

STEM Approach: Transforming Achievement Testing Systems into Applied Learning Experiences

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ABSTRACT: The integration of STEM-based approaches in education has gained increasing attention as a means to enhance both teaching and assessment practices. STEM evaluation promotes innovation and creativity and provides faculty members with the opportunity to develop critical thinking, problem-solving, and analytical skills for students, which are all essential to provide practical learning experiences for achievement tests. When these skills are applied to achievement tests, they help transform testing systems from classifying students and giving them grades into applied learning experiences. The basic purpose of this study was to examine the level to which STEM-based evaluation can transform achievement testing systems from classifying and grading students into applied learning experiences according to faculty members. This research developed questionnaire to collect responses from the faculty members (respondents) of the study. The findings of this study indicate that faculty members possessed high-level skills in constructing a good achievement test and average skills in constructing an achievement test using the STEM approach. The results also indicated that faculty members with skills in developing achievement tests had the ability to construct an achievement test using the STEM approach. The STEM-based evaluation method had the potential to achieve the objectives of achievement tests and provide them with practical educational experiences.

Keywords: Achievement Tests, STEM Approach, Applied Learning Experiences, Student Evaluation, Saudi Arabia.

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1. Introduction

STEM education is one of the emerging approaches being used to support students for technology and engineering. This technique plays an important role to improve learning of students in mathematics and Sciences (Kong & Mohd Matore, 2022). Hence, this approach has gained increasing attention and popularity in numerous research domains and countries. Recently, the STEM approach has emerged as one of the foremost global trends and methodologies in developing educational resources and curricula for students in science. Some of the studies mentioned that STEM is one of the emerging

fields that is being attracted to on the basis of transdisciplinary, multidisciplinary and multidisciplinary approaches (Golegou & Peppas, 2025). This approach has the ability to provide authentic and suitable platform in order to design scientific education systems.

Most of the countries around the globe has shown interest in STEM based education including KSA. The vision 2030 of KSA has made it evident that policy makers are focusing on human capital. Therefore, they are more interested in providing training to students and faculty in order to develop certain skill set that is required to meet the requirements of jobs (Babineau, 2023). Moreover, around 3/4th of the jobs at the global level are related to STEM, supporting the alignment of KSA's vision (Hackling, 2015). STEM education has emphasized increasing attention to the development of education in terms of curriculum, teaching and school, as it seeks to keep education in line with scientific and civilizational developments.

In past, conventional metrics were used in the form of performance tracking methodologies, classroom participation, and other standardized testing systems for the evaluation of students. These techniques provides some information regarding students but they hardly provided actual performance of students and other related information in the form of cognitive styles, inherent talents, and individual student experience (Villegas-Ch et al., 2025). The learning objectives are mostly confused with traditional tools of learning as they are not equipped to measure the actual performance of students. In other words, traditional models to evaluate students are not able to measure the actual skill set of the students (Abdrakhmanov et al., 2024).

The process to analyze achievements of the students through tests results is important to re-orientate assessment from just student's classification towards their learning, specifically in terms of STEM education (Doz & Bregant, 2024). The achievement tests are designed to measure the certain competencies of students. Such exams also help to identify procedural gaps and conceptual misunderstandings in educational systems. The evaluation process which is rigorous is based on clear rubrics and longitudinal tracking that enables the evaluator to convert raw scores into actionable insights. This approach to analyze and collect data provides comprehensive report of individual student's performance (Şahin, Yıldırım, & Öztürk, 2023). It also helps the faculty members to set their targets for the students, adjustment of curriculum, and development of activities for experiential learning. By adding real world tasks in STEM and assessments on the basis of projects for the evaluation of students ensures continuous improvement of students (Mater, Daher, & Mahamid, 2023). It helps students to improve problem solving capacity and skill development.

