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Investigation of Creative Teaching for High School Mathematics Teachers in Saudi Arabia

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Abstract

This study examined the creative teaching for high school mathematics teachers in Saudi Arabia. The original data set included 200 teachers in high public schools in the province of Dammam, Saudi Arabia. The researcher also prepared a creative teaching questionnaire for mathematics teachers in high schools and a qualitative analysis method was employed to analyze the data. The results showed that the items on the questionnaire on creative practices ranged between (3–4.23) with a general average value (3.16) and a standard deviation (0.192), which indicated a median level of creative practice among the high school mathematics teachers in Saudi Arabia. This study suggested that it should be better to prepare training programs for mathematics teachers to acquire creative teaching skills and make them more aware of the importance of creative teaching in their classes.

Keywords: creative teaching, mathematical female teachers, high school

1. Introduction

1.1 Introduce the Problem

Teachers are the main element in improving skills for students such as creative thinking, to allow them to compete in the educational field efficiently and professionally. Moreover, teachers are counselors of student learning and designers of constructive classroom settings, in which students can improve the skills they might require now or in after time. With the current movement towards achieving Vision 2030 in general education classrooms in Saudi Arabia, creative education has become vital to individual and national development (Saudi Arabia's Vision for 2030, 2017).

The creativity of teachers is necessary to maintain the activity of the learner, and it is one of the factors that enable teachers to achieve their goals and to facilitate success in their work, and to achieve this they should follow various methods that suit the level of learners, so the teachers need to use the creative teaching methods that develop the talents and abilities of their students, and also it is important for teachers to stimulate students to ask questions and to use open answers to problems and in divergent situations (Craft, 2005; Morais & Azevedo, 2011). Thus, a creative teacher provides an interesting environment that helps the students to learn with fun and stimulates creative thinking in students.

Moreover, one of the main aims of high school is to develop creative and critical thinking. This can be accomplished by encouraging students' in-depth learning and through creative teaching (Al-Harbi, 2018). Thus, mathematics teachers should have a profound understanding of ideas and use several ways to represent and clarify them, and the teaching practices should create the highest change in student outcomes, besides what composes a difference in the classroom. So, in this study, the researcher investigated the creative teaching of mathematical female teachers in high schools in Saudi Arabia.

1.2 Definitions: Creativity and Creative Teaching

Creativity allows students to think outside their own points of view, and to perceive situations in a variety of new sights (Lankard, 1995; Venturi, 2013).

Although the term Creativity has a lot of definitions, Some definitions focused on creativity as an ability to solve

problems as Bierly, Kolodinsky, and Charette (2009) indicated that creativity is something we can all learn to use effectively leading to adaptive solutions for problems and agreed with them Batey (2012) that defined the creativity as the capacity within individuals to develop ideas for the purpose of solving problems and exploiting opportunities.

Creativity can be defined as the ability to perceive new relationships as Ariza (2019) asserted that creativity is the ability to break out of usual thoughts, rules, and relations with new concepts, forms, and interpretations. The output of the creative process is a notion or concept significantly different from the status quo.

Some definitions focused on what a person produces, and creativity refers to the phenomena whereby a person creates something original (a product, a solution, a work of art etc.) that has some type of significance. What counts as "original" may be in point of reference to the person creator, to the society, or to the field within which the novelty takes place (Ruikar & Wankhade, 2013; Robinson, 2001, Aschenbrener, 2008; Gladding, 2008; Baer & Kaufman, 2012).

Creativity involves the capacity to produce, reason with, and critically evaluate new suppositions or fantasy scenarios. It is about thinking, inventing and reinventing, problem-solving, and flexing one's inventive muscles. As such, the creative process involves uncertainty, risk, alteration, challenge, and criticality (Beetlestone, 1998; Cremin, 2009; Runco & Chand, 1995).

Though creativity is difficult to describe, several researchers concur that it consists of three factors, comprising: novelty, effectiveness for others, and benefit to society (Torrance, 1995; Fox & Fox, 2000). Creativity has been taught by joining thinking ability with pattern recognition and creation, dreamwork, reverie, common writing and painting, and visual and auditory pattern recognition (Downs, 1993), additionally, creativity in mathematics has newly presented to be taken as a needed skill that may and should be enhanced in all learners (Mann, 2005). Mathematical creativity incorporates a sequence of representations, comparison of answer techniques, joining of numerous thoughts and notions, and noticing mathematical subjects from diverse viewpoints. These features are believed as valued proof of the growth of mathematical thinking and powers (Leikin 2007; National Council of Teachers of Mathematics [NCTM], 2000). Kattou, Kontoyianni, Pitta-Pantazi, and Christou (2013) emphasized that mathematical creativity is a requirement for the growth of mathematical ability. Furthermore, mathematical creativity might prophesy mathematical ability. Although mathematical creativity is a subpart of mathematical ability, so to improve mathematical ability teachers should exploit the growth of mathematical creativity.

