

Validating Visual Art Educators' Test Construction Skills at the Senior High School in the Sekyere South District of Ashanti Region, Ghana

Osei Adiyaa^{1*}, P. Osei-Poku², H. Barton Essel³

¹SDA Senior High School-Agona, Ghana; oseiadiyaa@yahoo.com/oseiadiyaa@gmail.com

²Faculty of Educational Studies, Kwame Nkrumah University of Science and Technology, Ghana; patrickoseipoku@gmail.com

³Faculty of Educational Studies, Kwame Nkrumah University of Science and Technology, Ghana; bartoness@gmail.com

*Correspondence: oseiadiyaa@yahoo.com/oseiadiyaa@gmail.com

Article History

Received: 01 August, 2022

Accepted: 18 August, 2022

Published: 27 August, 2022

Citation

Adiyaa, O., Osei-Poku, P., & Essel, H. B. (2022). Validating visual art educators' test construction skills at the senior high school in the Sekyere South District of Ashanti Region, Ghana. *Journal of Educational Science*, 1 (1), 1-8.

<https://doi.org/10.56388/edu220827>

Copyright

This is an open-access article under the terms of CC BY License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited. © 2022 The Authors.

Publisher's Note

Sci-hall press Inc. stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

1. Introduction

In ensuring quality education in Ghana, teachers, during or after teaching, and sometimes before classroom teaching, need to make decisions concerning teaching and learning. Generally, this information gathering procedure is referred to as assessment. As a measure of the quality of learning is very critical, the educational system should thus make sure performance monitoring test, criterion-referenced test, and school-based assessment and other assessment tools available at the pre-tertiary education level to measure students' abilities and as a means of monitoring their progress (Adu-Agyem and Osei-Poku, 2012). One of the methods of gathering information from students is the use of teacher-made tests. Studies have suggested that if teacher-made tests adequately prepare the learners for the summative assessment at the end of the various critical stages of learning, then teacher-made tests must be comparable on the key attributes (validity and reliability) of test quality (Parr and Bauer, 2006). Evaluating lessons helps in knowing to what extent instructional objectives have been achieved and knowing the strengths and weaknesses of individual students, enhancing students' academic performance (Osei-Poku et al., 2016).

Tests are normally administered to students after a period of instruction for certain purposes. Test construction skills is an attribute required of any teacher if teaching and learning goals are to be achieved. Unfortunately, writing quality tests (reliable and valid), is very difficult. The teacher must make sure that test items assess the most important and relevant concepts and skills taught. In addition, test items should be consistent with the instructional strategies used to help students learn and the teaching syllabus (Hogan, 2007). Alkharusi, et al, (2014), based on an exploratory study done on Muscat Teachers of Oman on their Attitudes, Competence, Knowledge, and Practices of Educational Assessment, also affirmed that teachers have low level of knowledge in educational assessment. Quansah and Amoako (2018) opined that most Ghanaian teachers had limited skills for constructing the objective and essay type tests and a negative attitude towards test construction. Onyechere (2000) found that most teachers construct poor items which failed to function as it was supposed to. Some teachers do turn to past or previously

Abstract: This study assessed visual arts teachers' test construction skills of examination questions (multiple-choice and essay) in General Knowledge in Art (GKA) at the Senior High School (SHS) in the Sekyere South District of Ashanti Region (SSDAR), Ghana. The survey design method was adopted for the study. A sample of n = 35 Visual arts/GKA teachers was selected from five public Senior High Schools. The 25-item Test Construction Skills Inventory (TCSI) and 32-item Attitude of Teachers towards Test Construction (ATC) questionnaire with internal consistency reliability coefficient of $\alpha = 0.73$ and $\alpha = 0.85$ respectively were used in the study for the data collection on test construction skills. GKA teachers' knowledge of test construction skills was established through Chi-square. As the calculated chi-square test ($X^2 = 106.10$) exceeds the critical chi-squared value ($X^2 = 14.067$), the data showed that a significant difference exists between the expected and observed GKA teachers' knowledge on test construction skills indicating the observed values do not have a "good-fit" with the expected values. The level of GKA teachers' knowledge of test construction skills was, therefore, can be described as limited. The study recommended that conferences/workshops on test construction should be organised to improve teachers' ability on test construction and proper evaluation routine by regional and district directorate to ensure quality GKA test construction.

