

## Original Paper

# Effect of COVID-19 on Academic Performance in Four CORE Subjects of selected Senior Secondary School Students in Upper West Region of Ghana

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### **Abstract**

*COVID-19 created lots of distortions in the world. This study investigated effect of COVID-19 on academic performance among selected senior secondary school students from Ghana. WASSCE results from 2017/2018 through 2021/2022 academic sessions were considered to determine order in academic performance before, during and after COVID-19. Two research questions and hypotheses were stated, while a descriptive correlational survey was adopted, and convenience sampling technique employed to select needed sample for the study. WASSCE results of five (5) academic sessions were extracted for core subjects in senior high schools for pre-, during, and after COVID-19. Data used are standardized scores with reliability coefficients of 0.5, 0.6 and 0.7 respectively at  $p=0.01$  (2-tailed). Data collected were analyzed using frequency and percentages. Results revealed that highest and lowest mean scores recorded occurred in 2017/2018 and 2021/2022 academic sessions respectively. Also, the relationship between academic performance after COVID-19 was established to be significant and stronger than the relationship between academic performance before COVID-19 which was weak but, not significant. Models introduced into the school system during COVID-19 should continue since academic performance in the core subjects is improving as desired by stakeholders in education.*

**Keywords**

*performance assessment, subjects, secondary education, lockdown, covid-19*

**1. Introduction**

COVID-19, an infectious pathological disease was traced to Wuhan in China. Though, coronaviruses are a group of related viruses that cause respiratory tract infections which could be mild or fatal. The disease turned out to become an outbreak which affected almost the whole world from late 2019 through 2020 though, its consciousness is gradually fading since many people have imbibed the necessary precautions as recommended by World Health Organization (WHO) which assisted in its fast disappearance in Africa as a continent. At the onset, when it filtered into African countries, the effect was very mild until it was fully blown wherein, it paralyzed economic, religious, social, education, politics, and other activities significantly which threw everyone panicking over the world including Ghana. COVID-19 pandemic greatly affected the tourism sector and the economic activities at local level in Ghana due to the various restrictions introduced in the country (Tanko & Dramani, 2023). The panic made governments at both local, national, and international level to swung to different actions such that the spread of the pandemic can be curtailed to the barest minimum at different locations.

Measures taken to control the impact of COVID-19 in African states hampered the rate at which different businesses and vocations thrived, which Africans are still struggling to recover from it till date (Acquaah; Namatovu, & Kiggundu, 2021). COVID-19 was tagged the period of 'new normal'. This is because many activities in the various sectors require new approach such that the rate of collapse can be regulated to some extent. Lockdown was declared as one of the numerous strategies rolled out to deter the spread of the disease to the minimum from nation to nation and within nation. Lockdown prevented individuals to go about their regular activities as scheduled. Lockdown is a state or period in which movement or access to an area is restricted in the interest of public health and safety. Lockdown is an emergency in which people are not allowed to freely enter, leave, or move around in an area because of danger that has been discovered by authorities to be looming. Due to the signal received from World Health Organization (WHO), continents and countries began to subject their people to test for the outbreak either they are going or coming into any place. Ghana as a nation recorded its first two cases of the outbreak on 12th March 2020 which led to partial lockdown on 30th March 2020 for fourteen days, later extended and relaxed after some time with strict adherence to requisite precautions to adopt as recommended by international organizations.

COVID-19 was declared a pandemic by World Health Organization on 11th March 2020. President of Ghana said in his speech to Ghanaians, "The disease is new, it is plain evolution, and there is, therefore, yet no vaccine or cure". COVID-19 affected the educational system whereby both the public and private facilities were asked to remain closed as long as the pandemic ravages the world and as they adhere to precautions from health personnel and other relevant authorities. Education, which remains the foundation for viable growth and development in the various sectors of each nation and all over the

world. Each nation has peculiar education structure to meet existing and emerging needs in their environment. The various forms of education; formal, informal, and non-formal are employed to educate everyone in the nation as their abilities can allow them to the realization of government's intentions for her citizenry. Recently, an emeritus said, incidental education cannot be brushed aside which can be life-long and life-wide (Obanya, 2022). Each form of education has specific contributions to the growth and development of the various sectors in every society, when harnessed accordingly.

