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The Influence of Asynchronous Instructional Strategies on Performance of Grade 11 IGCSE Learners in Nairobi County, Kenya

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Abstract: *Asynchronous instructional strategies, such as pre-recorded videos, audios, email communication, and online forums, have become increasingly prominent in education, especially since the COVID-19 pandemic. These methods align well with the learner-centered and inquiry-based philosophy of the IGCSE curriculum, yet limited empirical research exists on their influence in the Kenyan context. The purpose of the study was to examine the influence of asynchronous instructional strategies on academic performance of Grade 11 IGCSE learners in Nairobi County. A correlational research design was adopted. The study sampled 176 teachers from eight purposively selected international schools in Nairobi County. Stratified sampling was used in sample size selection. Data was collected using a structured questionnaire. Analysis of data utilized descriptive statistics such as frequencies and percentages; and inferential statistics, comprising of simple linear regression. Asynchronous instructional strategies are widely utilized, with 95.1% of teachers reporting high usage. Teachers agreed that such strategies enhance flexibility, improve learner engagement, and contribute positively to academic performance. Regression analysis showed a statistically positive significant relationship between asynchronous strategies and learner performance ($R^2 = 0.590$, $\beta = .186$, $p < 0.0001$), indicating that 59.0% of the variation in performance of Grade 11 IGCSE learners could be explained by asynchronous instructional strategies. Asynchronous instructional strategies have a significant positive influence on the performance of Grade 11 IGCSE learners. The study recommends that school administrations empower teachers through training on the effective use of technology to support online instructional strategies. It also urges parents to provide learners with essential resources like mobile devices and internet access to facilitate online learning.*

Keywords: *Asynchronous learning, Academic performance, IGCSE, Instructional strategies, Grade 11 learners*

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1. Introduction

The integration of online learning in education systems has resulted in changed teaching and learning practices across the globe. Asynchronous instructional strategies are among the digital strategies increasingly used, which involve offering students access to educational content, activities, and tasks at their own pace and at any time, without the need for real-time interaction with the teacher (Hrastinski,

2023). This flexibility can foster personalized learning opportunities and help students manage their studies alongside other commitments. As a result, asynchronous learning has become an integral part of modern learning.

Cambridge Assessment International Education's International General Certificate of Secondary Education (IGCSE) is a system that is widely adopted in international schools in numerous countries including Kenya. The curriculum adopts learner-centered and inquiry-based teaching methods, which encourage students to think, solve problems and self-learn (Wang & Tse, 2024). For these pedagogical directions, instructional methods must be flexible and engage learners. Asynchronous instructional strategies provide opportunities to students to pace themselves through learning content and at their own learning style.

The COVID-19 pandemic disrupted education globally, leading to a surge in the demand for flexible learning spaces and technology-enabled classrooms across all international schools in Kenya, especially those that were implemented asynchronously (Jepkemei & Munyao, 2022). Pre-recorded lessons, electronic presentations, online discussion boards and electronic feedback systems are frequently used by teachers to deliver instruction. These strategies allow students to revisit material multiple times, engage in cooperative learning, and have access to learning materials outside of class time to promote continuity and flexibility in learning.

Although there are many examples of the adoption of an asynchronous approach to teaching, there is a limited amount of empirical research which has focused on how well this approach works for enhancing academic performance in IGCSE learners in Kenya. As far as the authors are aware, the existing literature has mostly been conducted at the university level or within the broader context of online education, and few studies have examined Grade 11 learners preparing for high-stakes exams. To date, most of the research that has been conducted has focused either on the university level or on general online learning contexts, with limited research on Grade 11 learners preparing for high-stakes exams. Therefore, there is a gap in the literature that seeks to address the effect of asynchronous instructional strategies on academic achievement, both in a contextual and empirical sense. The study was therefore aimed at investigating their impact on Grade 11 IGCSE students in Nairobi County.