For the transformation of students through evaluation tests faculty members play very important role. Basically, they design the assessments, interpret the results, and facilitate students in application of their knowledge. Faculty members can easily identify strengths and weaknesses of the students through analysis of tests (Levy-Feldman, 2025; Mater et al., 2023). They also provide personalized support to students and make learning experience enjoyable for students. Faculty members also provide formative feedback on a number of occasions and play the role of mentorship. Thus, creating roadmap for the success of students through perioding assessments. As assessment tests play key role in checking the level of skills among students, educational institutions have reported improvement in engagement of students, improved performance, and deeper understanding. Thus, reframing tests of students within STEM evidence based, informed evaluation system, empower faculty members to help students in their grading

systems (Haq et al., 2025). It also helps them to handle real world challenges and tackle complex issues. Thus, it is important to evaluate skill level of faculty members in terms of criteria of analyzing and building achievement tests, and role of the faculty members' skill level to develop an achievement tests in lights of STEM (Lerongan, 2025). Thus, aim of this study is to evaluate skill level of faculty members in terms of criteria of analyzing and building achievement tests. The achievements also include analyzing role of the faculty members' skill level to develop an achievement tests in lights of STEM.

2. Literature Review

2.1. STEM Education Approach

Science, Technology, Engineering, and Mathematics (STEM) education is an interdisciplinary teaching approach (Marzuki et al., 2024) that comprises all four subjects in an integrated form. The STEM acronym was first used nearly two decades ago by the National Science Foundation in the mid-1900s. Traditionally, all four subjects are taught in schools where (S) stands for science, (T) for technology, (E) for engineering and (M) stands for mathematics. It is a better way of developing productivity in economic competitiveness, and societal well-being. Its existence has grown everywhere in the form of artificial intelligence, robotics, automation, and 3D animation (Sahito & Wassan, 2024). This new educational paradigm in the 21st century enhances and explores science's skills, attitudes, interests, and possibilities (Kong & Huo, 2014), including biology, physics, and chemistry in STEM. Students connect and apply the principles and knowledge of science, technology, engineering, and mathematics together to find the scientific solution of the day to day life problems (Sahito & Wassan, 2024). Basically, STEM is an interdisciplinary approach that focuses on integrated and holistic learning experiences for students. STEM approach basically break down the boundaries of conventional grading system that separate mathematics, engineering, technology and science (Lesley, 2023).

2.2. Achievement Test

Considering the changes and developments witnessed in the contemporary world, most notably (STEM) education, there is a necessary need to update and develop achievement tests. Education based on memorization and retrieval of information is no longer feasible and useful to prepare the competent individual capable of dealing with the requirements of life and facing problems (Harris et al., 2023). Achievement test is an assessment tool in the evaluation process designed to measure the specific knowledge and skills a student has acquired after a period of learning or instruction.

Achievement test is one of the most widely used tools in evaluating the achievement of university students. They play a crucial role in evaluating the level of students at universities and measure the extent of their academic abilities (Şahin et al., 2023). They are not just tools to determine students' grades, but a combination of effective strategies that contribute to developing and improving the quality of education and directing the educational process towards achieving the best desired results. The process includes several steps of construction that includes the purpose of the test, analyzing the content, sorting the teaching objectives, formulating and producing the test, correcting it, analyzing and interpreting its results (Suwarto et al., 2023).

Achievement tests should be based on modern and contemporary scientific

foundations and standards according to the (STEM) method, so that they provide honest and reliable data (Kwon & Lee, 2025). Their most important criteria are honesty, consistency, objectivity, discrimination, including high levels of thinking, considering clarity, accuracy, and ease of use. With the multiplicity of the objectives of the exams, the tasks and responsibilities assigned to the faculty member have increased as student performance is main determinant. Student performance is the most difficult to measure in these diversified educational methods and tools also by meeting quality standards and modern educational trends (Ali, Raza, & Kosar, 2024).

The results of achievement tests should perform more than merely providing grades. It should also provide guidelines to teachers regarding current skill level of students and the level at which it must be elevated (Tariq, Asif, & Gul, 2023). Institutions use tests as the diagnostic tool for the students by identifying certain weaknesses and gaps among students. Therefore, it is important to turn scores into information that can be useful for students. These scores also help faculty to improve and develop curriculum and adopt certain teaching methodology that can be helpful for students (Alfageh et al., 2024). From the perspective of testing system, role of faculty is very important as they provide instruction to develop tests. Individual needs of the students are also identified by that help them in planning lectures for them as well.