Additionally, Sharp (2004) suggested practical strategies for improving students' creativity, incorporating being tolerant of ambiguity, posing open-ended problems, supporting experimentation and persistence, modeling creative thinking and behavior, and praising students who present surprising answers.

Jeffrey and Craft (2004) confirmed that teachers teach creatively and teach for creativity, according to the conditions they suppose appropriate and sometimes they do both at the same time, and that both concepts are complementary to the success of good teaching practice in the classroom. However, Svetlana, Dragana, and Lidija (2015) pointed out that teaching creatively is described as using imaginative methods to make learning more effective and interesting, and teaching for creativity is described as formats of teaching that are aspired to increase students' own creative behavior or thinking.

However, Fryer (1996) pointed out that teaching for creativity is more likely to appear in contexts in which teachers are teaching creatively despite some evidence of creative reactions to limited situations.

Creative teaching is defined as Effective teaching that emphasizes education for deep understanding and stresses inquiry skills rather than mastering cognitive skills (Harris, 2005), In addition, Chan (2004) confirmed that creative teaching is the implementation of teacher creativity in the sections of instruction, Meanwhile, National Alliance on Creative & Cultural Education [NACCE] (1999) asserted that Teaching creatively refers to the fantastic methods teachers apprehend student interest to make learning more effective and exciting.

Mayer (1989, p. 205) defined creative teaching as a set of "instructional procedures that are aimed to assist students to learn recent material in recent says that will allow them to transmit what they gained to new situations", but Rinkevich (2011, p. 219) had focused more on the relationship between student and teacher as a way of defining creative teaching and described creative teaching as " a unique, customized and significant exchange of experience among all persons in a learning situation,", moreover Sawyer (2004, p. 12) depicted creative teaching as a collaborative process that is a "disciplined improvisation".

Creative teaching can be considered the same as good quality practice, yet the good quality practice is not surely creative instruction. Creative instruction includes a complex interaction between the students, the context, and the teacher in such a process that each component is moving forward, looking for new boundaries, endeavoring

towards new areas, and always looking to expand on the search for something new (Beetlestone, 1998).

Moreover, creative teaching should have four aspects that are, ownership, innovation, control, and relevance (Woods, 1995), however, Cremin, Burnard, and Craft (2006) described three principles to create a positive environment for developing students' creativity: profiling learner agency, standing back, and creating time and space.

Creative teaching in mathematics means the procedures, behaviors, and educational responses by the teachers of mathematics that show before, during, and after teaching practice, and characterized by originality, fluency, and flexibility, and leads to the development of creativity among students, in addition, Robinson & Koshy (2004) confirmed that teacher should find chances to be creative in the planning phase by choosing activities that supply students with options and several ways of inquiry. However, giving chances to choose and apply learned procedures enhances comprehension, strengthens thinking skills, and lets students improve positive attitudes and estimation of mathematical elegance.

Moreover, Nadjafikhaha and Yaftian (2013) showed that learners would be delivered chances to involve in fighting to answer stimulating mathematics dilemmas which might progress learners to practice creativity in performance mathematics and similarly in attempting to believe as a mathematician, which implies that learners are inspired to reflect on their thoughts. And it is essential to increase instructors' skills to plan and apply learning settings that offer safe surroundings in which learners are boosted to take hazards, do errors and react with others and take part in their opinions.

To recognize teachers' teaching practices that foster the students' creativity, Cremin, Burnard, and Craft (2006) confirmed that profiling learner agency, standing back, and creating space and time were three critical instructional factors. In addition, Sternberg (2000) identified a set of creative teaching features as assisting students with redefining problems, analyzing ideas, taking a fair vision of knowledge and tolerating ambiguity, believing in themselves, being ready to grow, taking risks, overcoming difficulties, and discovering they adore doing and doing it.

The teacher must be creative, able to provide a safe and stimulating classroom environment, which makes the student able to present his opinion and express it without anxiety, or fear, and that such an environment allows the student to show his interest in the views of his colleagues and their various participations, and not rushing to make judgments (Goodman, 1992; Krulik & Rudnick, 1994; Lambert & Velez, 2011).