2. Literature Review

Asynchronous Instructional Strategies refer to instructional activities that take place outside of time and place, allowing learners to access learning experiences at their own time and place and as their learning needs dictate (Hrastinski, 2023). They can be video and audio lectures, narration of PowerPoints, digital notes, online quizzes, assignment portals, email communication or social media discussion forums. These approaches increase flexibility, provide the opportunity for learners to revisit teaching and learning content and take responsibility for their learning experiences (Barrot et al., 2021).

The learner-centered approach of the IGCSE curriculum is very similar to an asynchronous approach to instruction, as it focuses on active learning, learner autonomy and individual differences. Asynchronous environments enable differentiated instruction because they allow learners to watch content more than once; provide feedback that is personalized to the learner's needs; and allow for the learner to learn at their own speed (Varkey et al., 2023). The characteristics agree with the constructivist theory, as it focuses on the process of construction of knowledge by interacting with learning resources, reflecting, and exploring learning opportunities independent of the media (Bahiyah, 2021).

Literature reveals that discussion forums, collaborative activities, systems for managing assignments, and timely mechanisms for instructors to provide feedback can improve the engagement of the learners in an asynchronous learning environment (Rose, 2024). International schools often apply flipped classroom methods, pre-recorded mini-lectures and learner-led online discussions to support the cultivation of independent learning. The following practices provide opportunities for learners to revisit challenging ideas, ask questions if needed, and engage actively in learning experiences, which in turn nurtures cognitive learning and positive attitudes towards learning (Berestok, 2021).

Asynchronous instruction has shown great promise in enhancing learning outcomes, but research specific to the context of IGCSE in Kenya is limited. The existing studies have focused on tertiary institutions, synchronous online learning models or larger secondary education populations. The school will therefore be able to make the decisions on the extent to which the academic performance of learners in Grade 11 IGCSE will be affected by the use of asynchronous instructional strategies. The school will therefore be able to make such decisions as to the extent to which the academic performance of the learners in Grade 11 IGCSE will be affected by the use of the aforementioned instructional strategy. This gap is significant in informing instructional decisions and augmenting evidence-based practices in the international schools in Kenya.

3. Methodology

A correlational research design was adopted.The study was conducted in Nairobi County. The target population was 1760 teachers in 44 international schools in Nairobi County, Kenya. The study selected 176 teachers which represent 10 percent of the total population for the teachers. This followed the guidelines in Mugenda and Mugenda (2003) who asserted that a study's sample size should be 10-30 percent of the accessible population. Purposive sampling was used to select the eight largest IGCSE schools in Nairobi County based on learner enrollment, as they represent a significant portion of the IGCSE population. Within each selected school, stratified sampling with proportionate allocation was applied to select teachers. This ensured each school's representation was proportional to its teacher population. A structured questionnaire was used to collect data from the teachers. Descriptive and inferential statistics were used to analyze the collected data. Descriptive statistics involved the use of frequencies and percentages. Inferential statistics employed simple linear regression to evaluate the relationship between asynchronous instructional strategies and performance of IGCSE Grade 11 learners. Data analysis was achieved through the use of the Statistical Package for Social Sciences (SPSS), version 26.0. The researcher obtained informed consent from participants after clearly explaining the study's purpose, objectives, methods, and their right to voluntary participation. Confidentiality and privacy were strictly upheld by ensuring anonymity and not disclosing information to third parties. All respondents were treated with dignity, fairness, and without discrimination.

4. Results and Discussion

4.1 General Information of the Teachers

Teachers were required to indicate their general information such as gender, age in years, highest education level and specialization. The results as shown in Table 1 indicate that 54.3% (89) of the respondent teachers were male. Though male respondents were the majority, female respondents were slightly less indicating that both genders were well represented. Majority of the respondents as shown by 68.9% (113) had a Bachelor's degree as their highest level of qualification. In terms of specialization, all areas were well represented in the study with an almost equal representation in STEM related specialization (27.4%), Arts related specialization (26.8%) and languages (28.0%). Most of the respondents as shown by 71.3% were aged between 30-49 years with the mean age being 42.5 years (standard deviation = 8.8 years).