Achievement tests are a means to ensure the quality and development of student evaluation systems and university education, improve the quality of its outputs, and improve the university and move it from its current state to a better state (Grützmacher et al., 2025). It is also a necessity for every faculty member to achieve the university's goals, foremost of which is to reach an advanced education that is competitive with the labor market.

The study of Mohamed Sherif Abdel Salam (2019) indicated that measurement and evaluation skills are the most important skills that a faculty member should possess. An appropriate attention should be given within the educational preparation programs of faculty preparation institutions, and the skills of building achievement tests for students and faculty members should be diagnosed and analyzed from their point of view.

Several studies have aimed to take note of the most important qualities and steps of designing a good achievement test, which constitute the first and last concern of the teacher in evaluating the achievements of students (Ali et al., 2024). The most important characteristics of a good achievement test (validity, reliability, objectivity, comprehensiveness, discrimination) and the role it plays in the success of the evaluation process, and the study also emphasized the teacher's respect for the most important steps of building the achievement test to be honest (Susilawati et al., 2022).

The study of Husain Elsayed (2024) aimed to measure the effectiveness of the programs of the Student Measurement and Evaluation Center in developing achievement tests. The study identified difficulties and developing proposals that face the effectiveness of the programs, to reach a proposed plan. The extent to which the university professor possesses the cognitive competencies helps to prepare the achievement test. The results concluded that the degree of the university professor's possession of the cognitive competencies to prepare the tests according to the opinions of the students was average, and this shows the superficiality of the university professor's evaluation process (Ogunsanmi, Lijofi, & Gbolagun, 2025). This also showed lack of mastery of the skills of preparing, directing, applying and correcting tests, and accordingly, the university professor needs training methods to develop his competence in building tests.

2.3. Evaluation Process

The evaluation process is an essential element in the educational process, due to its effective role in its development and progress. The evaluation process has a strong base of data and information that helps to make many sound decisions related to the student and educational programs (Ifeoma, 2022). Therefore, the evaluation process is an integral part of the educational process, directing, reinforcing and correcting its course. It also helps in immersing the student in scientific knowledge, skills, and habits of mind, so that they practice science, research, investigation, solve creative problems, and think scientifically (Biswal & Behera, 2023). Hence, universities in general seek to achieve the targeted educational outcomes and achieve their goals set by the higher education policy in the country. Based on sound educational goals, faculty members in universities must be keen to measure and evaluate the educational outcomes of their students with the appropriate scientific methods according to modern trends in measurement and evaluation and seek to provide and train them in the various methods of evaluation (Noor, Tahir, & Zahra, 2024).

The model of assessment which is being used by the educational institutions is based on memorizing the content and getting passing grades (Jabali, Hamamra, & Ayyoub, 2024). Whereas, priority of assessment system must be development of certain skills that are required for certain subjects. Furthermore, studies mentioned that national assessment system of certain countries do not measure the gradings of the students. Presently, main focus is on assessment of students without understanding main purpose of assessment. Past studies mentioned that there is need to integrate assessment system being used by educational systems into pedagogy in order to improve learning outcome and involvement of students (Albeladi, 2022).

The faculty member is considered the link between knowledge and the student, which obliges him to be able to perform his tasks. The faculty must be able to plan and implement the educational process very well to evaluate students' results. The evaluation allows him to reveal the level of learners in a correct way, and to show a clear picture of the validity of the measures he has taken to reach planned educational outcomes, giving an honest reflection of educational goals (Jabeen, Saeed, & Kumari, 2024). Therefore, education and assessment activities should be designed and built in a way that appears challenging for the students. This will motivate them towards STEM-based study and encourage them to follow the behavior of STEM scientists by following the scientific method of thinking and practicing, rather than only directing (Bajuri et al., 2021).