Keywords: assessment; test construction skills; teachers' ability; general knowledge in Art

made questions by others to gather information about their students' learning as they accept themselves, not being conversant with test construction skills (Onyechere, 2000).

General Knowledge in Art (GKA) is described by the Curriculum Research and Development Division (CRDD-2010) of Ghana Education Service (G.E.S) as a subject consisting of Art History, Appreciation and General Art concepts that provide broad-based abilities in the theory and practice of Art. The CRDD of G.E.S provides syllabi for different subjects, and for that matter GKA Syllabus. It is required by the syllabus that GKA teachers ensure that the objectives of each topic of a subject are well met and hence, the areas become testable. The CRDD also produces syllabuses in order to make them clear the areas to be tested. The syllabuses provide objectives to be achieved, as well as the expected timeline for the coverage of specific content in the form of topics. As an elective subject for visual art students in Ghana, GKA consists of both theory and practical topics.

Opoku-Asare et al. (2014) opined that GKA teachers are not sensitive to learning difficulties and testing mechanisms that use the natural inclinations and intelligence of students to help them recognize their academic strengths and weaknesses. It is therefore assumed that GKA teachers are not conscious of testing practices as suggested by Quansah et. al (2018) that teachers do not follow the basic prescribed principles of test construction in their classroom achievement tests.

The construction of test items (multiple-choice or essay) requires principles to be followed in order to come out with reasonable test items. Do GKA teachers follow these guidelines? Thus, what we find is the usual practice of teachers leafing through pages of notes or textbooks and WASSCE past questions and set questions as they come to mind (Onyechere, 2000).

This study, therefore, sought to assess GKA teachers' knowledge of test construction skills in the Sekyere South District of Ashanti Region (SSDAR) of Ghana.

2. Literature Review

2.1 Teachers' Tests Construction Skills

Reliable and valid tests require enough and extensive planning to ensure that the instructional objectives, the teaching strategy to be employed, the textual material, and the evaluative procedures are all related. Test construction skills ensures that a teacher design test with accuracy, suitable diction, without ambiguity and use of require grading scale, and teachers are not supposed to be educational measurement and evaluation expert to design a good test, but require a basic test construction competency to design a satisfactory test (Silker, 2003). Amedahe, (1989) as cited by Oduru (2008), explains that the basic principles for the construction of teacher-made tests have been developed over the years by a number of educational measurement experts. Tamakloe et al. (1996) and Etsey (2004), came out with eight steps for constructing multiple-choice and essay questions. These steps are The steps are: (a) Define the purpose of the test; (b) Establish the item format to use; (c) Establish what is to be tested; (d) Write the individual items; (e) Review the items; (f) Prepare the scoring key; (g) Write directions; and (h) Evaluate the test.

In a review of empirical studies, Agu et. al (2013) opined achievement tests have been criticized over the years for lack of proper psychometric properties of a test. These views bother on teachers' possession or non-possession of competencies in test construction skills. This study developed and validated a Test Construction Skill Inventory (TCSI) for assessing the secondary school teachers' competencies in constructing classroom-based tests. Factor analysis was done on the 30- item instrument developed by the researchers. 25 items were found to be factorial valid.

Quansah et.al, (2019) carried out an investigation in Cape Coast Metropolis Senior High Schools (SHSs) in the Central region of Ghana on teachers' test construction skills. The researchers employed a qualitative document analysis on samples of End-of-Term Examination papers in Integrated Science, Core Mathematics and Social Studies selected from three SHS in the Cape Coast Metropolis randomly. The results showed that the teachers have inadequate abilities in construction of test construction of end-of-term examination. This came to light as teachers were found to be having problems with reliability of test, content representativeness and relevance of test and fairness in the test which were examined. The researcher suggested that heads of SHSs should engage appropriate resource persons to organize workshops on testing practices for teachers on regular bases.