Table 1: Demographics of Teachers

		f	%
Gender	Male	89	54.3%
	Female	75	45.7%
Highest education level	College Diploma/Certificate	42	25.6%
	Bachelor's Degree	113	68.9%
	Postgraduate	9	5.5%
Area of specialization	STEM related specialization	45	27.4%
	Arts related specialization	44	26.8%
	Languages	46	28.0%
	Technical related specialization	29	17.7%
Age of the Respondents (mean =42.5 years; standard deviation = 8.8 years; minimum = 26.0 years; maximum = 60.0 years	20-29 years	6	3.7%
	30-39 years	61	37.2%
	40-49 years	56	34.1%
	50-59 years	34	20.7%
	60-69 years	7	4.3%

Asynchronous Instructional Strategies and Performance of Grade 11 IGCSE Learners

Respondents were first required to indicate the extent to which some listed asynchronous strategies were utilized in teaching learners in their respective schools. The results are as illustrated in Table 2.

Table 2: Extent of Utilization of Asynchronous Instructional Strategies

	To no extent at all	To a moderate extent	To a great extent	To a very great extent
Pre-recorded online audios	12 (7.3%)	14 (8.5%)	31 (18.9%)	107 (65.2%)
Pre-recorded online videos uploaded on platforms such as Youtube	2 (1.2%)	12 (7.3%)	28 (17.1%)	122 (74.4%)
Non-live interactions on online platforms such as social media	7 (4.3%)	14 (8.5%)	44 (26.8%)	99 (60.4%)
Interactions through e-mails	6 (3.7%)	18 (11.0%)	24 (14.6%)	116 (70.7%)

From Table 2, 65.2% (107) of the respondents indicated that pre-recorded online audios are used to a very large extent. Further, 74.4% (122) of the respondents were of the opinion that pre-recorded online videos uploaded on platforms such as Youtube were utilized in teaching learners to a very large extent. Also demonstrated by the findings is that 60.4% (99) of the respondents indicated that non-live interactions on online platforms such as social media were utilized in teaching to a very great extent. Lastly, 70.7% (116) of the respondents indicated that interactions through e-mails were used in teaching learners to a very great extent.

The overall extent of utilization of asynchronous instructional strategies was determined. This was achieved by computing the mean of the responses in the table above and then recoding the mean into three categories: mean scores of 2.5 and above were recoded into "to a great extent", mean scores between 1.5 and less than 2.5 were recoded into "to a moderate extent" and mean scores below 1.5 were recoded "to no extent". The findings as reported in Table 3 indicate that 95.1% (156) of the responses imply that asynchronous instructional strategies are utilized to a great extent.

Table 3: Overall Extent of Utilization of Asynchronous Instructional Strategies

	To a moderate extent	To a great extent
Overall extent of utilization of asynchronous instructional strategies	8 (4.9%)	156 (95.1%)

Respondents were further presented with Likert scale items regarding the influence of asynchronous online strategies on performance of IGCSE Grade 11 learners where they were required to indicate their level of agreement/disagreement. The results are as illustrated in Table 4.

Table 4: Likert Scale Responses on the Influence of Asynchronous Strategies on Performance of Learners

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
By enabling teachers' communication to their students outside the walls of the physical classroom, asynchronous strategies enhance more learning thus improved performance	4 (2.4%)	8 (4.9%)	38 (23.2%)	72 (43.9%)	42 (25.6%)
Being student-centered methods of teaching, asynchronous strategies utilize e-learning resources for information sharing outside time and place constraints thus creating more learning time which improves performance of learners	15 (9.1%)	23 (14.0%)	26 (15.9%)	73 (44.5%)	27 (16.5%)
Asynchronous instructional strategies provide sufficient time for learners to access course content and acquire information on the objectives of the subject which leads to improved performance	12 (7.3%)	22 (13.4%)	36 (22.0%)	64 (39.0%)	30 (18.3%)
When asynchronous strategies are utilized learners are in a position to complete their learning around other commitments such as work and sports activities which improves their performance	16 (9.8%)	12 (7.3%)	20 (12.2%)	77 (47.0%)	39 (23.8%)
The versatility of asynchronous strategies enhances learners' incentives to research which increases the cognitive engagement leading to performance	10 (6.1%)	23 (14.0%)	40 (24.4%)	48 (29.3%)	43 (26.2%)
Having in place recorded education materials ensures learners learn at their own pace (flexibility) which increases understanding of the content thus improving their performance	10 (6.1%)	8 (4.9%)	24 (14.6%)	86 (52.4%)	36 (22.0%)