Each form of education is hinged on the education policy formulated from the constitutional objectives for educating the members of a nation across the education ladder. Giddings said, education should be to develop self-confidence and self-control, emancipate them from superstitious beliefs and ignorance, train them to acquire knowledge that will make them think realistically, which will give them awareness about their immediate and larger society. Education is employed to expose learners to the various contents as they occur in the curriculum developed for each subject. Different subjects are offered in formal school system such that learners can be exposed to the required foundations on which they build themselves as they progress in the educational structure thereby preparing them for life career.

The intention of general education as identified by International Board of Education (IBE) and United Nations Educational, Scientific and Cultural Organizations (UNESCO) is to provide students with transferrable skills that prepare them to gain knowledge, acquire new competencies, and broaden their perspectives so that they may better adapt to the needs of a changing society. This implies that from international perspective, education is expected to be accessed by everyone in a nation with the intention of being able to pass it on as the need arises and be able to align with whatever change may surface in the society and proffer appropriate solutions at varied level to make sure that the society retains its identity for every member from time to time. It is to equip learners with skills that will give room for continuity, such that if one generation is no longer in the scene whatever the preceding set passed to the successive members of the society can continue with modifications where necessary and growth for appropriate development.

Each country has both general and specific objectives for education meant to be achieved through the various forms of education but, the overall objective of any form of education is to play a dynamic role in the advancement and development in every segment of national activities and for her citizenry to remain relevant such that they can contribute their quota significantly both individually and collectively. To determine if the objectives stated are attained or achieved for any form of education in the society, assessment of the processes involved is an essential factor. Assessment reveals the situation of the educational programme which often help to discover what has worked, what is working and what is not working as intended in the processes involved (Odinko, 2014). Educational assessment is regarded as the evaluation of the performance of individuals in the system or the performance of the system with a view to understand the steps that enhance or deter the expected outcome from the system (Yoloye, 2008). Educational assessment is about determining the effectiveness and efficiency of the school

managers and the learners.

Teaching-learning activities in education are often assessed by both internal and external qualified personnel in the system. Internal assessments of teaching-learning activities are carried out to determine how the school arrangement fare in academic and administrative endeavours. School-based academic assessments are carried out by the members of staff which could be formative or summative in nature, while external assessment is carried out by public examining bodies and personnel who may be directly or indirectly domiciled in some of the schools being assessed, it is often performance-based and summative in nature. Often, school-based assessment is initiated and conducted by the school management to determine among themselves how learners are faring in the school. Each subject teacher set questions on areas covered in the subject curriculum taught, while questions set are submitted for thorough vetting by senior colleague in relevant area (Singha & Sikdar, 2018). Areas indicated for corrections are treated as instructed before it is approved for use during examination period. School-based assessment can come up at the end of each term or at the end of a session which is the third term in both basic and secondary stage of education. It is not compulsory that the teacher made test adhere to the recommended curriculum, mostly contents covered are assessed within the school in each class concerned. Content validity is often based on what the teacher taught the learners within the time frame.

Marking guides are prepared by respective teachers that set questions and at times, these teachers may be chosen to mark the answer booklets, or another arrangement may be employed for the marking of the scripts. It is employed with the intention of generating continuous assessment scores which cover all the domains of learning explored during classroom interactions (Singha & Sikdar, 2018). At times, school-based assessment may be used for moving one student from one class to another class in a certain stage in the academic structure. It is employed to determine areas where the learners need remediation before they are set for public examination or terminal examination in education structure. This type of examination is believed to be subjective since the teacher who taught the subject is the one that determines the fate of each candidate that participated in the examination. Though, a teacher made test may be essay and/or multiple choice in form and at times both, in some subjects, whichever way, the internal assessor has the prerogative to determine the outcome of the examination conducted therefore, standard adherence is restricted.

