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COMMUNICATING ACADEMIC ACHIEVEMENT OF SCHOOLS TO STAKEHOLDERS: THE USE OF WEIGHTED AVERAGE

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ABSTRACT

This paper examined the statistical approach adopted by schools to communicate their academic achievement to stakeholders. The paper looked at the most frequently adopted method, the use of percentage scores, and discussed the limitations of its usage. The paper also explored the use of the weighted average of scores and compared it to the use of percentage scores. Data from the West Africa Examinations Council and standardised test scores from a selected high school were used for the paper's analyses and illustrations. The paper demonstrated that the weighted average of scores accounted for quality of grades obtained as well as the number of candidates presented by a school. The paper identified the use of weighted average of scores as a preferred option to percentage scores in communicating academic achievement to stakeholders. Major recommendation suggested by this paper is for the adoption of weighted average of scores to communicate academic achievement of schools to stakeholders.

Contribution/Originality: This study documents the use of weighted average of scores as the preferable means of communicating student test scores to stakeholders.

1. INTRODUCTION

Stakeholders have expectations of schools that go beyond the schools meeting just the minimum acceptable standards. The schools should provide education that will shape the character of the students to become good citizens and at the same time equip them with the requisite knowledge to contribute to the economic growth and development of the nation. Character formation and intellectual development go together. In the legitimate, moral-ethical, and social-political frames of school perspectives, Kowalski (2010) postulates that in addition to the school meeting legal standards and having a sense of moral purpose, the school must be efficient in preparing the students to pass their examinations. The reality for students is that, in the pursuit of their highest levels of academic and personal achievement, taking tests is not an option. Testing is an important part of education. It provides objective information about students' progress and a means to measure school output. Test scores have become key determinants of academic achievement of schools. They are also used to convince stakeholders, especially parents or guardians, that schools are efficient and up to the task. In addition to tests scores being used to judge performance of schools, they also are used to make important decisions about students, for example, for classification, retention, and promotion (Moses and Nanna, 2007).

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School must provide evidence to parents to show that they are meeting expectations by establishing a clear and accurate system of grading and reporting academic achievement. The reporting should enable stakeholders to gain understanding of how the test scores reflect students' achievement and progress and how the school is meeting stakeholder expectations. The medium used in communicating test scores should satisfy the condition of providing true reflection of students' achievement. Clark and Smitherman (2013) describe the results of test as a snapshot of a student's academic achievement at a certain period in time. Stakeholders should make meaning out of this snapshot.

When communicating academic achievement of schools to stakeholders using test scores, it is essential for educators to keep in mind the most pressing question stakeholders ask: what do the scores mean? The format of presentation should include vital information to address this question so that stakeholders can make meaning out of the test scores. Information communicated to stakeholders, especially, parents or guardians, is to enable them to be abreast of the academic performance of students in order to provide the necessary support to help the student progress. Suskie (2009) notes that sharing assessment results is an opportunity to tell an important story with a meaningful point.