There us need to set certain foundations and principles so the STEM based evaluation can achieve its objectives and goals effectively (AlAli, Alsoud, & Athamneh, 2023). Integration of subjects is one of such principles, that is important to adopt STEM approach. The assessment process is an integral part of the STEM teaching and learning process that guides, reinforces and corrects its course, and as the STEM approach focuses on direct practical application, linking education to life, and immersing students in scientific knowledge, skills, and habits of mind, so that they practice science, research, investigation, and creative problem solving (Hassan, 2021).

The results of Durrani and Kataeva (2025) study revealed that the level of teaching performance of female science teachers in the middle school considering STEM education was average in the field of learning evaluation of STEM education. The study of Jamaluddin et al. (2023) indicated that the degree of availability of teaching competencies among female mathematics teachers in the field of assessment was

moderate considering the STEM integration approach. Khalil et al. (2023) confirmed the impact of STEM in the development of creative thinking. Studies also showed the impact of using the STEM approach on the development of conceptual comprehension and creative thinking. Tashtoush et al. (2024) also indicated the impact of teaching mathematics using the STEM approach on academic achievement and thinking skills.

3. Research Methodology and Procedures

To achieve the desired objectives of this study, the data were collected from the sample members by preparing a questionnaire. To confirm the level of faculty members' possession of the skills to build a good achievement test according to the (STEM) system, a form of (26) a Phrases was developed and distributed over two dimensions. The first dimension is the level of faculty members' possession of the skills of building a good achievement test, and the second dimension is the level of faculty members' possession of the skills of building a good achievement test according to the (STEM) system. The paragraphs of the scale were listed on a five-point scale.

The questionnaire has been designed in the light of the theoretical literature and previous studies on the skills of building the achievement test with good standards. Later, the statements were developed it according to the foundations and standards of the STEM system. These studies dealt with STEM education in terms of its concept, philosophy, importance, goals, principles, foundations, standards, strategies, evaluation methods, educational activities, and learning and teaching resources.

The study population consisted of faculty members at King Faisal University in Al-Ahsa, Saudi Arabia. In order to collect data from the respondents of study, we adopted simple random sampling. The data was gathered from six different faculties of university namely science, engineering, computer science, pharmacy, veterinary medicine, agricultural sciences and food. Total sample size was 288 respondents, and 48 faculty members were approached from each faculty of university.

This study used the different statistical indicators through the Statistical Software Package (SPSS) for the analysis of the data. The indicators included arithmetic mean and standard deviation, Pearson correlation coefficient, Cronbach's alpha coefficient of stability, simple linear regression analysis, and the level of response on the questionnaire Phrases and their axes were classified into 3 levels as follows:

High	Medium	Low
3.67 – 5.00	2.34 – 3.66	1- 2.33

3.1. Validity and Reliability of the Study Tool

4. Results

4.1. Internal Consistency of the Tool

The Pearson correlation coefficient was extracted between the score of each paragraph with the score of its field. Later the final score of the tool as a whole was used, by applying the scale to a survey sample of (30) teachers, which led to the paragraphs remaining with statistically significant construct validity as shown in Table (1).

Table 1: Correlation Coefficients between the Score of the Phrases and the Total Score of the Axis to which it Belongs and the Total Score of The Instrument.