Quansah and Amoako (2018) explores the attitude of teachers towards test construction. The instrument was developed based on literature as well as personal experiences of the researchers. The developed instrument named "Attitude towards Test Construction (ATC) Scale" was administered to 432 Senior High School teachers in the Cape Coast Metropolis. Through an exploratory factor analysis, four dimensions were obtained which include: planning, item construction, item review and assembling. A confirmatory factor analysis was then conducted to examine the factor loadings of the items. After critical evaluation, the items on the instrument remained 32 which was on a four-point Likert scale. Analysis carried out on the data collected with the designed instrument revealed overall poor test construction skills by teachers. It is recommended that Ghana Education Service (GES) together with head teachers ensure productive oversight of test construction by teachers.

Cobbinah (2016), conducted research on Items' sequencing on difficulty level and students' achievement in mathematics tests in the Central Region of Ghana. After the findings, the researcher suggested that teachers and examination officers should be educated on the psychometric properties of tests and the effect it has on item ordering. Hence psychometric properties of the test and its sequencing are ignored by teachers.

Anhwere (2009), investigate whether tutors in the teacher training colleges of Ghana follow the basic laid down principles of testing practices, especially, test construction, administration and scoring of classroom or teacher made tests in the teacher training colleges now college of education. The study showed that teacher training college tutors did not follow the basic

principles of testing in the construction of teacher-made or classroom tests, and that they perceived the management of assessment practices in the colleges as an extra load to their teaching activities.

Finding of Quaigrain (1992) was that while some teachers reviewed their essay-type tests items, others did not review them. He also found that most of the teachers did not indicate the score points which each item attracted on the question paper to guide students. Lastly on test construction, Quaigrain (1992) found out that most of the teachers prepared their marking scheme after the examination while few prepared their marking scheme before the test was taken. These findings of Quaigrain generally support the first finding of Amedahe that to a great extent, the teachers in the study did not follow the basic prescribed principles of classroom test construction.

It is against this backdrop that this study sought to assess the knowledge of GKA teachers on test construction skills.

2.2 Assessment and Visual Arts Education

Developing assessment criteria for visual arts and for that matter GKA is a very difficult task. This is because expression, personal development, creativity, imagination, and originality, are difficult to measure. Thus, assessment in visual arts education is multidimensional (Amsami et al., 2015). This has influenced many art education writers calling for a variety of assessment strategies for visual arts that examine both product and process. Thus, performance and authentic assessments are involved in visual arts. Performance tasks allow students to delve into their prior knowledge and apply what has been learned to real world situations (Jackson and Davis, 2000). An authentic visual arts assessment consists of a performance task (a painting, sculpture or other artwork) with an accompanying constructed-response (essay questions) in which the student could explain the work, and selected-responses items (multiple choice questions) that question a student's additional understandings about process, content, or composition, (Gollan et al., 2016).

The forms of assessment in the GKA syllabus are, School Based Assessment-SBA (objective-type paper and structured questions/Essay) and Practical paper. These assessments are exactly in line with performance and authentic assessments. For the purpose of this study multiple-choice and essay questions are considered. To ensure quality in the examination question set by GKA teachers, the syllabus recommended that examination questions should be in line with the rationale of the GKA syllabus (to broaden the student's scope of vocabulary and to equip him/her with the requisite communication skills that would enable him/her to talk knowledgeably in the subject) and image-based test that evoke a strong level of visual literacy should be inculcated in examination questions set by teachers.

3. Methodology

3.1 Study Design and Participants

Quantitative research design which involves cross-sectional survey was used to answer the research question and Chi-square was employed to test the hypothesis of study. These were done to determine the level of knowledge exhibited by GKA teachers during tests (multiple choice and essay questions). 35 teachers of GKA were sampled based on purposive sampling technique participated in the research.

3.2 Measures

The TCSI and ATC questionnaires with internal consistency reliability coefficient of $\alpha = 0.73$ and $\alpha = 0.85$ respectively are the foundation of this research. The internal consistency reliability coefficient of the two questionnaires imply they are enough to ensure reliable responses as indicated by Pallant (2010) that a reliability coefficient (alpha) of 0.70 or higher is suitable for research. Details of the questionnaires are shown in Table 1 and Table 2 which are extracted from Quansah and Amoako (2018). and Agu et al. (2013) respectively.

Table 1. Attitude of Teachers towards Test Construction (ATC) (from Quansah and Amoako, 2018).