Table-1. WAEC League Table for 2004

Pos	NAME OF SCHOOL	No. of Stds	Number of Subjects Passed									Passes in 6 to 8 Subs	% passes in 6 to 8 Subs
			8	7	6	5	4	3	2	1	0		
1	Wesley Girls High Sch	381	374	6	1							381	**100**
1	Notre Dame Sem/Sec Sch	77	31	45	1							77	**100**
1	Sefwi Bekwai Sec Sch	71	35	29	7							71	**100**
1	Kukuom Agric Sec Sch	51	14	32	5							51	**100**
1	Diaso Sec Sch	52	0	47	5							52	**100**
6	Yaa Asantewaa Sec Sch	429	404	20	4	1						428	**99.77**
7	St James Seminary	187	139	44	3	1						186	**99.47**
8	Opoku Ware Sch	491	458	26	4	1	1	1				488	**99.39**
9	St Louis Sec Sch	274	186	81	5	2						272	99.27
10	Ghana Sec Tech Sch	383	342	33	5	1	0	1	0	1		380	99.22
11	Mozano Comm Sec Sch	226	173	45	6	1	1					224	99.12
12	Holy Child Sch	222	204	13	3	2						220	99.1
13	Mfantsipim Sch	545	438	87	15	5						540	99.08
14	St. Roses' Sec Sch	273	256	9	5	2	1					270	98.9
15	Prempeh College	813	709	76	19	6	1	1	0	1		804	98.89
16	St. Monica Girls' Sec Sch	386	346	29	6	4	1					381	98.7
17	Aburi Girls' Sec Sch	323	75	230	12	5	1					317	98.14
18	St. Peter's Sec Sch	358	238	98	14	7	1					350	97.77
19	St Charles Sec Sch	81	38	33	8	1	0	0	1			79	97.53
20	Adeiso Sec Sch	87	0	79	6	1	1					85	97.7
21	Adisadel College	472	415	39	6	5	5	2				460	97.46
22	Armed Forces Sec – Kumasi	333	274	34	16	5	3	0	0	1		324	97.3
23	Achimota Sch	521	206	267	33	9	3	2	0	1		506	97.12
24	Benkum Sec Sch	347	174	125	38	9	1					337	97.12
25	Nandom Sec Sch	171	131	25	10	5						166	97.08
26	Presby Boys' Sec Sch – Legon	787	532	193	36	14	4	3	2	3		761	96.7
27	Mfantsiman Girls' Sec Sch	502	395	67	23	12	3	1	1			485	96.61
28	Archbishop Porter Girls' Sec Sch	233	152	56	17	5	1	1	0	1		225	96.57
29	Kumasi Academy	295	201	61	20	6	5	2				282	95.59
30	Namong Sec Sch	203	78	96	19	7	1	1	1			193	95.07
31	St Augustine's College	459	342	73	23	12	5	3	0	1		438	95.42

Source: WAEC, League Table of Schools, 2004

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Bobowski (2016) intimates that one of the most powerful (and often underestimated) allies of an educator, is an informed parent who understands their child's academic needs and is in a position to reinforce what happens in the classroom. She goes on to point out that a powerful partnership is created that can take learning to the next level is created between school and home when educators share test scores with parents.

Using percentage of students attaining a certain score – passing the examination - tends to be the most common means of communicating students' academic achievement to stakeholders. The use of percentage lends itself to easy computation. Raw scores are converted into percentages and these can easily be compared. Knapp (2010) observes that percentages are widely used to communicate results because irrespective of the size of the samples, various groups can be compared whether the samples sizes are equal or unequal.

In Ghana, the use of percentages to communicate the academic achievement of schools to stakeholders is pervasive. The West Africa Examination Council (WAEC), the body charged with the responsibility to conduct standardised tests for students, uses percentage of students who pass in the number of subjects taken at the examinations as basis to compare academic achievement of schools. A ranking of schools, based on percentage pass, is presented to stakeholders. For example, using the percentage of the number of students who passed in six to eight subjects, the WAEC presented a ranking of schools as depicted in Table1. Table 1 shows the top 32 schools in the ranking.

The total number of candidates presented by Wesley Girls' High School is 381. Therefore, the percentage of the candidates who obtained between 6 to 8 passes is given by:

$$\frac{\text{The number of students who obtained between 6 to 8 passes}}{\text{The total number of students presented}} \times 100\%$$

$$= \frac{381}{381} \times 100\% = 100\%$$

Similarly, for Opoku Ware Secondary School, 4 students obtained 6 passes, 26 had 7 passes and 458 with 8 passes. The total number of students who obtained between 6 to 8 passes is 488 (that is 4 + 6 + 458). The total number of candidates presented by Opoku Ware is 491. Hence, the percentage number of the candidates who obtained between 6 to 8 passes is given by:

$$\frac{488}{491} \times 100\%$$

$$= 99.39\%.$$

A similar calculation was done for all the schools to obtain the percentage number of students who obtained between 6 to 8 passes in the examinations. It is from these percentages that the schools were ranked.

1.1. Emerging Issues: Disadvantages of the Percentage Ranking Methodology

The ranking based on the percentage number of passes in 6 to 8 subjects does not give a fair representation of the performance of schools. The quality of passes is not reflected in the percentages. The grades A, B, C, D and E are lumped together in one category of a pass. The grade A, which indicates an excellent performance, should not be put in the same class as the grade E. The grades have different weights when candidates are being considered for admission into tertiary institutions.

Again, the performance of a student who obtained 6 passes is equated to that of a student who obtained 8 passes. Table 1 shows that both Wesley Girls' High School and Diaso Secondary School had 100% and are ranked 1st.