Phrases	Domain		The Scale as a whole	
	Correlation Coefficient	Sig	Correlation Coefficient	Sig
Skills for Building a Good Achievement Test				
The test motivates the student to study and stimulates their motivation to learn.	.720**	.000	.493**	.000
The test achieves comprehensiveness and balance in the relative importance of behavioral objectives and content through the construction of a specification table.	.634**	.000	.534**	.000
The test includes the components of the content elements (cognitive, skillful, and value).	.767**	.000	.472**	.000
The test measures the aspects it is designed to measure.	.625**	.000	.511**	.000
The test takes into account the individual differences between students.	.609**	.000	.481**	.000
Clarity of the wording of the test paragraphs, free of scientific and spelling errors, and the relevance of the questions to the content and their suitability for the application.	.672**	.000	.582**	.000
The test instructions, grading, and answering methods are clear and exemplary.	.569**	.000	.404**	.000
Easy to correct the test and easy to interpret students' scores on the test.	.578**	.000	.422**	.000
The test contains lower and higher thinking skills.	.621**	.000	.459**	.000
Avoid subjectivity in test and debug mode.	.607**	.000	.574**	.000
Analyze the test questions, find the coefficient of ease, difficulty, and discrimination, and find the effectiveness of camouflage statements.	.762**	.000	.656**	.000
The results of the achievement tests are used to develop advising and academic programs that develop students' performance and develop their skills	.571**	.000	.468**	.000
The student feels the fairness of the score he obtained in the test.	.527**	.000	.437**	.000
Skills for Building a Good Achievement Test in Light of the STEM System				
Plan to design and build the achievement test in terms of content analysis, behavioral goal sorting, formulation, correction, and analysis and interpretation of its results.	.512**	.000	.384**	.018
In the achievement tests, I focus on stimulating ideas and solutions and developing research skills.	.544**	.000	.433**	.009
In the achievement tests, I am keen on investigative and exploratory enrichment activities.	.632**	.000	.532**	.000
In the achievement tests, I focus on puzzling questions and real-world problems that challenge the student's thinking and stimulate his motivation towards learning.	.578**	.000	.555**	.000
In the achievement tests, I pay attention to questions that develop the student's creative thinking.	.687**	.000	.629**	.000
In the achievement tests, I am keen to create an educational environment that is conducive to research, inquiry, active learning, problem solving, and projects.	.648**	.000	.587**	.000
In my achievement tests, I focus on developing relationships between math, science, engineering, and technology.	.712**	.000	.615**	.000
Be fair and impartial when writing, correcting and analyzing achievement tests.	.697**	.000	.659**	.000
Analyze students' results in scientific and studied ways to provide a clear and comprehensive picture of students' performance in detail and analytically.	.564**	.000	.404**	.000
Through the analysis of the test results, I focus on the need to make informed decisions to improve the curriculum and teaching methods, and to ensure that students are provided with an outstanding and impactful learning experience	.651**	.000	.607**	.000
Use various assessment methods (True and False, Multiple Choice, Conformity Test, Completion Test, Essay Test, Oral Test)	.694**	.000	.649**	.000
Identify the strengths and weaknesses of each student by analyzing the results of the test, and provide him with the necessary support to develop his skills, achieve his future goals, and chart the right path for his academic life.	.525**	.000	.401**	.000
Promote the use of achievement tests in developing and improving the quality of education and guiding the educational process towards achieving the best desired results	.544**	.000	.395**	.013
* Significant at the 0.05 level, ** Significant at the 0.01 level				

According to the results shown in Table (1), all correlation coefficients between the phrases and their domains and between the phrases and the scale as a whole were statistically significant at the level of (0.01).

4.1. Reliability of the Study Tool

To calculate the stability coefficient, the reliability coefficient was calculated for both the total score and the sub-axes as shown in Table (2).

Table 2: Reliability Coefficients for the Scale as a whole and Subdomains.

Domain	Number of Phrases	Cronbach's Alpha
Skills for Building a Good Achievement Test	13	0.74
Skills for Building a Good Achievement Test in Light of the STEM System	13	0.76
The scale as a whole	26	0.81

Table (2) shows that the overall Reliability coefficient of the scale as a whole was (0.81), which is a high stability value. Moreover, the Reliability coefficients for the domains ranged between (0.74 - 0.76). The scale is described as acceptable when the values of Cronbach Alpha are greater than (0.6) (Malhorta, Birks, & Wills, 2006).

Tables (3 and 4) show the high degrees of Validity and Reliability of all the phrases of the variables of the survey list, which is considered an important reference to trust them and distribute them to the study sample to achieve their objectives and test their questions.

To Answer the First Question: What is the level of faculty members' possession of the skills to build an achievement test that meets the criteria (Validity, Reliability, objectivity, discrimination, fairness, and comprehensiveness).

To answer this question, arithmetic averages and standard deviations of the level of faculty members' possession of the skills of building a good achievement test (Validity, Reliability, objectivity, discrimination, fairness, and comprehensiveness are met) were calculated. Table (3) shows this.

Table 3: Arithmetic Averages and Standard Deviations of the Level of Faculty Members' Acquisition of Skills to Build a Good Achievement Test.