1.3 Creative Teaching and Student Learning

Renzulli (1992) assumed a developmental theory proposing teachers are a key part of developing creativity, both as mentors and role models. In addition, When the teacher applied creative teaching, adopting creative strategies to promote lesson plans and engaging students with creative activities can lead to better learning (Ward, 2007), give confidence to students to think independently, contribute actively and express themselves without hesitation, and students are more likely to become creative experts (Horng, Hong, ChanLin, Chang, & Chu, 2005), also creative teaching increases student engagement in understanding the role that they systematic play (McGhee, 2017; Morin & Stanley, 2017). Creative teaching is strategic (Jeffrey, 2006), original (Sawyer, 2004), and exhibits an energetic delivery of content that learners find interesting (Lilly & Bramwell-Rejskind, 2004).

The creativity of the teacher is represented in his ability to the fluent and unfamiliar application of new ideas, in his ability to innovate in the way his lessons are presented, implemented, and evaluated, in the design of innovative educational methods, and in initiation to find solutions and proposals for issues or problems facing him.

Creative teaching has several advantages when utilized in the classroom (Henderson & Malone, 2012; Shepard & Brew, 2013), including altering relationships between objects, strengthening experiential comprehension of topics, and more profoundly accessing feelings (Henderson & Malone, 2012). Shepard and Brew (2013) established that creative teaching improved students' self-awareness and pleasure with the material.

Moreover, when the teacher implements creative teaching techniques, a number of benefits will be achieved, such as self-esteem is strengthened; flexibility is stimulated; tolerance to uncertainty and diversity are promoted; also, students the freedom and responsible decision-making are supported (Runco, 2004) and students' motivation and involvement in the learning process is stimulated (Barry, Kanematsu, Nakahira, & Ogawa, 2018; Runco, 2004).

Creative teaching is related to the teacher himself, the teacher's teaching strategies reflect the nature of the relationship between him and his students and describe the ways in which teachers perform their roles and reflect their attitudes towards their school work, also Beetlestone (1998) and Stern (1989) referred that teachers progressively are aware of the need to implement more creative strategies concerning the management of the curriculum and to bear in mind contexts which give a more creative structure for instruction and learning as well as

employing creative teaching strategies is one way by which educators can stimulate their learners and refresh their own batteries. Also delivering apposite surroundings and providing trust through operating activities, students can be anticipated to contribute effectively (Sriraman, Yaftian, & Lee, 2011)

The study by Rus (2020) showed that the application of creative methods in teaching is one of the factors contributing to increasing student motivation, which is one of the essential preconditions of the successful practice of professional teaching skills. The study by Li and Li (2019) indicated that in-service kindergarten teachers hold positive attitudes toward the importance of creative pedagogy; and they assume that they adopt these pedagogies in their teaching.

Additionally, Morris, (2006) indicated that the teacher uses creative strategies to make the learning process more stimulating, motivating and interesting, also Reppa (2010) described Creative teachers as planning geniuses, experimenters, and innovators.

The results of many studies revealed that there is a correlation between teacher creativity and student achievement as a study by Morrow (1983) Confirmed the importance of the role of the teacher in establishing a classroom atmosphere that leads to growth in student creativity and highlighted that the creative teacher encourages unusual solutions to problems, moreover Runco (2014) noticed that there is a positive correlation between students' creative thinking and the teacher's creativity.

The study of Altman (1999) revealed that there is a relationship between the practice of creative teaching and its impact on the creative thinking and achievement of students. In addition, if a teacher has confidence in effectively carrying out creative teaching, there is a strong possibility of that teacher transforming students' positive beliefs into practical performance (Huang, Chi-Kin, & Dong, 2019).

In the context of the interest in creative teaching, several studies have been conducted on these skills, including Patrick (2000) that aimed to identify the impact of training programs for teachers in Britain in the field of creative teaching on the creative thinking abilities of students and their attitudes to a sample of 20 teachers, The results showed that the creative skills demonstrated by teachers, which led to the improvement of creative thinking abilities of students are linked to the impact of training programs for teachers.

The study by Horng, Hong, ChanLin, Chang, and Chu (2005) found out the aspects impacting creative instruction are personality traits, family factors, experiences of growth and education, beliefs in teaching, hard work, motivation, and the administrative side of school institution, as well as among these factors, beliefs in teaching, motivation and hard work are the foremost factors. Furthermore, Cheung (2012) found that the beliefs of teachers of good creative teaching practices can be put together into four components: the traits of a creative teacher, the environmental surrounding vital for improving creativity, the teaching strategies employed for developing creativity, and the criterion for assessing children's creativity. Meanwhile, Huang and Lee (2015) identified that the beliefs of teachers about the creative teaching cover process and product dimensions.