No.	Items	SA	A	D	SD
1.	To be honest, it is a waste of time trying to outline the purpose of a test when planning for the test.				
2.	I just need my textbook to start writing test items.				
3.	I mostly do not prefer using test specification table in crafting questions				
4.	I prefer to finish crafting the test before considering the thinking skills those items measure.				
5.	Since I am the classroom teacher, I do not need to specify the content area I want to test.				
6.	Planning a test is needless if I am the teacher.				
7.	I prefer writing items based on what learners are expected to know whether taught or not.				
8.	As a teacher there is nothing wrong with crafting items without considering the learning objectives.				
9.	I prefer the item format of a classroom test to be decided by the learners.				
10.	It is not possible to always craft new questions for learners.				
11.	Crafted items do not necessarily have to match learning objectives.				
12.	I like to write tricky questions to test my students' understanding.				
13.	Arranging the options to multiple-choice items alphabetically is not compulsory.				
14.	I always refer to the test specification table when constructing items.				
15.	I like to always write items with the same difficulty level.				

Table 1. Continued.

No.	Items	SA	A	D	SD
16.	There is the need to take items verbatim from textbooks used in teaching.				
17.	I usually construct test items in a few days for the paper to be written.				
18.	It is optional to review constructed items before it is administered				
19.	Checking for the item difficulty and discrimination after the test has been constructed is not too necessary				
20.	It is essential to present more difficult items before less difficult items in assembling crafted items				
21.	It is optional to number all the items on a test				
22.	It is optional to provide clear directions for examinees on the test instrument				
23.	It is right to arrange options of test items horizontally.				
24.	It is better to rely on past questions when constructing a test				
25.	I like to prepare marking schemes after the tests have been administered.				
26.	It is necessary to check for the clarity of crafted items				
27.	I prefer preparing marking scheme two or more days after constructing the test				
28.	I always like to arrange questions into sections based on their nature or type				
29.	I select questions from topics I think students have understood.				
30.	I think the test specification table should be prepared by test experts and not the classroom teachers.				
31.	It is essential to identify behaviours to represent a construct when crafting test items.				
32.	I do not think it's necessary to craft more items than actually needed.				

Available at <https://www.researchgate.net/profile/Frank-Quansah/publication/323760629>;

Items 1,2,4,5,6,16,17, 25,27,30,31 are on Planning for test items;

Items 3,7,8,10,12,14,15,24,26,29,32 are on Item Construction;

Items 11,18,19 are on Item Review;

Items 9,13,20,21,22, 23,28 are on Assembling of items.

Table 2. Questionnaire (Test Construction Skills Inventory-TCSI) (from Agu et al., 2013).

A teacher takes the following steps in constructing tests for his/her class					
No.	Items	SA	A	D	SD
1.	Outline the content covered for the term before setting tests from them.				
2.	Prepare a test blueprint as a guide in the test construction.				
3.	Consult standard text books on the subject for guidance.				
4.	Organize test items in a logical manner.				
5.	Give clear instructions to guide the test takers.				
6.	Write tests so that both high and low achievers can understand.				
7.	Subject test items to item analysis.				
8.	Keep a resource bank of questions that can be referred to when setting tests				
9.	Set tests with due regard to the time available for testing				
10.	Add enough test items to cover all the requisite levels of cognitive domain.				
11.	Ascribe scores for each test item.				
12.	Ensure that the items are measuring the determined objectives.				
13.	Set essay items that elicit creative and imaginative answers from the students.				
14.	Prepare a marking guide while constructing the test.				
15.	Consider the age of learners during item writing.				
16.	Avoid gender stereotypes in the test items.				
17.	Add sufficient items to cover the appropriate instructional units.				
18.	Submit items for vetting to the Head of Department				
19.	Submit tests meant for promotional examinations for expert editing on time.				
20.	Number diagrams in tests clearly.				
21.	Avoid the use of interlocking items.				
22.	Avoid items that measure opinions.				
23.	Limit essay tests to high level objectives.				
24.	Avoid overlapping alternatives in writing objective tests.				
25.	Avoid too long questions or phrases in item writing				

Available at https://academicjournals.org/article/article1379700583_Agu%20et%20al.pdf;