Phrases	Arithmetic Standard		Coefficient of Variation	Percentage of Impressions	Satisfaction Level
	Mean	Deviation			
The test motivates the student to study and stimulates their motivation to learn.	4.04	0.52	13%	87%	High
The test achieves comprehensiveness and balance in the relative importance of behavioral objectives and content through the construction of a specification table.	3.87	0.75	19%	81%	High
The test includes the components of the content elements (cognitive, skillful, and value).	3.97	0.62	16%	84%	High
The test measures the aspects it is designed to measure.	3.12	0.89	29%	71%	Medium
The test takes into account the individual differences between students.	3.46	0.63	18%	82%	Medium
Clarity of the wording of the test paragraphs, free of scientific and spelling errors, and the relevance of the questions to the content and their suitability for the application.	4.19	0.55	13%	87%	High
The test instructions, grading, and answering methods are clear and exemplary.	3.21	0.79	25%	75%	Medium
Easy to correct the test and easy to interpret students' scores on the test.	4.25	0.67	16%	84%	High
The test contains lower and higher thinking skills.	4.31	0.70	16%	84%	High
Avoid subjectivity in test and debug mode.	4.23	0.57	13%	87%	High
Analyze the test questions, find the coefficient of ease, difficulty, and discrimination, and find the effectiveness of camouflage statements.	3.03	0.89	29%	71%	Medium
The results of the achievement tests are used to develop advising and academic programs that develop students' performance and develop their skills	3.47	0.84	24%	76%	Medium
The student feels the fairness of the score he obtained in the test.	3.86	0.61	16%	84%	High
Total	3.77	0.92	23%	77%	High

By extrapolating the meanings of the numbers from table (3), it is clear that the

majority of the sample phrases have a high degree of skills to build an achievement test in which the criteria (validity, reliability, objectivity, discrimination, fairness and comprehensiveness) are met. The average sample reached (3.77) with a high level of satisfaction and a coefficient of difference (0.23), which is a weak degree of dispersion. This indicates that there is a great homogeneity between the opinions of the faculty members and their tendency to agree (77%). In detail, the results showed that the phrases obtained an average higher than (4.00). The phrases achieves the test comprehensiveness, balance for the relative importance of behavioral goals and content by building the penultimate specification table in terms of average Arithmetic.

To Answer the Second Question: What is the level of faculty members' possession of the skills to build an achievement test in the light of the (STEM) system?

To answer this question, the arithmetic averages and standard deviations of the level of faculty members' possession of the skills of building an achievement test in the light of the (STEM) system were calculated. Table (4) shows this.

Table 4: Mathematical Averages and Standard Deviations of the Level of Faculty Members' Acquisition of Skills to Build an Achievement Test in the Light of the (STEM) System.

Phrases	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Impression Percentage	Satisfaction Level
Plan to design and build the achievement test in terms of content analysis, behavioral goal sorting, formulation, correction, and analysis and interpretation of its results.	3.39	0.62	21%	79%	Medium
In the achievement tests, I focus on stimulating ideas and solutions and developing research skills.	3.10	0.71	18%	82%	Medium
In the achievement tests, I am keen on investigative and exploratory enrichment activities.	3.06	0.72	22%	78%	Medium
In the achievement tests, I focus on puzzling questions and real-world problems that challenge the student's thinking and stimulate his motivation towards learning.	3.25	0.75	18%	82%	Medium
In the achievement tests, I pay attention to questions that develop the student's creative thinking.	3.72	0.78	14%	86%	High
In the achievement tests, I am keen to create an educational environment that is conducive to research, inquiry, active learning, problem solving, and projects.	3.83	0.85	15%	85%	High
In my achievement tests, I focus on developing relationships between math, science, engineering, and technology.	3.55	0.86	16%	84%	Medium
Be fair and impartial when writing, correcting and analyzing achievement tests.	3.11	0.87	21%	79%	Medium
Analyze students' results in scientific and studied ways to provide a clear and comprehensive picture of students' performance in detail and analytically.	3.39	0.62	21%	86%	Medium
Through the analysis of the test results, I focus on the need to make informed decisions to improve the curriculum and teaching methods, and to ensure that students are provided with an outstanding and impactful learning experience	3.10	0.71	18%	80%	Medium
Use various assessment methods (True and False, Multiple Choice, Conformity Test, Completion Test, Essay Test, Oral Test)	3.06	0.72	22%	85%	Medium
Identify the strengths and weaknesses of each student by analyzing the results of the test, and provide him with the necessary support to develop his skills, achieve his future goals, and chart the right path for his academic life.	3.25	0.75	18%	83%	Medium
Promote the use of achievement tests in developing and improving the quality of education and guiding the educational process towards achieving the best desired results.	3.72	0.78	14%	84%	High
Total	3.35	0.85	25%	75%	Medium