Performance-based assessment is conducted by a body of examiners engaged by public examining bodies responsible for the assessment. Performance-based assessment is employed to measure students' ability in both cognitive and non-cognitive domains of a unit or units of study. It engages the students to use their higher order thinking level to complete a given task or job within a time frame. It is concerned with determining specific standards among the learners involved. Performance assessment is conducted to ascertain the level of adherence to the planned curriculum that was employed to teach the learners. Performance-based assessment is conducted to determine those learners that can move to the next stage in the existing education structure and the specific area of competence each learner can

explore in the school system. It is used to determine the effectiveness and efficiency of the school structure to produce competent learners from secondary stage that can proceed to tertiary institutions. It measures the level of taught curriculum by the subject teachers and the level of learned curriculum by each learner within the allotted time for the completion of the recommended curriculum.

Examination questions and marking guides employed are set by specialists for each subject and the items are standardized. Performance-based assessment can determine how much of what each learner has grasped in the teaching-learning process (Hilliard, 2015). Standardized tests are employed to determine the success of schools everywhere (Alismail & McGuire, 2015). Recent WAEC question formats have open ended short structured and multiple-choice sections for each subject (Chun, 2010; McTighe, 2015). Performance-based assessment has become a valid alternative compared to traditional multiple-choice tests in educational settings because it is often made public, and results are displayed in symbols about how well students have learnt in the sessions assigned to a level of education. It is also seen as assessment of learning because it is summative in nature. Examinations conducted on each subject are marked by qualified personnel in each subject. Scores generated from the marking exercise are standardized by using any of the standard scores. For instance, a WAEC examiner once mentioned the use of stanine score to determine the grade that candidates get at the end of marking after collation for grading purpose (Adegoke, 2018).

A stanine score is employed to compare the various groups of scores to one another using a scoring format that ranges from 1 to 9 whereby all the scores generated are converted into single digit each. Stanine stands for “standard nine” which indicates nine statistical units thus, a stanine score of 1, 2, or 3 is below average, 4, 5, or 6 is average while 7, 8 or 9 is above average. These units are employed to display performance level in a test which could be for psychological or educational purpose. Stanine scores are more effective compared to t-scores and z-scores because stanine use whole number in its scaling and can only yield positive values while others cannot do that (Adegoke, 2018). Results released by West African Examinations Council are standardized results and this is one of the reasons why the result is tenable in other countries aside where the candidate sat for the examination. This is because stanine measures students’ scores in relation to the scores generated from a large group of students who sat for the same test. The WASSCE letter or grade interpretations are thus, A1= Excellent, B2=Very good, B3=Good, C4=Credit, C5=Credit, C6=Credit, D7=Pass, E8=Pass and F9= Fail. Looking at this, it is in consonance with the stanine score interpretation for standardized scores.

Secondary education in Ghana is in two phases with duration of three (3) years each. Senior secondary education begins at minimum age of fifteen (15) years after participating in the final examination for junior secondary education. Results obtained are employed to place each student to their areas of competencies. At the second cycle of secondary education, students are exposed to the following general subjects: English, mathematics, social studies, and integrated science. They are referred to as core subjects which every senior secondary student must participate in the learning and examination. In addition, students are expected to choose from the electives for their field to make the subjects offered

add up to minimum of eight (8). Available specializations are agriculture, business, technology, and trade, as well as general education which could be in arts or sciences. The final examination for senior secondary education is conducted by the West African Examinations Council (WAEC) where the students participate in West African Secondary School Certificate Examination (WASSCE). WAEC as a body conduct the same examination in other four west African countries and other examinations in the participating countries aside the WASSCE.

Conducting WASSCE by WAEC in Ghana during the pandemic was not pleasant due to lockdown which prevented most of the candidates to attend classes in preparation for the certificate examination during 2019/2020 academic session. Junior and senior high schools were reopened along with university students from 15th June 2020 to allow them to prepare for the certificate examination for the year. The period of reopening happened to be around the time when regular students should be writing the final examination for that year. This implies that period for classroom interactions fell into the time of lockdown. Information revealed that part of the secondary indirect effect of COVID-19 was very strong on education throughout the various levels in Ghana (Republic of Ghana, 2022). Prior to the pandemic, senior secondary students always spend 40 weeks for each academic year which should be 120 weeks for the three years allotted for senior secondary stage in the education structure wherein they ought to have covered the contents of the curriculums for the stage in the various subjects. But invasion of the pandemic prevented the learners from having direct access to traditional teaching-learning process and substantial number of these students do not have personalized (private) phones to enable them to learn and study on-line either with others during classes or on their own after classes. Report had it that COVID-19 pandemic disrupted the varied gains that have been acquired including learning in Ghana (Republic of Ghana, 2022).