Items 5,6,11,16,25 are on Language use of the test item

Items 1,7,10,12,13,14,17,23 are on Content coverage of the test

Items 4,9,20,21,24 are on Item organization

Items 2,3,8,15,18,19,22 are on Test guidance

The TCSI was developed for examining the secondary school teachers' skills in constructing classroom-based tests. 30-item instruments developed by the researchers were passed through factor analysis which resulted in 25 items that were realised to be factorially legitimate. During its validation, the secondary school teachers accepted almost all the 25 items as important skills for quality classroom-based test construction. The instrument – Test Construction Skill Inventory (TCSI) – was advanced and evaluated from review of literature and survey instruments. The principal component extracted only five constructs, out of which only four factors had items substantially loaded on them. This indicates that the instrument accepts four factors (language use, content coverage, item organization and test guidance) as valid for measurement of teachers' test construction skill. All the items in Test Construction Skill Inventory (TCSI) are positive worded statements hence scored as strongly agree (SA) 4-point, agree(A) 3-point, disagree(D) 2-point and strongly disagree(SD) 1-point.

In order to ensure the validity of the ATC instrument, the developers allowed it to be reviewed by experts in the Measurement and Evaluation field to validate the instrument. This was done in line with the assertion that content and construct validity is established by expert judgement (Anim, 2005). Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were employed by the researchers to indicate the suitability of the items for factor analysis using data collected from 432 teachers in selected SHS in the Cape Coast Metropolis in the four core subjects (Mathematics, integrated science, English and social studies). The results showed both Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were not violated. With the Principal Component Analysis Method, an exploratory factor analysis was, then, carried out to establish the factors involved in the scale. The factors were established by scree plot which were four. using Minimum Likelihood Method was additionally carried out to investigate the factor loadings of each item to depict a confirmatory analysis. Four factors were named as: planning, item construction, item review and item assembling because of the confirmatory factors analysis. The reliability of the instrument was estimated using Cronbach's Alpha Reliability Method. The Attitude towards Test Construction (ATC) scale has both positive and negative items/questions of which responses are measured on a 4-point scale.

3.3 Procedure

The respondents were educated on the need to respond to the instrument. Effort was made to establish good rapport with respondents which yielded accurate responses willingly by teachers of GKA in SSDAR. Individual GKA teachers were allowed to independently respond to the instrument. The consent of individual GKA teachers was sought. In all, 25-30 minutes was given to each respondent to respond to the questionnaires.

3.4 Data analyses

The collected data from the questionnaires were entered in Excel and loaded to IBM SPSS statistics 22 to ascertain the sum for the various items answered by GKA teachers in SSDAR on test construction skills. Pearson's chi-squared test analysis was then used to assess the level of GKA teachers' knowledge on test construction skills

3.5 Ethical Consideration

Individual participants of the study were provided with sufficient information on the significance of the study and as such an informed decision was made by the participant that ensured an agreement of trust between the researcher and the participants.

4. Results

4.1 Level of GKA teachers' knowledge on test construction skills

The results are based on the research question: What is the level of GKA teachers' knowledge on test (multiple choice and essay questions) construction skills in Sekyere South District of Ashanti Region?

Table 3 consists of what was observed from GKA teachers on test construction skills and what is expected of them from the adopted TCSI and ATC questionnaire. All the items in TCSI and ATC were scored as strongly agree (SA) 4-point, agree(A) 3-point, disagree(D) 2-point and strongly disagree(SD) 1-point. What was observed from GKA teachers fell within the scoring of 1-point to 3-point and what was expected of them was scored 4-point. Therefore, what is expected of the 35 GKA teachers on each questionnaire item will be $35 \times 4 = 140$.

Table 3. Scores of TSCI and ATC.

	FACTORS	OBSERVED	EXPECTED
TCSI	Language Use	124	140
	Content Coverage	115	140
	Item Organization	105.2	140
	Test Guidance	113.57	140
ATC	Planning	91	140
	Item Construction	93	140
	Item Review	71	140
	Assembling	95.2	140
Total		808	1,120

Source: Field Study, 2020

It is released from the table that there is a mismatch between what was observed and what is expected of them. On the factors for TCSI and ATC, the 35 GKA teachers scored a total of 808 (observed) out of 1,120 (expected) based on the scoring guidelines of the questionnaires as explained above. There are none of the factors from the adopted questionnaire where teachers were able to match what is expected of them. But according to Frey (2007), any feature of a test item which does not allow the student to focus or concentrate affects the usefulness of that test item. Therefore, a limited knowledge level on test construction skills was revealed among GKA teachers of SSDAR in the study as seen from the table.