By extrapolating the meanings of the numbers from table (4), it is clear that the majority of the sample vocabulary has an average degree of skills in building an achievement test

in the light of the (STEM) system. The average sample reached (3.35) and a coefficient of difference (0.25), which is a weak degree of dispersion. It indicates that there is a great homogeneity between the opinions of the faculty members and their tendency to agree (75%). In detail, the results showed that the paragraphs, I am keen in the achievement tests to create an educational environment that helps research, investigation, active learning, problem solving and projects, I pay attention to the questions that develop the student's creative thinking in the achievement tests, I get a high level of satisfaction but with an average of less than (4.00). Whereas the rest of the paragraphs came with a moderate level of satisfaction and less than average (3.67). On the other hand, the paragraph, I am keen in the achievement tests on the investigative and exploratory enrichment activities in the last place with an average of (3.06).

To Answer the Third Question: What is the impact of building an achievement test skills that meet the criteria (validity, reliability, objectivity, discrimination, fairness, and inclusiveness) in building an achievement test in the light of the (STEM) system?

To answer this question, a simple linear regression was calculated to predict the construction of an achievement test in the light of the (STEM) system through the skills of building a good achievement test, as shown in the following table (5).

Table 5: Results of Simple Linear Regression Analysis to Predict the Construction of an Achievement Test in the Light of the (STEM) System by Building an Achievement Test in which the Good Test Criteria Are Met.

Variable	R	R ²	Adjusted R ²	β_i	Regression Constant	F. test		T. test	Sig
						Value	Sig		
Quality of achievement tests	0.79	0.62	0.616	0.83	0.913	460.603	0.000	4.449	.000

regression line equation, $Y' = 0.69 + 0.83X$

Table (5) shows the following:

- The correlation coefficient (R) between the skills of building an achievement test that meets the criteria (validity, reliability, objectivity, discrimination, fairness and comprehensiveness) and building an achievement test in the light of the (STEM) system reached (.79). It is statistically significant at the significance level of (0.000), and expresses a moderate and positive relationship between them.

- The coefficient of determination (R²) indicates that the skills of building a good achievement test that meets the criteria (validity, reliability, objectivity, discrimination, fairness and inclusiveness) explains (62%) of the variation in building an achievement test in the light of the (STEM) system, and this percentage indicates a practical significance of building an achievement test in the light of the (STEM) system that is relied on to predict the construction of an achievement test in the light of the (STEM) system.

Therefore, faculty members who have the skills to build a good achievement test have the ability to build an achievement test in the light of the (STEM) system. The construction of an achievement test in the light of the (STEM) system is affected by (0.83) if the skills of building a good achievement test change by one unit, as is evident through the regression line equation ($Y = 0.69 + 0.83X$).

It is noted that the results of the (ANOVA) analysis of the regression significance test are statistically significant and the value of ($F = 460.603$). Therefore there is a relationship between the dependent variable (building an achievement test in the light of the (STEM) system) and the independent variable (skills of building an achievement test

in which the criteria of a good test are met). The independent variable (skills of building an achievement test that meets the criteria for a good test) has a statistical significance as shown by the value of ($T=4.449$). We can see from the regression equation that if the skills of building a good achievement test change one unit, the performance in building an achievement test in the light of the (STEM) system will change by (0.83).