As the Chang, Chuang, and Bennington (2011) study showed, by surveying and examining the group of studies on the creative teaching skills of teachers in Taiwan, a relationship between creative teaching, personal characteristics of learners, creative thinking, and development of internal motivation for learners. However, this finding contrasted sharply with the study of Cordero and Gil-Izquierdo (2018) showed that the carrying out of more innovative active learning strategies looks to have a negative effect on student achievement.

In addition, the study of Bhoi (2008) investigated the effectiveness of a creative teaching model in mathematics on the mathematical creativity of VIII class students and found that the Mathematical creativity of the experimental group is better than the control group, also the study of Gautam (2011) developed creative teaching program for standard VII in mathematics and examined the effect of it on achievement in mathematics, found that The creative teaching program had improved the achievement of students in mathematic.

Accordingly, mathematical creative teaching is an instruction that develops students' ability to link and reorganize different concepts in new ways that are fluent, flexible, original, sensitive to problems, and perceive details. Thus, the need is not only for mathematics teachers who have the knowledge and scientific theoretical skills about mathematics but also for teachers who are able to create a generation with the ability to reform their society.

Thus, investigating teacher practices, especially creative teaching in mathematics, can benefit researchers appreciate teachers' learning occasions for mathematics instruction practices, which can have a constructive influence on students' learning proficiencies, so the study of Al-Aswad (2018) aimed to identify the level of possessing creative teaching skills among a sample of faculty members in Algerian universities and found that the assessment of faculty members in Algerian universities for their creative teaching skills was low, also the study of Salam (2018) revealed that teaching performance of social studies teachers concerning planning, implementation,

and evaluation skills were poor and inadequate whereas the study of Ayyash (2017) found that the degree of need to possess creative teaching performance skills from the point of view of the teachers in basic education is strong with an average of 3.28.

Moreover, both the study of Al-Namar (2014) and the study of Al-Masrahi (2016) showed that primary mathematics teachers possess creative teaching skills in degrees ranging from a few to medium. Also, the study by Smadi (2017) showed that the level of professional education teachers' practice of creative teaching skills is average as a whole. But the study by Hussein (2014) showed that mathematics teachers in primary school have a high level of creative teaching skills.

Based on the results of previous studies, additionally, the study of Liu, Tsai, Wang, and Chen (2019) recommended that Future studies should be conducted to examine creative teaching behaviors for teachers and assessment of student creativity in the classroom. Also, the study of Al-Assaf and Awamleh (2013) indicated that determining the degree of creative teaching for teachers is mainly important for administrators in the Ministry of Education to participate in the development of programs for in-service teachers. So, this research examines the creative teaching of mathematical female teachers in high schools in Saudi Arabia. Where the researcher did not find any study concerned with examining the creative teaching of high school teachers in Saudi Arabia.

1.4 Teaching Mathematics in Saudi Arabia High School

The Kingdom of Saudi Arabia has endeavored to address the shortcomings in the curricula and bring them in line with developments that occur in education and teaching strategies in light of international standards and modern educational theories, Therefore, the best international series in mathematics were adopted, which is the American series "Magrwell" courses, which are designed according to NCTM standards to provide students with intellectual skills that help them understand mathematics and its applications. It also links mathematics with other subjects to make it a subject relevant to the daily life of students, to help them solve life problems. It also includes many strategies that help teachers take into consideration the individual differences between learners (Al-Shaya & Abdel-Hamid, 2011).

Consequently, The Tatweer Company for Educational Services, which is chiefly concentrated on mathematics and science teachers' development needs, subsequently produced a set of goals, as follows: Stimulating a hopeful attitude towards science, math, technology, and engineering, developing creativity, fantasy, and inquisitiveness, and developing instructors' leadership of their classes (Tatweer Project, 2020).

Mathematics teaching is one of the parts that continuously have been assigned with stayed requisitions for development. Proof has frequently specified the unacceptable mathematical proficiency of Saudi students. These critiques of mathematics teaching binding the Ministry of Education to conduct instant efforts to get better the standard mathematics curriculum and teaching programs (Alsaeed, 2012).

The poor competence of Saudi students in mathematics may be due, As Al-Shahrani (2010) exposed that Saudi teachers exploit most of their mathematics instruction classes in an authority-based instructing style that depends on preparing students to remember and appliance steps and procedures that are useless for them without imparting creativity in the students or advancing critical thinking. In addition, the main style of learning in Saudi Arabia schools is memorization, the major style of instruction is lecturing, and mathematics teachers in high school are frequently still employing traditional instruction strategies instead of reform instruction strategies and depend on the textbook in their instruction practices (Aljughaiman & Grigorenko, 2013; Al-Salim, 2019).

