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Graphics and Academic Performance of Social Studies Students: A Narrative Literature Review

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Abstract
The paper is an original paper that investigated the use of graphics as visual learning aids, and how they can be applied in education to boost the academic performance of students especially in social studies. Graphics are visual representations of objects, ideas or concepts and normally includes charts, pictures, illustrations, diagrams, and graphs. They are used to convey educational content, knowledge and information visually. The research method adopted in this paper was a systematic review of empirical literature/studies, in order to ascertain the extent to which researchers globally have investigated the use of graphics to boost academic performance of students. The narrative review that synthesizes empirical studies indicated that the usage of graphics to promote visual learning has been quite extensive across the globe and in many states in Nigeria and graphics have proven to be effective in boosting students learning and academic performance. However, such studies that have been conducted in social studies are few. Similarly, the author also noted that majority of such empirical studies have been conducted in the cognate science subjects and in mathematics, leaving the subject social studies behind. This constituted the gap which the study seek to fill. Finally, the paper concluded by calling on social studies educators, to integrate graphics as visual aids into their instructional methods and procedures to enhance students' understanding of social studies concepts to increase their academic performance.

Keywords: Graphics, Academic Performance, Visual Learning, Social Studies, Narrative Review, Empirical Studies.

Inroduction

In the realm of educational research, an increasingly captivating focus has emerged on the dynamic interplay between visual representation of learning concepts and students' academic performance. Scholars and researchers have also underscored the critical significance of aligning visual content meticulously with predefined learning objectives and strategic pedagogical visual resources in social studies (Atubi, 2021). The educational arena has undergone a discernible transformation propelled by the evolving pedagogical landscape and the integration of visual learning paradigms. Within this dynamic shift, the nexus between graphics and academic performance of students in social studies has taken the back stage. Irrespective of the technological advancements that have catalyzed a deeper insights into cognitive mechanisms, these advancements in learning with graphics is yet to be leveraged upon.

Graphics encompasses visual representations, such as charts, diagrams, graphs, and illustrations, used to convey information, concepts, or data visually. Graphics as elements of learning facilitate the visualization of historical events, geographic features, cultural dynamics, and other social studies content (Emudianughe & Akporhuaro, 2021). Graphics, ranging from visual representations to diagrams, charts, and illustrations, have also assumed a pivotal role as transformative tools that bridge the chasm between intricate concepts and efficacious learning in cognate sciences (Orjiude, 2021). Therefore, the author believe that since this is

achievable in the sciences, extending the use of graphics to social studies could be worthwhile. Therefore, in the heart of this paper lies a resounding affirmation of the cognitive engagement fostered by graphics.

In the tapestry of education, graphics emerge as illuminating threads, weaving intricate patterns of understanding and engagement. A vivid testament to their transformative potential is found in the study conducted by Brown et al., (2020), wherein the integration of graphics within mathematics education takes centre stage. The pedagogy of education is intricately woven with the power of visual aids, where graphics emerge as dynamic agents of cognitive transformation. A definitive stride in this trajectory was also taken by (Michael et al., 2019), whose rigorous study illuminated the profound impact of graphics within the realm of science education. The investigation of Micheal et al. (2019) stands as a testament to the potent role of graphics in reshaping the educational landscape and elevating students' academic attainment in the sciences.

In a similar direction, Johnson & Smith (2018) firmly established that well-designed graphics function as reservoirs of information, enhancing students' capacity to remember and retrieve what they have learned. The study also recognize the emergence of digital technology and its benefit in designing interactive graphics, which offer dynamic opportunities for graphical learning in various school subjects. However, the study recognized the challenges faced by most schools in developing countries like Nigeria on how to employ technology for graphics design.

Another major benefit of graphics which most studies on the resource such as Johnson & Smith (2018) are neglecting is the retention prowess, which graphics resonates with a profound significance. This retention prowess has positioned graphics as students' companion in the educational journey, aiding students in their pursuit of academic excellence. Perhaps the most resonant chord strike by graphics is the assertion that graphics are gateways to meaningful learning. Therefore, the contribution of this paper is confined to the impact of graphics on academic gain, and also how the incorporation of graphics in social studies can extend to enhancing the retention and recalling of information by students. Thus, the paper underscores the inherent capacity of graphics to bridge the chasm between passive reception and active engagement. As cognitive tools, graphics not only simplify complexity but also invite students to participate in constructing knowledge, thereby igniting the flame of meaningful learning.