- To enhance confidence in the previous results, the scatter plot and the regression line equation (as mentioned in figure 1) were drawn for the skills of building a good achievement test and its impact on building an achievement test in the light of the (STEM) system.

Figure 1: Scatter Plot and Regression Line Equation for Faculty Members in the Skill of Constructing a Good Achievement Test and Constructing a Test According to the (STEM) System.



5. Discussion

The results of the study showed that the performance of achievement tests largely depends on the range of skills possessed by the faculty member, and these skills are acquired over time rather than being innate abilities. Every faculty member has the potential to practice, refine, and eventually master these skills. A faculty member who develops the ability to analyze course content, accurately identify the required aspects of learning in terms of knowledge, skills, and values, and formulate behavioral objectives in light of those requirements, while also constructing a detailed table of specifications that achieves balance between the proportion of behavioral objectives and the various topics of the course, is far more capable of designing achievement tests that are characterized by objectivity, comprehensiveness, validity, and reliability. Possession of these professional skills not only enables the faculty member to build achievement tests in a successful and correct manner, but also ensures that with

continuous practice and the accumulation of professional experience, the individual becomes increasingly competent and excels in the process of test construction.

The results of the study further demonstrated that a faculty member who is proficient in the subject matter, fully aware of the intended learning outcomes of the course and program, and has a deep understanding of learner characteristics and their ability levels, can significantly enhance the quality of achievement test design. In addition, understanding the principles and techniques of test construction, knowledge of different forms of achievement tests, and the ability to analyze the results of tests in terms of the distribution of question difficulty, the extent of student responses, the identification of the most frequently answered questions, and the recognition of those questions left unanswered, collectively contribute to the effectiveness of assessment. When a faculty member is equipped with such expertise, he or she gains the ability to construct tests that are distinguished by objectivity, comprehensiveness, validity, and reliability, ensuring the fairness and accuracy of the evaluation process.

The study also revealed that there is a strong and positive influence of the faculty member who possesses advanced test-building skills in constructing assessments that align with the (STEM) approach. Such assessments are distinguished by their capacity to stimulate new ideas, encourage the generation of innovative solutions, and promote the development of research and inquiry-based skills. They also focus on the enrichment of activities and the use of real-world problems that challenge the thinking of students. This approach fosters creative thinking, cultivates an environment of research and discovery, and supports active learning, problem solving, and project-based activities. These features ultimately contribute to the preparation of students who can serve as creative, innovative, and productive minds, capable of keeping pace with scientific and technological progress. Moreover, STEM-based assessments aim to graduate generations that are prepared to meet the evolving requirements of a changing labor market. By adopting innovative methods of test construction that positively influence the learning process, faculty members are able to create a teaching and learning environment that supports enjoyment, engagement, and integrative learning experiences. These experiences, in turn, empower learners to develop their knowledge and skills in a distinctive, effective, and interactive way that reflects a more dynamic and enjoyable teaching style.

In light of these findings, it becomes clear that significant attention must be directed toward the continuous development of faculty members' skills and competencies. Such development is necessary to enable them to carry out their educational responsibilities in an effective and comprehensive manner, particularly in the area of designing and preparing diverse, reliable, and innovative assessment tools that serve both the learning objectives of the course and the broader goals of higher education.

5.1. Limitations and Future Recommendations

In terms of limitations of the study, the data of the study was gathered from six faculties of King Fahad University. It is recommended to add other universities in future. Moreover, this study used five-point Likert scale format to collect response from the faculty members of university. It is recommended to use seven-point Likert scale in similar future studies to collect the response. Moreover, the collected data was analyzed using SPSS in the present study. It is recommended that future studies may use advanced versions of SPSS like PROCESS MACROS for the analysis of similar data.

5.2. Managerial and Theoretical Contribution

This study contributes theoretically and managerially to the body of knowledge. In terms of theoretical implications, this research highlights the importance of STEM system for the grading of the students. Moreover, findings of the study highlight the importance of skill set of the faculty members in order to develop tests by using STEM approach. From the perspective of Managerial contributions, the findings of the study provide guidance to the higher management of the universities of KSA to focus on skill set of faculty members. These findings can be used by the academicians for their future studies.

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