Among the obstacles to teaching mathematics at high schools in the Kingdom of Saudi Arabia are the inefficiency of mathematics teachers and the lack of professional development, which leads to their dependence on theoretical aspects of teaching (Al-Ghamdi, 2005).

Also, Al-Ansari (2004) displayed that there is insufficiency in the training chances for teachers in Saudi Arabia and that the style applied in training is the lecture, and there was a nonappearance of teachers' contribution in the design plan of training frameworks and programs. This in turn has an impact on their teaching performance in the classroom. So, high school mathematics teachers in Saudi Arabia have weaknesses in employing modern teaching strategies required by the developed curriculum, not being able to teach developed textbooks, the inability to deal with exploration and expansion lessons, and not being able to formulate goals that measure higher thinking skills or explain mathematical problems that measure higher thinking skills such as creativity (Al-Harbi & Almatham, 2013).

It ought to be noticed that the teachers' role is serious in achieving change prerequisites that are being attempted by the Ministry of Education in Saudi Arabia. Furthermore, accomplishing the objective of awarding Saudi students the chance to practice problem-solving strategies and other mathematical processes requires the teacher to

coordinate the classroom in a system that aids students to practice mathematical thinking and examine problem-solving (NCTM, 2007).

Current government actions in Saudi Arabia planned to increase the quality and quantity of education are signs of the insistence on education improvement, particularly with the sum of young population growing. Government organizations implicated in education have presented novel curricula, standards, policies, and textbooks with the anticipation that teachers will combine the modifications seamlessly; but they have been dissatisfied to consider present instructor practices.

Moreover, the world has beheld changes in the instruction which led to a change in the role of high school teachers, especially math teachers. Teachers in Saudi Arabia are trying to improve their instruction in mathematics to remedy obvious reforms by the Ministry of Education. Saudi teachers must advance their students' thinking by participating in strategies and activities that enhance creativity. Formerly, the role of the teachers concentrated on the transfer of information to students and re-tests them. This role does not tend to prepare students to face the information technology developments which occur in the world. Therefore, the present study expanded on previous research by analyzing the degree of practicing creative teaching skills of mathematics female teachers of high schools in Saudi Arabia.

2. Questions of the Study

1) What is the degree of practicing creative teaching skills regarding planning lessons used by mathematics female teachers in Saudi Arabia?
2) What is the degree of practicing creative teaching skills regarding implementing lessons used by mathematics female teachers in Saudi Arabia?
3) What is the degree of practicing creative teaching skills regarding assessing lessons used by mathematics female teachers in Saudi Arabia?
4) What is the degree of practicing creative teaching skills (as a whole) used by mathematics female teachers in Saudi Arabia?

3. The limitations of the Study

This study is limited to the following:

1) All mathematics female teachers who teach mathematics in the first-grade high public schools of the Ministry of Education in Dammam Province of Saudi Arabia.
2) The dimensions of the observation card included three main dimensions: planning the lesson, implementing the lesson, and assessing the lesson.
3) The duration of the observation was 15 weeks within the first semester of the academic year 2019/2020.

4. Method

4.1 Research Design

In this study, a qualitative approach was followed using observation card, to determine the degree of practicing creative teaching skills used by mathematics female teachers practicing. Moreover, the observation card helps to obtain very accurate information and data compared to other tools. Additionally, observation is worthy through qualitative research because it lets the researcher gain immediate incoming, understandings, and confirmed views into the studied phenomenon, settings, and samples (Creswell, 2018).

4.2 Participants

The sample in the present study comprised all mathematics female teachers who teach mathematics in the first-grade high schools of the Ministry of Education in Dammam Province of Saudi Arabia during the first semester of 2019/2020, the number of them is 106 mathematics female teachers. The Saudi school buildings and instruction staff are severely separated for boys and girls (Oyaid, 2010), the separation of the learners may be referred to the principles and beliefs of Islam, though solo-sex education is also connected with social, and cultural values (Wiseman, 2010). Whereas education in Saudi Arabia is separated with regard to gender, both genders obtain similar goodness and educational opportunities (Al-Johani, 2009), and so all the participants are female and have more than 10 years of experience in teaching mathematics to high public school students, Also, the female teachers who are teaching mathematics in public schools are most often graduates of the same teacher education program taught at the college of education, in Saudi Arabia which is still identified as the main provider of teachers in Saudi Arabia. The number of female students in each mathematics class in the public school ranges between 35 to 40 students, also the students have 45-minute mathematics class a day.