However, a look at the table reveals that no student in Diaso obtained 8 passes whereas 374 students in Wesley Girls' obtained 8 passes. It will be mind boggling to accept the view that both schools have equivalent

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performances in the year and therefore, must be ranked at the same position on the WAEC league table. The ranking does not also give a fair basis for communicating the performance of the schools. Whereas Diaso Secondary School for example was ranked 1st with no student obtaining 8 passes, Opoku Ware Secondary School which had 458 students obtaining 8 passes was ranked 8th. Thus, the percentage of students presented to the WAEC examinations by Diaso and Opoku Ware schools with 8 passes are 0% and 93% respectively.

Finally, the use of the percentage does not take into consideration the number of students presented by schools and hence gives no indication of a school's contribution to the human resource development of the nation. It stops short of giving an indication of the number of students a school produces who are capable of pursuing further education. For example, Opoku Ware, which placed 8th, produced 488 students capable of pursuing further academic studies and Kukuom Secondary School, which ranked 1st produced 51 students. This approach may inadvertently, encourage Heads of institutions to admit fewer students if the percentage ranking is accepted in the form presented in Table 1.

1.2. Implications for Practice: Weighted Average Approach for Ranking of Schools

The weighted average method of ranking the performance of schools ensures that the quality of the passes are factored into the analysis by assigning different weights to the grades scored by students. A weighted average over N items is defined as

(1/N) * SUM [w_i * f_i], where w_i represents the weight (value or significance) of a single occurrence of type i, and f_i represents the frequency of an item i.

A weight of 8 is assigned to the candidates with 8 passes, 7 to those with 7 passes and so on. Those candidates who failed in all subjects are assigned a weight of zero. The number of passes under each weight is computed with the total number of students taking the examinations in a particular school as the base.

Table 2 indicates that on a scale of 8, the weighted score for Wesley Girls High School is 7.979, while that of Opoku Ware School is 7.906 and that of St. James Seminary Secondary School is 7.717. These average weighted scores for the schools can thus communicate the academic achievement of schools devoid of the inherent analytical problems associated with the percentage approach used to rank the schools.

Table-2. Weighted average scores for schools

NAME OF SCHOOL	Total Number of Candidates Presented	Number of Subjects Passed									Average Score
		8	7	6	5	4	3	2	1	0	
Wesley Girls High School	381	98%	2%	0%	0%	0%	0%	0%	0%	0%	7.979
Yaa Asantewaa Sec Sch	429	94%	5%	1%	0%	0%	0%	0%	0%	0%	7.928
Opoku Ware Secondary Sch	491	93%	5%	1%	0%	0%	0%	0%	0%	0%	7.906
St Roses Sec Sch	273	94%	3%	2%	1%	0%	0%	0%	0%	0%	7.894
Holy Child Sec Sch	222	92%	6%	1%	1%	0%	0%	0%	0%	0%	7.887
St Monica's Sec Sch	386	90%	8%	2%	1%	0%	0%	0%	0%	0%	7.852
Ghana Sec Technical Sch	383	89%	9%	1%	0%	0%	0%	0%	0%	0%	7.849
Prempeh College	813	87%	9%	2%	1%	0%	0%	0%	0%	0%	7.818
Adisadel College	472	88%	8%	1%	1%	1%	0%	0%	0%	0%	7.797
Mfantsipim Sec Sch	545	80%	16%	3%	1%	0%	0%	0%	0%	0%	7.758
Mozano Commercial Sec Sch	226	77%	20%	3%	0%	0%	0%	0%	0%	0%	7.717
St James Seminary	187	74%	24%	2%	1%	0%	0%	0%	0%	0%	7.717
Armed Forces Sec/Tech Sch	333	82%	10%	5%	2%	1%	0%	0%	0%	0%	7.700
Mfantsiman Girls Sec Sch	502	79%	13%	5%	2%	1%	0%	0%	0%	0%	7.657
Nandom Sec Sch	171	77%	15%	6%	3%	0%	0%	0%	0%	0%	7.649
St Louis Sec Sch	274	68%	30%	2%	1%	0%	0%	0%	0%	0%	7.646
St Peter's Sec Sch	358	66%	27%	4%	2%	0%	0%	0%	0%	0%	7.578
St Augustine's College	459	75%	16%	5%	3%	1%	1%	0%	0%	0%	7.571
Accra Academy	532	76%	13%	6%	2%	2%	0%	0%	0%	0%	7.541
Presby Boys Sec Sch	787	68%	25%	5%	2%	1%	0%	0%	0%	0%	7.529
Kumasi Academy	295	68%	21%	7%	2%	2%	1%	0%	0%	0%	7.495

Source: WAEC League Table of Schools, 2004

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Table 3 presents a comparison between the ranking of the top 60 schools using both percentages and the calculation of weighted average of results.