From the responses in Table 4, 69.5% (114) of the respondents were in agreement that by enabling teachers' communication to their students outside the walls of the physical classroom, asynchronous strategies enhance more learning thus improved performance. Majority of the respondents as indicated by 61.0% (100) agreed that being student-centered methods of teaching, asynchronous strategies utilize e-learning resources for information sharing outside time and place constraints thus creating more learning time which improves performance of learners. Based on 57.3% (94) of the respondents, asynchronous instructional strategies provide sufficient time for learners to access course content and acquire information on the objectives of the subject which leads to improved performance. The findings further indicate that 70.8% (116) of the respondents were in agreement that when asynchronous strategies are utilized learners are in a position to complete their learning around other commitments such as work and sports activities which improves their performance. Also evident from the results is that 55.5% (91) of the respondents stated that the versatility of asynchronous strategies enhances learners' incentives to research which increases the cognitive engagement leading to performance. The results also illustrate that 74.4% (122) of the respondents agreed that having in place recorded education materials ensures learners learn at their own pace (flexibility) which increases understanding of the content thus improving their performance.

4.2 Performance of Year 11 IGCSE Learners

The dependent variable for this study is Performance of Year 11 IGCSE Learners. This was assessed in terms of performance in regional exams and performance in externally organized academic contests. From the responses on performance indicators in Table 5, 55.5% (91) of the respondents indicated that performance of Year 11 IGCSE learners in regional-based exams was improving; 44.5% (73) indicated that performance was neither improving nor declining. On the other hand, 54.3% (89) of the respondents opined that performance of Year 11 IGCSE learners in externally organized academic contests was improving while 36.0% (59) indicated performance in this context to be neither improving nor declining.

Table 5: Performance of Year IGCSE Learners

	On a decline	Neither improving nor declining	Improving
What would you say about the performance of year 11 IGCSE learners in regional based exams?	0 (0.0%)	73 (44.5%)	91 (55.5%)
What would you say about the performance of year 11 IGCSE learners in externally organized academic contests?	16 (9.8%)	59 (36.0%)	89 (54.3%)

Overall performance of Year 11 IGCSE learners was determined by computing the mean of the responses for the two performance indicators. The mean score was then recoded into three categories; improving performance (mean scores of 2.5 and above), neither improving nor declining performance (mean score between 1.5 but below 2.5) and declining performance (mean scores below 1.5). According to 73.8% (121) of the respondents, the overall performance of Year 11 IGCSE learners was improving (see Table 6).

Table 6: Overall Performance of Year 11 IGCSE Learners

	Neither improving nor declining	Improving
Overall performance	43 (26.2%)	121 (73.8%)

4.3 Regression Modeling

Simple linear regression modeling was used to evaluate the relationship between asynchronous instructional strategies and performance of Year 11 IGCSE learners. The model summary results in Table 7 show that R-Square = 0.590. This indicates that 59.0% of performance of Years 11 IGCSE learners is explained by the independent variables: asynchronous instructional strategies, synchronous instructional strategies, online communities and simulations.

Table 7: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.590	.582	.35325

a. Predictors: (Constant), Simulations, Synchronous instructional strategies, Online communities, Asynchronous instructional strategies

b. Dependent Variable: Performance of learners

The ANOVA results in Table 8 show that p-value < 0.0001. This illustrates that the overall model is significant and can be adopted in predicting performance from asynchronous instructional strategies, synchronous instructional strategies, online communities and simulations variables.