The research hypothesis was as follows: There is no significant relationship between GKA teachers' knowledge on test construction skills and what is required of them. This was tested using Pearson's chi-squared test.

4.1.1 Chi-Square Analysis of TCSI and ATC

Pearson's Chi-Squared (χ^2) is given by:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where χ^2 = the value of chi-squared or relationship,

Σ = summation sign, read "the sum of..."

O = observed values

E = expected values (Yibrah, 2017).

-The chi-square value is computed from the formula.

-Workout the degree of freedom: $df = (No. of rows - 1) (No. of columns - 1)$

- Look at the relevant P-value in the table of the χ^2 distribution, (Thorndike,1997).

Observed(O) for TSCI and ATC=808

Expected (E) for TSCI and ATC=1120

O-E=808-1120= -312

$(O-E)^2 = 97,344$

$$\chi^2 = \frac{97,344}{1120} = 86.95$$

The degrees of freedom (df) = (rows -1) (columns - 1) = (8-1) (2-1) =7.

Using a χ^2 table or calculation, it was found there is only a 5% chance that the calculated value will exceed 14.067. Comparing the test statistic and critical value.

The calculated chi-squared (χ^2) value of the above, which is 86.95. Compared to the critical value, $\chi^2_c = 14.067$ at $\alpha = 0.05$ significance level with degree of freedom (DF) =7.

4.1.2 Theoretical Implication of the Results

There is a significant difference between the expected and observed GKA teachers' knowledge on test construction skills. For this reason, the null hypothesis of this study is rejected as there is a significant difference between observed (empirical) values and the expected (theoretical) values as revealed by the calculation of chi-square. This is against what was stipulated by the National Research Council (2001) that assessments do not function in separation; but on its relationships to curriculum and instruction to ensure effectiveness in improving learning. Ideally, assessment reflects curriculum in such a way that it reinforces the best practices in instruction. GKA teachers of SSDAR do not adhere to the knowledge of test construction skills stipulated in their syllabus and in literature.

4.1.3 Practical Implication of the Results

Practically, GKA teachers' of SSDAR test construction skills do not provide an accurate informed decision on students' academic attainment as any features of a test item which does not allow the student to focus or concentrate affects the usefulness of that test item (Frey, 2007).

4.2 The relationship between observed and the expected GKA teachers' knowledge on test construction skills

4.2.1 Chi-square test

Chi-square test is not exhaustive without other measures of association such as Pearson's Contingency Coefficient, Phi Coefficient, Siegel's Contingency coefficient, Cramer's Contingency Coefficient for the strength of association for nominal categorical variables, (Kothari, 2004).

To know the strength of association between observed (empirical) GKA teachers' knowledge on test construction skills and the expected (theoretical) GKA, Cramer's V coefficient of contingency was preferred among the χ^2 based measures of association. This measure is defined as:

$$V = \sqrt{\frac{\chi^2}{n(q-1)}}$$

Where q is the smaller of the number of rows or the number of columns. The smaller of the two numbers is used to represent the variable q. If r is number of rows, and c is the number of columns, then: $q = r - 1, c - 1$

Cramer's V all the time ranges in the interval [0, 1]. If Cramer's V is close to 1, then the value indicates a strong relationship between the expected and observed variables whereas if the value of Cramer's is close to 0, then the value indicates a weak association between these variables. On the other hand, if Cramer's V is equals to 0, there is no association or strength between the two variables, and has a maximum value of 1 when there is a very strong relationship between the two variables (here preferred to say perfect relationship or strength), (Thorndike, 1997)

The contingency of the table for TSCI and ATC is 3-by-8 (3 columns –observed, expected, and calculated chi-square value and 8 rows- Language Use, Content Coverage, Item Organization, Test Guidance, Planning, Item Construction, Item Review, Assembling), $q = (c-1=3-1)=2$, which is the smaller of the matrix. The χ^2 value for TCSI and ATC result is 86.95. As a result, the strength of relationship between observed GKA teachers' knowledge on test construction skills and expected GKA teachers' knowledge on test construction skills was computed in the following way:

Applying Cramer's coefficient of contingency

where $n=1,120$ (grand sample size), $q=2$ and $\chi^2=86.95$, substituting, we get

$$V = \sqrt{\frac{\chi^2}{n(q-1)}}$$

$$\chi^2 = 86.95, n = 1120, q = 2$$

$$V = \sqrt{\frac{86.95}{1120(2-1)}}$$

$$V = \sqrt{0.0776}$$

$$V = 0.28$$

The result of Cramer's contingency coefficient value V is 0.28.

