have PhDs in mathematics education and 13 teachers and advisors and wrote the final draft after making the adjustments provided by these experts.

Reliability.

At the beginning of Fall 2016, a pilot study was conducted in a middle school from the general population to check the reliability of the math academic achievement test. The pilot study included 32 students; two students were removed from the study because they did not take the test seriously (less than 15 minutes while the average time spent on the test was 72 minutes). As shown in table 8, the total number of students in the pilot study was N=32. The range of possible scores was 0-100. The mean of scores in the

study was (M=55.92, SD=13.98). According to the skewness and the kurtosis, the distribution of scores was normal (-1< skewness and the kurtosis <1). The average time spent on the test was (M=72.17, SD=21.15). The median of time distribution was 75 minutes while the mode was 90 minutes. As shown in the table, the test was measured by the Cronbach's alpha to measure the consistency of the instrument and had a reliability more than 0.85 before removing 2 outliers from the data, and a reliability equal to 0.82 after excluding students #27 and #30 from the study.

Table 8: pilot study for the 7th grade mathematical achievement test

groups	**N**	**N after removing**	**Mean**	**SD**	**Skewness**	**Kurtosis**	**Cronbach's alpha**
scores	32	30	55.92	13.98	-0.9	0.09	0.82
time	32	30	72.17	21.15	-	-	-

Conclusion

As described earlier in the paper, research quality on measurements that were checked for validity and reliability were not available for mathematics achievement in Saudi Arabia. The primary goal of this paper was to develop an instrument that measure math academic achievement for the 7th grade in Saudi Arabia, and to serve as a pre-test in the dissertation mentioned earlier, as well as to fill gaps in the literature. The development of the instrument involved five stages to make sure that the items of the test were clear, appropriate, based on the Saudi math contents and blueprint, and to make sure that the test was reliable. The experts who reviewed the instrument reported the following notes: a) The final draft of the instrument addressed content and practices found in the seventh-grade of the Saudi Arabia math curriculum, b) Items of the instrument matched

the level of goals and blueprint, c) Items were clear and appropriate for 7th graders. The instrument was piloted to be checked for its reliability. Based on the analyses, the test met the requirement of content validity, and had an acceptable level of constituency above the 0.80 Cronbach's alpha.

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