The closure of schools summed up to ten months which was like a complete session in the academic calendar. Studies have shown that inaccessibility to education as when due can lead to social and economic shocks which in the long run will influence the wellbeing of children and adolescents adversely. Some activities were rolled out to salvage the situation at hand among which was the Edmodo Learning Management System. This was a platform where teachers, learners and parents had opportunities for learning and communicating via the internet during the National Education Week on November 5, 2020. Also, International Development Association swung to action by funding the Ghana Accountability for Learning Outcomes Project (GALOP) where about 4.45 million students were supported in delivering remote education. Safe school reopening and student returning were not left out as part of their agenda during the period. Digital technologies in education were innovations to the system which was meant to give room to cover the lost time in the school system and keep the learners abreast with what were required in the various subjects especially the core subjects offered by all the students.

All these are in tandem with the recommendations put forward by World Bank through Global Education Innovation Initiative for online educational resources which are curriculum resources,

professional development resources and tools. These catered for the various segment involved in teaching and learning procedure both at home and in the classroom. Therefore, with the various efforts put in place to salvage the issue during COVID-19, including the students who registered for WASSCE during the pandemic. In view of the activities rolled out to assist in academic acquisition which in turn should reflect in academic performance of registered students for senior secondary education terminal examination. This study decided to determine the effect of COVID-19 on the learners' performance during the pandemic compared to the academic result before and after the pandemic has assuaged to a reasonable level such that normality has restored into major sectors.

### *1.1 Statement of the Problem*

Invasion of COVID-19 caused havocs in the various facet of life including education. Education at the senior secondary stage serves as determinant and foundation of what many children intend to pursue as career in life but, academic performance of learners in this clime has not reached the desired mastery level by stakeholders in education as a sector due to some constraints. Some of these problems are inadequate staffing in schools, lack of incentives to classroom and subject teachers, non-compliance with current trend in technological advancement, and lots more. Though, COVID-19 pandemic joined the existing issues in the education sector but, some models were rolled out to salvage the academic activities since certificate examinations were around the corner. The study found the effect of COVID-19 pandemic on academic performance of the selected students in the core subjects (English Language, Integrated Science, Social Studies, and Mathematics) before the pandemic, during the pandemic and after the pandemic. Apart from that, the study determined the percentage of the students that can proceed to tertiary institutions based on their academic performance in the core subjects. These research questions and hypotheses guided the study.

(i) What is the aggregate trend in academic performance in the core subjects from 2017/2018 academic session through 2021/2022 academic session WASSCE results in the selected school?

(ii) What is the percentage of students with at least a credit 6 in the core subjects between 2017/2018 academic session through 2021/2022 academic sessions in the selected school?

(i) There will be significant difference between the academic performance mean scores of the candidates in WASSCE results before COVID-19, COVID-19 and after COVID-19 academic sessions.

(ii) There will be no significant relationship in the academic performance in WASSCE results before COVID-19, during COVID-19 and after COVID-19 academic sessions.

## **2. Method**

### *2.1 Research Design*

A descriptive correlational survey was adopted for the study since it seeks to determine the relationship between the results generated in WASSCE among the participants in the sample selected 2017/2018 through 2021/2022 academic sessions. The study has no intention to make claims about cause and effect.

### 2.1.1 Population

This consists of the senior secondary students in Upper West region of Ghana. There are about twenty-eight public senior high schools in the region which are classified into categories A, B, and C in the most recent schools' register released by Ghana Education Service.