4.2.2 Theoretical Implication of the Results

According to Cramer's contingency coefficient V, two observations are said to have a perfect relationship if coefficient value is 1 and if $V > 0.5 < 1$, it indicates the presence of high or strong association or strong relationship whereas if coefficient value reads $V < 0.5 > 0$, it indicates the presence of weak association.

The obtained value of 0.28 in this case indicates the presence of a weaker relationship between observed GKA teachers' knowledge on test construction skills and expected GKA teachers' knowledge on test construction skills.

4.2.3 Practical Implication of the Results

The presence of weaker association between observed and expected GKA teachers' knowledge on test construction skills demonstrates that questions set by GKA teachers do not execute their educational performances of assessing and evaluating students (Areekkuzhiyil, 2019). It also indicates that the required expertise for constructing quality test items was missing among GKA teachers at the SHS.

5. Discussion and Conclusions

Students' achievements are reported with errors as a result of GKA teachers' limited knowledge in test construction skills in SSDAR and there is a violation of what is expected of GKA teachers concerning test construction skills as stipulated by the GKA syllabus. This was evident from the Weaker association between the observed and the expected GKA teachers' knowledge on test construction skills.

6. Recommendations

Ghana Education Service through its regional and district directorates should organize seminars/ workshops and provide in-service training for Sekyere South District GKA teachers to up-grade their knowledge in the art of testing since teaching without proper testing holds no value. Proper evaluation routine by regional and district directorate of Ghana Education Service to ensure effective supervision of GKA teachers in constructing quality tests for students. According to the GKA syllabus, decisions on students' performance are based on abilities in multiple-choice questions, essay questions and practical skills assessment. It is therefore recommended that future studies be carried out on GKA teachers' practical skills assessment (performance assessment) in order to determine GKA teachers' test construction skills and content validity of performance assessment. Quality Control is necessary for test development. Therefore, it is suggested that future research be conducted on item analysis of GKA test responses of students to establish quality control systems for GKA test development.

Author Contributions: This work was conducted in collaboration among all authors. All authors read and approved the final manuscript.

Acknowledgments: We would like to express our profound gratitude to Mr. Kwakwa Ebenenezer, Evelyn Hasford and Nhyiraba Ama Osei Agyemang for their support and encouragement.

Ethical Statement: This study has been approved by the Faculty of Educational Studies, Kwame Nkrumah University of Science and Technology.

Conflicts of Interest: The authors report of no affiliation or involvement in an organization or entity with a financial or non-financial interest in the subject matter or materials discussed in this manuscript.