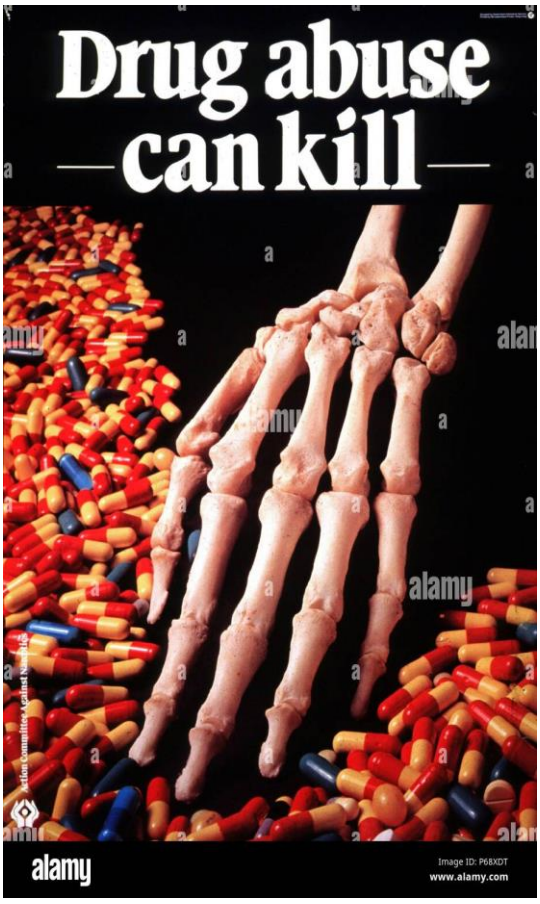

Figure 1. Graphics Showing the Negative Effect of Drug Abuse
Source: Infographics (2024).

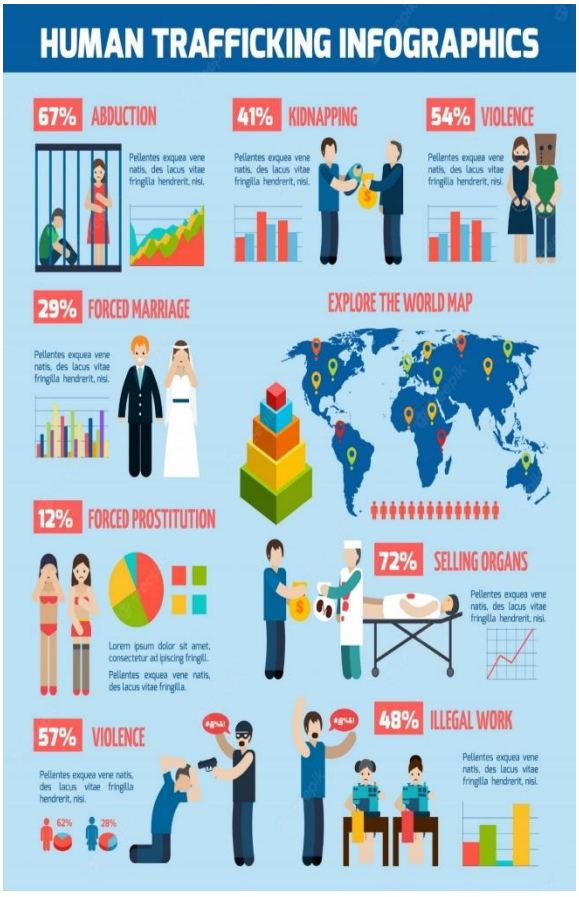

Figure 2. Graphics Effects of Human Trafficking

Figures 1 and 2, clearly suggest that the incorporation of graphics by social studies teachers will not only enrich the journey of social studies learning, but also does so in a manner that resonates with students comprehension. The two themes illustrated in the pictures which are drug abuse and human trafficking are major aspects of social studies learning, therefore graphics like this will create a great impression on the cognitive domain of the students. This viewpoint reinforces the notion that the selection, design, and presentation of visual aids should be a purposeful endeavour, tightly interwoven with the overarching educational goals, thereby fostering an environment where graphics become catalysts for elevated comprehension and enhanced engagement. Therefore, achieving a harmonious integration of graphics and academic performance of students in social studies education have necessitated this article.