Table-3. Top 60 Schools Ranking Using Percentages and Weighted Average Method

NAME OF SCHOOL	Weighted Average Score	Percentage Rank	Weighted Average Rank	NAME OF SCHOOL	Weighted Average Score	Percentage Rank	Weighted Average Rank
Wesley Girls High	7.98	1	*1*	TI Ahmadiyya	7.22	40	*31*
Yaa Asantewaa	7.93	6	*2*	Krobo Girls'	7.21	45	*32*
Opoku Ware	7.91	8	*3*	Pope John	7.19	37	*33*
St Roses	7.89	14	*4*	Kukuom Agric	7.18	4	*34*
Holy Child	7.89	12	*5*	Namong	7.16	30	*35*
St Monica's	7.85	16	*6*	Aburi Girls	7.16	17	*36*
Ghana Technical	7.85	10	*7*	Boa-Amponsem	7.14	43	*37*
Prempeh College	7.82	15	*8*	St Mary	7.13	41	*38*
Adisadel College	7.80	21	*9*	Bishop Herman's	7.12	50	*39*
Mfantsipim	7.76	13	*10*	St Thomas Acquinas	7.11	36	*40*
Mozano Commercial	7.72	11	*11*	Koforidua /Tec	7.10	53	*41*
St James Seminary	7.72	7	*12*	SDA , Agona	7.09	39	*42*
Armed Forces /Tech	7.70	22	*13*	Kumasi High	7.09	57	*43*
Mfantsiman Girls	7.66	27	*14*	Kumasi Girls'	7.08	55	*44*
Nandom	7.65	25	*15*	Nkawie Tech	7.07	46	*45*
St Louis	7.65	9	*16*	Okomfo Anokye	7.06	54	*46*
St Peter's	7.58	18	*17*	University Practice	7.01	66	*47*
St Augustine's College	7.57	31	*18*	OLA Girls , Kenyasi	7.01	52	*48*
Accra Academy	7.54	32	*19*	Toase	6.98	51	*49*
Presby Boys	7.53	26	*20*	OLA , Ho	6.97	48	*50*
Kumasi Academy	7.50	29	*21*	Mansoman	6.97	67	*51*
Archbishop Porter Girls	7.48	28	*22*	Anglican , Kumasi	6.93	58	*52*
St John's	7.42	33	*23*	Tarkwa	6.93	61	*53*
Lassia Tuolo Snr	7.40	35	*24*	Dunkwa Tech	6.91	44	*54*
Sefwi Bekwai	7.39	3	*25*	Diaso	6.90	5	*55*
Notre Dame Seminary	7.39	2	*26*	New/Juaben /Commercial	6.90	59	*56*
Sunyani	7.38	34	*27*	Okuapeman	6.88	63	*57*
Benkum	7.33	24	*28*	Adeiso	6.87	20	*58*
St Charles	7.28	19	*29*	St Augustine's	6.85	62	*59*
Achimota	7.25	23	*30*	Aburaman	6.84	42	*60*

Source: WAEC League Table of Schools, 2004

The positions of some of the schools have changed. Some schools, which were among the top 60 schools, have fallen out of the top ranking. For example, Notre Dame Seminary Secondary School which ranked 1st with Wesley

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Girls' High School has moved to the 26th position. University Practice Secondary School has moved up from 66th position to 47th position and St. Martin's Secondary School and Adventist Day Secondary School had fallen out of the top 60 schools.

The weighted average method of calculation takes into consideration the number of students presented by a school. It introduces a factor that standardizes the number of students presented as well as those who obtained a particular number of passes. For example, Kukuom presented 51 students and 14 obtained 8 passes; on the other hand, Opoku Ware presented 491 students and 458 obtained 8 passes. The ratio of students who obtained 8 passes to number of students presented gives a standard value for students who obtained 8 passes for the two schools.