References

- Adu-Agyem, J. and Osei-Poku, P. (2012). Quality Education in Ghana: The Way Forward. *International Journal of Innovative Research & Development*, Vol 1 Issue 9.
- Agu, N. N., Onyekuba, C. and Anyichie, C. A. (2013). Measuring teachers' competencies in constructing classroom-based tests in Nigerian secondary schools: Need for a test construction skill inventory. *Academic Journals*, Vol. 8, pp. 431-439, 23 April, 2013.
- Alkharusi, H., Aldhafri, S., Alnabhani, H., Alkalbani, M., (2014). Educational Assessment Profile of Teachers in the Sultanate of Oman. *International Educational Studies*, journal, Vol. 7, No. 5 (2014)
- Amsami, U., Mohammed, Y and Mazila, A. (2015). Visual art Teachers and Performance Assessment methods in Nigerian Senior Secondary Schools. *Mgbakoigba: Journal of African Studies*, Volume 4, 2015.
- Anhwere, Y. M. (2009). Assessment practices of teacher training college tutors in Ghana. Unpublished Master's thesis, University of Cape Coast, Cape Coast.
- Areekuzhiyil, Santhosh. (2019). Assessment Practices in Higher Education: Myths and Realities. *University News*, 57(11), 18-20.
- Cobbinah, A. (2016). Items' sequencing on difficulty level and students' achievement in mathematics test in Central Region of Ghana. Department of Education and Psychology, University of Cape Coast-Cape Coast, Ghana. *African Journal of interdisciplinary Studies*, Vol. 9, pp 55-62, December 2016, ISSN:0855-9724
- Curriculum Research and Development Division (CRDD) of Ghana Education Service (2010). *Visual Arts Teaching Syllabus*. Accra. Ghana Education Service.
- Etsey, Y. K. A. (2004). *Educational measurement and evaluation*. Lecture notes on EPS 203. Unpublished document, University of Cape Coast, Ghana.
- Frey BB (2007). Coming to Terms with Classroom assessment. *Journal of Academic* volume 18, number 3, spring 2007 pp 402-423.
- Gollan, C., Poole, L., C and Roeber, E. (2016). *Arts Education Assessment Specification (Visual Art)*. Michigan Assessment Consortium, Lansing, M.
- Hogan, J., Paul Barrett, and Robert Hogan (2007). Personality Measurement, Faking, and Employment Selection. *Journal of Applied Psychology* Copyright 2007 by the American Psychological Association 2007, Vol. 92, No. 5, 1270–1285 0021-9010/07/\$12.00 DOI: 10.1037/0021-9010.92.5.1270.
- Jackson, A. W., and Davis, G. A. (2000). *Turning points 2000: Educating adolescents in the 21st century*. NY: Teachers College Press.
- National Research Council. (2001). *Knowing What Students Know: The Science and Design of Educational Assessment*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10019>.
- Oduro-Okyireh G (2008). *Testing practices of senior secondary school teachers' in the Ashanti region of Ghana*. Unpublished master's thesis, University of Cape Coast, Cape Coast, Ghana.
- Onyechere, I. (2000). New face of examination malpractice among Nigerian youths. *The Guardian Newspaper* July 16.
- Opoku-Asare, Agbenatoo and Kwamena (2014). Instructional Strategies, Institutional Support and Student Achievement in General Knowledge in Art: Implications for Visual Arts Education in Ghana. *Journal of Education and Practice* ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.5, No.21, 2014.
- Osei-Poku, P., Osei-Mensah Darkwa F. and Opoku-Asare N. A. (2016). Assessment of Students' Performance in General Knowledge in Art: A Case Study of Schools at Abura-Asebu Kwamankese District. *International Journal of Educational Leadership. IJEL*, University of Education, Winneba, Volume 6, No. 1, 61-70.
- Pallant, J., (2010). *SPSS survival manual: A step by step guide to data analysis using the SPSS program*. 4th Edition, McGraw Hill, New York.
- Parr, A. M., and Bauer, W. (2006). Teacher made test reliability: a comparison of test scores and student study habits from Friday to Monday in a high school biology class in Monroe County Ohio. Masters Thesis. Graduate School of Marietta College.
- Quansah, F., Amoako, I. (2018). Attitude of Senior High School Teachers Toward Test Construction: Developing and Validating a Standardised Instrument. *Research on Humanities and Social Sciences*, ISSN 2224-5766 (Paper), Vol.8, No.1, 2018.
- Quansah, F., Amoako, I., Ankomah, F. (2019). Teachers' Test Construction Skills in Senior High Schools in Ghana. *International Journal of Assessment Tools in Education 2019*, Vol. 6, No. 1, 1–8. DOI: 10.21449/ijate.481164
- Silker RT (2003). *Teachers and tests*. London: Basil Blackwell.
- Tamakloe, E. K., Atta, E. T. & Amedahe, F. K. (1996). *Principles and methods of teaching*. Accra: Black Mask Ltd.
- Thorndike, R.L. and E.P. Hagen (1977). *Measurement and Evaluation in Psychology and Education*. (4th Ed.). New York: John Wiley and Sons.
- Westera, W. (2001). Competences in Education: a confusion of tongues. *Journal of Curriculum Studies*.
- Yibrah, M. (2017). Assessing Content Validity of the EGSEC English Examinations. *International Journal of Innovations in TESOL and Applied Linguistics* Vol. 3, No. 1; 2017 ISSN 2454-6887 Published by ASLA, Amity University, Gurgaon, India © 2017.