Despite the global recognition and adoption of graphics as potent learning tools that elevate academic performance, their application in the realm of social studies has remained largely unexplored. This article therefore was an investigation that emerged as a compelling response to this underrepresented facet of social studies education. The findings from this article could fill the knowledge gap, contributing a valuable piece to the puzzle of enhancing academic performance of social studies students through innovative instructional resources such as graphics. Hence, the problem of the study is to examine the use and impact of graphics on academic performance of students in social studies. This was achieved through a narrative review of empirical studies that have been conducted by prior researchers.

Theoretical Framework

The study is anchored on the Cognitive Load Theory (CLT), proposed by Sweller (1988). The theory explains how the human brain processes information and how instructional design can influence learning outcomes. According to CLT, working memory is limited in both capacity and duration, meaning that the way information is presented can either enhance or hinder learning. This is particularly relevant in educational settings, where effective instruction can significantly impact academic performance. CLT identifies three types of cognitive load. Intrinsic load refers to the inherent complexity of the material being learned. Subjects or tasks that are naturally difficult, such as solving complex equations or grasping abstract concepts, demand more cognitive effort. To avoid overwhelming students, instructional materials must be designed to match their cognitive capacity. Extraneous load is caused by how information is presented and represents unnecessary cognitive effort. For example, cluttered slides, irrelevant details, or poorly structured lessons can overload students' working memory, making it harder for them to focus on important information, which negatively impacts learning outcomes. Germane load refers to the cognitive resources that are used for constructing and processing meaningful understanding, essential for long-term learning.

The implication of the CLT for this study is that graphics as visual aids can influence cognitive load. When used effectively, they simplify complex ideas and reduce the cognitive effort required to understand them, supporting better academic performance. However, excessive or poorly designed graphics can increase extraneous load and distract students, undermining their ability to focus on essential information. Cognitive Load Theory provides a valuable framework for understanding the link between the use of graphics and academic performance of students in Social Studies. By carefully managing cognitive load through the use of thoughtfully designed graphics, educators can improve students' ability to process and retain information, ultimately enhancing their academic success. This could be achieved without inundating them with cognitive overload (Fu et al., 2020).

Research Method

This study adopted a narrative review approach to review 12 empirical studies chronologically, by investigating in depth the research carried out on graphics and academic performance, providing an in-depth analysis of all research elements, procedures and findings involved in such research. The time frame of the empirical studies reviewed are from 2008 to 2022. The review began from the earliest to oldest studies that have been conducted on the problem. The criteria used to select the studies was based on those that have to do with graphics in all subjects taught at the secondary school level, and any study that have been carried out on graphics among higher education students were excluded. The author used the Google Scholar data base to identify and review relevant empirical studies.

Findings and Discussion

Narrative Review of Empirical Studies

Emudianughe & Akporhuarho (2022), delved into investigating the correlation between the integration of graphics in Social Studies instruction and the subsequent academic performance of students in Upper Basic Schools within the Delta Central Senatorial District. The study formulated three research hypotheses to guide its exploration. This study follows a correlational survey design, seeking to establish relationships between

variables. The study's target population encompassed all upper basic school students within the Delta Central senatorial district. The district comprises a total of 188 public secondary schools, hosting a collective student population of 13,394 across its eight Local Government Areas. A sample size of 335 students was selected with random sampling technique, ensuring a representative sample. The research employed a Social Studies Achievement Test (SSAT) as its primary research instrument. To analyze the data and evaluate the hypotheses, Pearson Product Moment Correlation Statistics were utilized at a significance level of 0. 05. The research findings brought to light the effectiveness of utilizing graphics materials in enhancing students' academic achievements in the realm of Social Studies. Additionally, it revealed the instrumental role of graphics in mitigating cognitive abstraction often associated with certain intricate Social Studies concepts.