4.3 Research Instrument

To accomplish the aims of the study, the Teachers' observation card was constructed and applied to measure the creative teaching skills of mathematical female teachers at the high school. The observation card items are designed to be short and describe teacher actions in different situations of lessons. The dimensions of the observation card were determined by reviewing the previous studies such as Al-Assaf and Awamleh (2013), Al-Namar (2014), Salam (2018), and Rizk(2016), which included three main dimensions: planning lesson, implementing lesson, assessing lesson. The skills were formulated in a procedural way so that they can be observed as a tool for teacher evaluation within the class, thus observation card contains three main dimensions and 29 skills.

The scoring method was used to identify the teacher's performance levels in the observation card. Every item in the observation card was evaluated according to a five-point- Likert type scale, teacher's degree is the total score given to the teacher on the items on the card. To calculate the validity of the observation card, the observation card was submitted to a panel of a jury (10 persons) specialized in the field of mathematical curricula and methods of teaching mathematics to determine the degree of importance of each creative teaching skill.

After analyzing the jury responses, it was found that all the proposed creative teaching skills were agreed upon by almost all the jury members; 80% or more of the jury members agreed on each of the creative teaching skills and the observation card. In addition, the jury indicated that the card was valid, and the creative teaching skills included were clear and adequate. Therefore, no modifications were made to the items on the original card.

To calculate the reliability of the observation card, the researcher used the method of agreement with the observers. The researcher and another observer - after training him on how to use this card on the teachers – applied for the observation card on (8) mathematics female teachers, then calculated the reliability coefficient using the Cooper equation and the results are shown in the following Table 1.

Table 1. The ratio and the mean of the agreement ratio between the observers to calculate the reliability of the observation card

NO	Teacher	Reliability coefficient	Percentage
1	The first	0.89	89%
2	The second	0.80	80%
3	The third	0.99	99%
4	The fourth	0.81	81%
5	The fifth	0.85	85%
6	The sixth	0.90	90%
7	The seventh	0.98	98%
8	The eighth	0.86	86%
The mean		0.89	89%

As shown in Table 1, the mean of the agreement ratio between the observers was (89%) which indicates the reliability of the observation card.

The reliability of the tool was also calculated by observing (8) mathematics female teachers and Kuder–Richardson Formula 20 was used to find the reliability (0.88), which is Appropriately high, and accordingly, the tool was used with confidence.

5. Results and Discussion

The researcher, in cooperation with mathematical female supervisors who were trained by the researcher for a week on how to apply for the observation card, observed a sample of mathematics female teachers at a high school in Dammam, using the creative teaching observation card when they were teaching mathematics during the first semester of the academic year 2019/2020. To answer the first question which purpose to determine the degree of practicing creative teaching skills regarding planning lesson for mathematical female teachers of high schools, the arithmetic means and standard deviations for each item in the dimension of planning lesson was calculated as follows.

Table 2. Means, standard deviations, ranks, and the degree of practicing creative teaching regarding planning lessons in descending order

No	Items	Mean	S. D	Rank	Degree
Planning lesson					
1	Setting different procedural objectives for every single educational situation.	4.00	.263	2	High
2	Formulating procedural objectives related to the development of creative thinking skills.	3.70	.702	5	High
3	Creating some innovative tools and aids to raise students' attention and develop creativity.	3.67	.802	6	High
4	Choosing teaching strategies that help to develop creativity (such as brainstorming, problem-solving, etc....).	3.80	.610	3	High
5	Designing Assessment methods to measure the creative skills of students.	3.50	.682	7	Median
6	Suggesting different forms for organizing student seats that provide opportunities for cooperation and individual work.	4.23	.728	1	High
7	Planning various activities that help to develop the creativity of students.	3.23	1.382	9	Median
8	Identify homework assignments that help to develop the creativity of students.	3.73	.9808	4	High
9	There is flexibility in determining the time required to complete the teaching process.	3.43	.898	8	Median
Total		3.70	.467		Median

Table 2 displays the degree of practicing creative teaching skills for the mathematical female teachers regarding planning lessons with a range between 3.23 and 4.23. Item 6: (Suggesting different forms for organizing student seats that provide opportunities for cooperation and individual work.) got the highest average (4.23) with the highest degree of practicing, while the lowest is item 7: (planning various activities that help to develop creativity of students.) which acquired the lowest average (3.23). Table 2 also shows that the practice of creative teaching skills regarding planning lessons got average values (3.70) with a median degree of practice.