Table 8: ANOVA Table for the Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.135	1	42.135	345.369	.000[b]
	Residual	19.840	162	.122		
	Total	61.976	163			

a. Dependent Variable: Performance of learners

b. Predictors: (Constant), Asynchronous instructional strategies

The regression coefficients are as shown in Table 9. From the regression coefficient results, all the p-values are less than 0.05; constant (p-value = 0.032) and asynchronous instructional strategies (p-value < 0.0001). This means that the constant and asynchronous instructional strategies are all significant. Therefore, asynchronous instructional strategies have a significant effect on performance of Year 11 IGCSE learners. The regression model is therefore presented as follows:

Performance = 2.458 + 0.186 Asynchronous instructional strategies

Table 9: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.458	.218		11.267	.000
	Asynchronous instructional strategies	.186	.050	.239	3.709	.000

a. Dependent Variable: Performance of learners

4.4 Discussion

The findings established that asynchronous instructional strategies such as pre-recorded audios, videos, none-live interactions through online platforms and interactions through e-mails were utilized as instructional strategies to a large extent. From the regression modeling, asynchronous instructional strategies were found to have a significant influence on performance of Year 11 IGCSE learners in Nairobi County, Kenya. The findings that asynchronous instructional strategies have a significant influence on performance of IGCSE learners align with Siddiqa (2022) who established that asynchronous instructional strategies are student-centered teaching methods that utilize learning resources for information sharing outside time and location constraints of learners thus positively affecting performance of learners. The findings are also in agreement with Alzahrani (2019) who established that asynchronous instructional strategies utilize different methods such as audio discussions and emails which encourage positive interactions. Learners and teachers enable communication among learners and between learners and teachers. They also provide learners with sufficient time to access course resources and acquire knowledge concerning a given subject area. These enable learners to complete their learning even when they have other commitments such as extracurricular activities and work.

According to Hrastinski (2023) who supports the findings of this study, asynchronous instructional strategies enable learners to focus and process information on various subjects. Learners are also incentivized to research due their versatility in addition to learners learning at their own pace. This helps increase the understanding of learners. In a German-based study by Fabriz *et al.,* (2021), asynchronous instructional strategies were found to have an effect on academic performance of learners which resonates with the results of our study. Using a cohort of university students, Fabriz *et al.,* (2021) asynchronous methods were found to have an impact on learning outcomes such as peer-centered student feedback.

Another study that agrees with the findings of this study is one conducted in Turkey Demirtaş and Türk (2022) who assessed the performance of students a microeconomics when asynchronous instructional strategies were used. Asynchronous strategies were found to have a significant influence on performance due to their flexibility thus compensating for issues such as accessibility and internet availability during Covid-19 outbreak. In Philippines, Aque *et al.,* (2021) established that motivation and performance of students in science learning increased due to adoption of asynchronous learning strategies thus agreeing with this study. Similarly, Hung *et al.,* (2024) supports the findings of our study by establishing that asynchronous method was preferred by more students and led to significant improvement in exam scores of students in Taiwan. Further, Udofia and Tommy (2021) conducted a study in Nigeria and established that learners under asynchronous instructional strategies were highly motivated and achieved significantly higher scores as compared to learners under normal classroom learning.

5. Conclusion and Recommendations

5.1 Conclusion

The study finds that pre-recorded audio and video lesson, non-live online learning and email communication are widely used in the sampled international schools as the asynchronous instructional strategies. The findings also showed that asynchronous instructional methods significantly positively affect the academic performance of the Grade 11 IGCSE learners in Nairobi County. The findings highlight the importance of learner-focused and flexible methods of teaching and learning in promoting better academic learning for learners studying IGCSE.

5.2 Recommendations

1. School leaders should offer ongoing professional development to improve teacher capacity to integrate technology and effectively use asynchronously delivered instruction.
2. International schools should provide sufficient digital infrastructure, such as a good internet connection and suitable learning management

systems to make use of the asynchronous learning experience.

3. Teachers should be urged to create and use a variety of asynchronous learning materials including audio-visual lessons, online forums, digital quizzes, and similar resources to encourage student self-paced learning and engagement.
4. It is important to sensitize parents on the importance of supporting online learning and provide learners with essential resources such as Internet connectivity, mobile devices and conducive home learning environment.

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