Table-4. Percentage and Weighted Average Scores of a selected school

	A1	B2	B3	C4	C5	C6	D7	E8	F9	Total Entry	% Pass	Total Weighted Score	Weighted Average
Mathematics	38	43	62	36	48	20	22	11	6	280	97.9		5.23
	304	301	372	180	192	60	44	11	0			1464	
Integrated Science	16	48	44	37	48	30	28	18	11	280	96.1		4.53
	128	336	264	185	192	90	56	18	0			1269	
Social Studies	7	36	59	92	35	27	15	9	0	280	100		4.94
	56	252	354	460	140	81	30	9	0			1382	
English Language	13	21	45	60	53	35	19	22	12	280	95.7		4.28
	104	147	270	300	212	105	38	22	0			1198	
Accounting	2	6	28	25	20	9	4	3	0	97	100		4.84
	16	42	168	125	80	27	8	3	0			469	
Bus. Management	18	23	41	5	2	3	3	1	1	97	98.9		6.19
	144	161	246	25	8	9	6	1	0			600	
General Knowledge in Art	0	0	9	7	16	11	6	1	0	50	100		3.98
	0	0	54	35	64	33	12	1	0			199	
Lit-in-English	0	0	7	13	14	8	3	4	0	49	100		4.02
	0	0	42	65	56	24	6	4	0			197	
French	2	2	5	6	8	6	11	5	0	45	100		3.71
	16	14	30	30	32	18	22	5	0			167	
History	0	6	9	10	6	8	4	2	2	45	95.5		4.53
	0	42	54	50	24	24	8	2	0			204	
Economics	17	34	16	6	10	6	3	3	2	97	97.9		5.85
	136	238	96	30	40	18	6	3	0			567	
Geography	0	0	14	10	6	2	3	5	5	45	88.9		3.89
	0	0	84	50	24	6	6	5	0			175	
Biology	20	28	49	14	6	4	1	1	1	124	99.2		6.12
	160	196	294	70	24	12	2	1	0			759	
Physics	23	36	36	19	5	7	10	2	4	124	96.7		6.53
	184	252	216	95	20	21	20	2	0			810	
Chemistry	11	43	38	12	8	1	1	1	9	124	92.0		3.18
	88	301	228	60	32	3	2	1	0			715	
Elective Mathematics	15	29	37	12	11	3	5	3	7	122	92.7		5.50
	120	203	222	60	44	9	10	3	0			671	

Source: WAEC Examination Records, St. Augustine's College, 2012

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The weighted average calculation also places a distinction between the number of subjects passed, that is, passes in 8 subjects cannot be put in the same category as passes in 6 subjects. Weights are assigned to each category of passes such that passes in 8 subjects have a higher recognition than passes in 7 subjects, which in turn have a higher recognition than passes in 6 subjects.

At the school level, the weighted average approach can be adopted to communicate academic achievement to reflect more accurately how students are performing in various subjects. Schools generally communicate the percentage of students who passed in specific subjects. A weight of 8 is assigned to grade A1, 7 to grade B2, 6 to grade B3 and so on. The grade F9 is assigned a weight of zero. Table 4 depicts the performance of students of a particular school in the various subjects using both percentage and weighted average to present the results.

As seen from Table 4, percentage score fails to present accurate information of students' achievement since it does factor into its computation the quality of passes. For example, using percentages to communicate student performance will present students who sat for Accounting (100% pass) as performing better than those who sat for Business Management (98.9% pass). However, computing the results using weighted average shows that the performance of students in Accounting (M= 4.84) is lower than the performance of students in Business Management (M = 6.12). Similarly, using percentages present students' performance in General Knowledge in Arts as better than the performance in History, but the computation of weighted average of the results proves otherwise.

2. CONCLUSION

Engaging stakeholders has the potential to expand opportunities for schools to benefit from enhanced stakeholder participation culminating in the continuing support for school programmes and provision of needed resources. Communicating academic achievement to stakeholders is an essential element to foster stakeholder engagement. This paper concludes that the adoption of the method of weighted average of scores is a better option in presenting the academic achievement of schools to stakeholders. Stakeholder interest in the performance of students goes beyond the number of subjects passed to a focus on the quality of the grades obtained and those grades represent in terms of opportunities for further studies. A major recommendation based on the conclusion drawn is that the Ghana Education Service should consider replacing the ranking of schools and individual subjects by calculating percentage passed with calculations based on weighted average of scores. Schools should also consider the use of weighted average of scores to analyse students' test scores.

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