This result indicated a decrease in the performance of mathematics teachers in creative teaching skills regarding planning lessons, and this can be explained by the fact that the teachers focus on planning traditionally and formulating teaching objectives at lower levels and assigning traditional teaching in lesson plans such as direct teaching. This result is consistent with the study of Al-Masrahi (2016), which indicates the weakness of primary school mathematics teachers in creative teaching skills associated with lesson planning, and the study of Salam (2018) which indicated the weakness of social teachers in the skills of planning for creative teaching.

To answer the second question which purposes to determine the degree of practicing creative teaching skills regarding implementing lesson for mathematical female teachers of high schools, the arithmetic means and standard deviations for each item in the dimension of implementing lesson was calculated in the Table 3.

Table 3. Means, standard deviations, ranks, and the degree of practicing creative teaching regarding implementing the lesson in descending order

No	Items	Mean	S. D	Rank	Degree
Implementing lesson					
10	Warming up the lesson by asking questions that are appropriate to the level of students and stimulate their thinking.	3.57	.935	2	High
11	Encouraging students to come up with many different ideas.	3.90	.959	1	Median
12	Promoting outstanding student responses and citing them during the lesson presentation.	3.47	.571	3	Median
13	Students are guided to build upon, develop, or shorten their colleagues' ideas.	3.03	0.556	7	Median
14	Providing unusual examples that support student ideas.	3.23	.430	4	Median
15	She remained silent for a moment after asking the students to give them the opportunity to think more.	2.73	.450	10	Median
16	Interpreting student's Mistakes as constructive efforts to access new information.	3.20	.407	5	Median
17	Asking students to give as many alternatives as possible to answer questions.	3.03	.615	6	Median
18	Satisfying the creative needs of students by accepting their questions and respecting their ideas.	2.83	.461	8	Median
19	Listening to more than one answer after asking the question.	2.77	.430	9	Median
	Total	3.18	.150		Median

Table 3 displays the degree of practicing creative teaching skills for the mathematical female teachers regarding implementing lessons with a range between 2.73 and 3.90. Item 11: (Encouraging students to come up with many

different ideas.) got the highest average (3.90) with the highest degree of practicing, while the lowest is item 15: (She remained silent for a moment after asking the students to give them the opportunity to think more.) which acquired the lowest average (2.73).

Table 3 also shows that the degree of practice in creative teaching skills regarding implementing lessons got average values (3.18) with a median degree of practice. This result indicated that mathematics female teachers use warm-up methods that do not help to develop creativity among students, just as the activities assigned to students are not diverse and do not include creative activities, where the weakness of teachers in planning lesson skills affected the implementing lesson skills. It is consistent with the study of Smadi (2017), which indicates the weakness of teachers of professional education in the skills of implementing creative teaching, and the study of Salam (2018) which indicated the weakness of social teachers in the skills of implementing creative teaching.

To answer the third question which purposes to determine the degree of practicing creative teaching skills regarding assessing lessons for mathematical female teachers of high schools, the arithmetic means and standard deviations for each item in the dimension of assessing lessons were calculated in the Table 4.

Table 4. Means, standard deviations, ranks, and the degree of practicing creative teaching regarding assessing lessons in descending order

No	Items	Mean	S. D	Rank	Degree
Assessing lesson					
20	Many tools are used to evaluate students' creativity.	2.00	.000	10	Low
21	Asking Open-ended questions required multiple answers.	3.03	.183	3	Median
22	Giving students the opportunity to explain and justify their answers in an atmosphere of respect and freedom.	3.07	.365	2	Median
23	Avoiding the issuance of monetary judgments on students' answers and mistakes in language.	2.80	.610	5	Median
24	Training students to write paragraphs and phrases that show their opinions.	2.50	.509	6	Median
25	Avoiding focusing on grades in the classroom.	3.23	.679	1	Median
26	Providing nontraditional answers for students' errors.	3.03	.182	4	Median
27	Asking students to present the most important ideas discussed in a new way.	2.00	.001	9	Low
28	Allowing students to practice self-assessment.	2.20	.484	8	Low
29	Using The reinforcement to reinforce the students' unfamiliar answers.	2.27	.450	7	Low
	Total	2.61	.131		Median

Table 4 displays the degree of practicing creative teaching skills for the mathematical female teachers regarding assessing lessons with a range between 2 and 3.23. Item 25: (Avoiding focusing on grades in the classroom.) Got the highest average (3.23) with the highest degree of practicing, while the lowest is item 20: (Many tools are used to evaluate students' creativity.) Which acquired the lowest average (2).