### 2.1.2 Sampling Technique and Sample

A convenience sampling technique was employed. Convenience sampling technique refers to a technique that goes for the sample that is available in the light of easy access (Bryman and Bell, 2007). This was basically to allow the researcher to collect the needed data with ease since the sample is a good representation of the academic activities in the location and it is a mixed senior high school. The sample is chosen because of proximity and the time bound for the completion of the study. The school is one of the mixed senior high schools in the area with the highest representation of the indigenes among both genders.

### 2.1.3 Data Collection Procedure

Data was collected from a foremost senior secondary school situated in Upper West Region of Ghana. WASSCE results of students who graduated from the senior high school within five academic sessions are extracted from 2017-2022. These covered both pre- and post-COVID-19 periods. All the programmes presented for WAEC examination at senior secondary education stage in Ghana are available in the school. Therefore, the data required for each year coverage were drawn from the WASSCE results of the same school. The privacy of the students and the name of the selected senior high school are protected for the purpose of confidentiality.

### 2.1.4 Validity and Reliability of Instruments

Data employed are ready standardized results generated after subjecting scores by candidates to the required processes for validation by West African Examinations Council. Reliability coefficients of the scores were determined using Pearson correlation. The reliability coefficients are 0.5, 0.6, and 0.7 significant at  $p=0.01$  (2-tailed).

### 2.1.5 Data Analysis Procedure

Standardized data collected were categorized into three (3) as A1-C6 = Category A, D7-E8=Category B and F9=Category C. Each category was analyzed with excel using frequency counts and percentages. Therefore, the equivalent percentages of core subjects WASSCE results for 2017/ 2018 through 2021/2022 academic sessions are displayed.

## 3. Results

The following are the results generated from the data collected.

**Table 1. WASSCE Results between 2018 through 2022 Academic Sessions**

Grade	Core Subjects	2018	2019	2020	2021	2022
<b>A</b>	English	32.4	30.3	22.8	78.3	83.4
	Int. Sci	41	42.3	34.4	89.3	95.3
	Maths	18.7	49.8	30.8	91.9	83.9
	Soc. St	62.9	80.9	60.4	86.7	90.1
<b>B</b>	English	42.6	42.4	53.6	18.5	14.3
	Int. Sci	37.5	47.8	35.1	10.7	4.4
	Maths	43.5	29.4	37.6	7.9	15.6
	Soc. St	23.7	13.4	16	9.3	7.6
<b>C</b>	English	25	27.3	22	3.2	2.3
	Int. Sci	21.5	9.9	30.5	0	0.3
	Maths	37.8	20.8	31.6	0.2	0.5
	Soc. St	13.4	5.7	23.6	3.9	2.3
<b>Total</b>	4	644	528	444	633	385

Table 1 reveals that aggregation of WASSCE results for 2017/2018 through 2021/2022 academic sessions is as follow. English results for Category A has the highest performance (83.4%) in 2021/2022 academic session, followed by 2020/2021 academic session with 78.3% while the lowest performance (22.8%) occurred in 2019/2020 academic session. Category B English has the highest performance (53.6%) in 2019/2020 academic session followed by 2020/2021 academic session with 18.5% while the least performance occurred in 2021/2022 academic session with 14.3% performance. Highest failure in English occurred in 2018/2019 academic session with 27.3% followed by 2017/2018 academic session with 25.0% and the least failure occurred in 2021/2022 academic session with 2.3% in English result. Integrated science results for Category A has the highest performance (95.3%) in 2021/2022 academic session, followed by 2020/2021 academic session with 89.3% while the lowest performance (34.4%) occurred in 2019/2020 academic session. Category B Integrated science has the highest academic performance (47.8%) in 2018/2019 academic session followed by 2017/2018 academic session with 37.5% while the least academic performance occurred in 2021/2022 academic session with 4.4%. Highest failure in academic performance in Integrated science occurred in 2019/2020 academic session with 30.5% followed by 2017/2018 academic session with 21.5% and the least failure in academic performance occurred in 2020/2021 academic session with 0% in Integrated science result. Mathematics results for Category A has the highest academic performance (91.9%) in 2020/2021 academic session, followed by 2021/2022 academic session with 83.9% while the lowest (18.7%) occurred in 2017/2018 academic session. Category B Mathematics has the highest academic

performance (43.5%) in 2017/2018 academic session followed by 2019/2020 academic session with 37.6% while the least performance occurred in 2021/2022 academic session with 7.9% academic performance.