Table 4 also shows that the degree of the practice of creative teaching skills regarding assessing lessons got average values (2.61) with a median degree of practice. This result indicated the weakness of creative teaching skills that relate to assessing the lesson, and this can be explained that this weakness may be due to the fact that the teachers focus on the traditional assessment of teaching, and the use of direct questions that do not help to excite creativity among students, and not to use self-assessment methods or student participation in the evaluation or their peers. It is consistent with the studies of Smadi (2017), Salam (2018), Al-Masrahi (2016), which indicated the weakness of teachers in the skills of assessing creative teaching. This may be due to the teachers' practice of traditional evaluation, as the study Çalışkan and Kaşıkçı (2010) indicated that teachers are still focusing on traditional evaluation, such as multiple-choice tests, and they have a lack of awareness of the importance of using self-evaluation and its tools.

To answer the fourth question Table 5 also shows the arithmetic means and standard deviations for the three dimensions of the creative teaching of high school mathematics female teachers in descending order.

Table 5. Means, standard deviations, ranks, and the degree of practicing creative teaching for the three dimensions in descending order

No	Dimension	Mean	S. D	Rank	Degree
1	Planning lesson	3.70	.467	1	Median
2	Implementing lesson	3.18	.150	2	Median
3	Assessing lesson	2.61	.131	3	Median
	Total	3.16	.192		Median

It is clear from Table 5 display that the average of the three dimensions ranged between (3.70 – 2.61). This means that the three dimensions did not get a high-level estimation or close to it. The dimension "planning lesson" came in the first rank, while the second rank went to the dimension "implementing lesson". The third rank took by the dimension "assessing lesson".

Table 5 also shows that the degree of practice in creative teaching skills for the mathematical female teachers of high schools in Saudi Arabia got average values (3.16) with a median degree of practice. This result contrasted with the study of Al-Assaf and Awamleh (2013) which indicated that the degree of creative teaching of teachers is significantly high in Jordon and the study of Hussein (2014) which showed that mathematics teachers of primary school have a high level of creative teaching skills, but it is consistent with the studies of Smadi (2017), Al-Namar (2014), Al-Masrahi (2016), Salam (2018), and Al-Aswad (2018) which showed that creative teaching performance of teachers was poor and inadequate.

6. Conclusion

The findings of the study showed that the degree of practice creative teaching skills for the mathematical female teachers of high schools in Saudi Arabia got average values (3.16) with a median degree of practicing regarded (planning – implementing – assessing) and need to be modified in order to satisfy the demands of Vision 2030. This may be attributed to the fact that the knowledge of mathematics teachers with creative teaching skills and its importance in educational situations and its role in creating effective learning does not seem to be sufficient, and this also may be attributed to the fact that the training courses which held by the Ministry of Education for mathematics teachers focus mostly on training teachers to use general teaching methods, and a few of them focuses on providing the teacher with competence in modern teaching methods and using it in developing the innovative thinking of female students. This result may be due to a large number of job burdens for teachers, such as: assigning a greater number of lessons for the teacher, or some administrative tasks within the school, where that creative teaching needs to prepare various plans for lessons and do activities outside of the classroom and other creative teaching activities.

This result may be attributed to the fact that the mathematical female teacher is required by the school administration and her supervisor to provide only achievement results for students, and that the teacher is not trained in the process of measuring and evaluating creative skills until the evaluation strategies used by the teacher are traditional and do not fit with creative teaching and do not attain his goals.

7. Recommendations

In light of the conclusion above, I recommended that stakeholders in Saudi Benefits from the study result to satisfy the demands of Vision 2030 by organizing a course for training mathematics teachers to use the skills of creative teaching and making mathematics teacher more aware of the importance of creative teaching. Moreover, the necessity of providing a stimulating educational environment that helps to develop creative teaching skills for mathematics teachers and reduces the number of students per class to allow the implementation of creative teaching strategies. It is important to include mathematics manuals and books at the secondary level for real educational situations that can be applied how to develop creative teaching skills for teachers. appreciating the creative teacher, and her efforts, and assigning part of the budget to give to creative female teachers in a way that encourages them to exert more effort in devising creative ways of teaching. Among the necessary things for the quality of teaching and achieving creative teaching increase the time of mathematics class and reducing the daily classes burden for the mathematics teacher this allows her to perform more activities and to make the interaction that is required to stimulate creativity. Activating school activities that contribute to developing creative thinking skills, such as Celebrating the creative achievements of some students, gives an incentive and encouragement to all students to unleash their creative energies. In addition, further studies need to be conducted to determine the effectiveness of a training program to develop creative teaching skills for high school mathematics teachers. Furthermore, this study could be repeated and expanded to contain mathematics teachers in middle, and primary

schools. Moreover, this study emphasized mathematics teachers, but another study could focus on other teachers in the education field.

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