Highest failure in Mathematics occurred in 2017/2018 academic session with 37.8% followed by 2019/2020 academic session with 31.6% and the least failure occurred in 2021/2022 academic session with 0.2% in Mathematics result. Social studies for Category A has the highest academic performance (90.1%) in 2021/2022 academic session, followed by 2020/2021 academic session with 86.7% while the lowest (60.4%) occurred in 2019/2020 academic session. Category B social studies have the highest academic performance (23.7%) in 2017/2018 academic session followed by 2019/2020 academic session with 16.0% while the least academic performance occurred in 2021/2022 academic session with 7.6% academic performance. Highest failure in social studies occurred in 2019/2020 academic session with 23.6% followed by 2017/2018 academic session with 13.4% and the least failure occurred in 2021/2022 academic session with 2.3% academic performance.

**Table 2. Credit Six (C6) in the Core Subjects between 2017/2018 through 2021/2022 Academic Sessions in WASSCE Results**

Subject	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022
English	32.4	30.3	22.8	78.3	83.4
Int. Sci	41	42.3	34.4	89.3	95.3
Maths	18.7	49.8	30.8	91.9	83.9
Soc. St	62.9	80.9	60.4	86.7	90.1
4	644	528	444	633	385

Table 2 reveals that English results have highest C6 and above 322 (83.4%) out of 385 candidates in 2021/2022 academic session while the least C6 and above 101(22.8%) out of 444 candidates was recorded in 2019/2020 academic session. Integrated science recorded the highest C6 and above 367(95.3%) and the lowest in 2019/2020 academic session out of 385 candidates. Mathematics recorded the highest C6 and above 560 (91.9%) in 2020/2021 academic session while the lowest C6 and above 119(18.7%) was recorded in 2017/2018 academic session. Social studies had the highest C6 and above 347(90.1%) in 2021/2022 academic session while the lowest C6 and above 268(60.4%) was recorded in 2019/2020 academic session.

**Table 3. Relationship between Academic Performances in WASSCE Core Subjects before COVID-19 Years, COVID-19 Year and after COVID-19 Years**

Sessions	2018	2019	2021	2022		
2020	2018	Correlation	1.000	.344	.165	.236

	Significance (2-tailed)	.	.301	.627	.486
2019	Correlation	.344	1.000	.732	.694
	Significance (2-tailed)	.301	.	.010	.018
2021	Correlation	.165	.732	1.000	.993
	Significance (2-tailed)	.627	.010	.	.000
2022	Correlation	.236	.694	.993	1.000
	Significance (2-tailed)	.486	.018	.000	.
	df	9	9	9	0

Table 3 reveals the relationships that exist between academic performance in WASSCE in the core subjects before COVID-19 and during COVID-19 as 0.344 at  $p=0.05$  with  $df =9$  and after COVID-19 and during COVID-19 as 0.99 as highest at  $p=0.05$  with  $df =9$ .

#### 4. Discussion

Results revealed that highest number of credit and above in each subject vary from session to session, but social studies have the highest record of credit 6 and above for three different sessions which are 2017/2018 with 405 candidates out of 644 participants, 2018/2019 with 427 candidates out of 528 participants and 2019/2020 with 268 candidates out of 444 students that participated in WASSCE. Mathematics had 560 candidates out 633 participants scoring C6 and above in 2020/2021 academic session while Integrated science recorded the highest C6 and above with 347 candidates in 2021/2022 academic session out of 385 candidates that participated in the examination. There has been consistence in the academic performance in social studies within the period that the study covered.

Although, improved performance manifests in other subjects, but none is a match with the existing record in social studies. Academic performance in Integrated science is also remarkable with a record of 0% failure in 2020/2021 academic session. This can be attributed to the treatments that the students were exposed to during lockdown among which are the Edmodo Learning Management System, a platform for teachers, learners, and parents, Ghana Accountability for Learning Outcomes Project (GALOP) funded by International Development Association to about 4.45 million students in Ghana and digital technologies embraced in education to cater for lost time in covering needed contents in the core subjects and others as required. The full manifestation of these were more pronounced among the students who were introduced to the models while in the first year of their senior secondary education during COVID-19 year. Though, the traces of the impacts of the innovations during COVID upsurge manifested to a great extent in the 2020/2021 academic session but the highest impact was in 2021/2022 academic performance where there was 0% failure in Integrated science.

## Recommendations

With the trend discovered in the academic performance in WASSCE results from 2017/2018, 2018/2019, 2019/2020, 2020/2021 and 2021/2022, there will be need to inculcate the following into the teaching-learning procedure to retain and continue to improve on the emerging brilliant and mastery academic performance in the school. Firstly, is the sustenance of the various innovations like Edmodo, GALOP, digital education for stakeholders in educational sector to continue as it was inaugurated during COVID-19 into school activities. Also, the need to retrain staff both academic and non-academic in the administrative in the system. Finally, there will need to introduce the would-be teachers to these innovative models before they are inducted into teaching profession such that as soon as they aboard, they can fit into the system and contribute positively to the sector and the system with ease. Another area of concern is the fluctuation in participants for WASSCE registration as shown in Table 1, there is need to encourage the people in this axis of Ghana to improve allowing their children and wards to access senior secondary education than how it was since the design caters for the various fields relevant to society and beyond. Academic performance of students in WASSCE from 2017/2018 through 2021/2022 academic sessions have revealed that there is possibility for every learner to come up with results commensurate with their innate tendencies if required needs for each learner is met accordingly. The personalized learning approach has contributed significantly to studying and learning habits of learners which manifest in the overall academic performance of the sample selected for the study. It is obvious that learning in schools can be well mastered by most learners and individual abilities will reflect in their academic performance which will assist to decipher the needed steps from time to time. It is evident through the academic sessions' performances that the correlations that exist both before and after COVID-19 are positive though pre- was weak while post has been strong and significant.

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## References

- Acquaah, M., Namatovu, R., & Kiggundu, M. N. (2021). Introduction to the special issue: Preliminary investigations into the COVID-19 pandemic and management in Africa. *Africa Journal of Management*, 7(1), 1-12. <https://doi.org/10.1080/23322373.2021.1882223>
- Adegoke, B. A. (2018). *Advanced statistical methods lecture manual*. Institute of Education, University of Ibadan, Nigeria.
- Bryman, A., & Bell, E. (2007). *Business research methods* (2nd ed.). New York: Oxford University Press Inc. Dictionary. Cambridge.org
- Fernando, M. R. (2020). *Global education innovation initiative in collaboration with OECD, WHO and*

*hundred.*

Hilliard, P. (2015). *Performance-based assessment: Reviewing the basics.*

Mohita, N. (n.d.). *Education objectives: Major objectives of education.*

Nuffic. (2018). *Ghana education system.*

Nuffic. (2018). *The education system of Tunisia.*

Obanya, P. A. I. (2023). *Seminar presentation.* Institute of Education, University of Ibadan, Nigeria.

Odinko, M. N. (2014). *Evaluation research, theory, and practice.* Giraffe books, Ibadan, Nigeria.

Republic of Ghana. (2022). *COVID-19 coordinated education response plan for Ghana.* Ministry of Education, Ghana.

Republic of Ghana. (2022). *Ghana accountability for learning outcomes project additional financing project.* Ministry of Education, Ghana.

Republic of Ghana. (2022). *Ghana Edmodo.* Ministry of Education, Ghana.

Singha, S. K., & Sikdar, D. P. (2018). Professional development of teacher and professionalism in teacher education. *International Journal of Applied Social Science*, 5(8), 1320-1332.

Tanko, D. D., & Dramani, J. M. (2023). *Assessing the impact of COVID-19 on tourism in northern Ghana.* Role of local governments for destination recovery.

The Virginia Homeschool. (2022). *Percentages and stanines.* How to interpret test results.