Considering these findings, it was recommended that the Delta State Ministry of Education take proactive measures such as organizing seminars and workshops for teachers. This would empower educators with the knowledge and skills needed to seamlessly integrate graphic materials into their Social Studies teaching methods. By doing so, teachers can harness the power of visuals to foster a more engaging and comprehensible learning experience for students, ultimately contributing to enhance academic performance and conceptual clarity. However, generalizing the findings from this research is a limitation, because the random sampling technique which included only one senatorial district out of the three in Delta State. The study could have benefited more from a multi-stage sampling technique. However, study’s strength lines on the fact that it was conducted in social studies.

In a similar dimension, Orjiude (2021) nvestigated the impact of graphic organizers on the academic achievement of secondary school students in Biology within Enugu East Local Government Area (L. G. A), Enugu State. The research encompassed two hundred and sixty-seven students hailing from six distinct secondary schools within the Enugu East L. G. A. These participants were assigned to both experimental and control groups, forming the basis for addressing three primary research questions and evaluating three null hypotheses. The design was rooted in a quasi-experimental approach, specifically adopting a non-equivalent control group design. The research instruments employed for data collection were the Biology Achievement Test (BAT) and the Group Embedded Figures Test (GEFT). The objective items of the BAT were subjected to an internal consistency reliability assessment, yielding a reliability estimate of 0. 72 through the Kuder-Richardson Formula 20. Additionally, an interrater reliability coefficient of 0. 90 was established for the essay items of the BAT.

The collected data underwent analysis employing mean and standard deviations, alongside the utilization of Analysis of Covariance (ANCOVA) to discern patterns and relationships. Notably, the findings unveiled several key insights. Students who were instructed using graphic organizers demonstrated higher achievement mean scores in Biology compared to those who were taught using conventional lecture methods. Furthermore, the study indicated that there was no substantial variance in the mean achievement scores between male and female students. The interaction between mode (graphic organizers vs. conventional methods) and location was also found to exert a significant influence on students' achievement in Biology. The implications of these findings reverberate through the educational sphere. They underscore the importance of incorporating graphic organizers into the teaching of Biology at the senior secondary school level, to enhance students' achievement. The research findings suggest that a type of graphic organizer can be effectively employed to facilitate learning. As a result of these revelations, the study recommends the promotion and encouragement of graphic organizer use, particularly within urban school environments. By harnessing the potential of graphic organizers, educators could potentially foster improved learning outcomes and engagement among students in Biology education. The limitation of this study is that factors such as the cognitive styles of field-dependence and field-independence, that often influence the performance of students in science and mathematics subjects, were not put into consideration.

Hassan (2021) conducted a study that encompassed a vast population of Eight Thousand Five (8,057) students, of which a carefully selected sample of Two Hundred and Seventy-Six (276) students participated in the experiment. The sample was divided into an experimental group (n=153) and a control group (n=123). Four schools were randomly chosen from the population, pretested, and subjected to ANOVA. The research embarked on a comprehensive exploration into the impact of Graphic-Advance-Organizers on both interest and performance among students in Upper Basic Science Secondary Schools within the Potiskum Education zone of Yobe State, Nigeria. A quasi-experimental design employing control groups, pre-tests, and post-tests was embraced, utilizing a non-randomized approach with intact classes. Subsequently, two schools with similar mean scores were singled out for further analysis. Using a simple random sampling technique involving balloting, the selected schools were assigned to either the experimental or control group.

The data collection instruments embraced were the Basic Science Performance Test (BSPT) and the Basic Science Students‟ Interest Questionnaire (BSSIQ). Employing a descriptive statistical approach, responses to the research questions were analysed. Hypothesis 1 was examined via the Wilcoxon Signed Rank Test, while hypotheses 2 and 4 underwent ANCOVA analysis. Hypothesis 3 was subjected to Kristal Wallis analysis. The Statistical Package for Social Science (SPSS) was employed for data analysis, with a significance level of $P \leq 0.05$ determining the acceptance or rejection of stated hypotheses.

The findings emanating from the study illuminated several crucial insights. Firstly, a significant distinction was evident between the mean interest levels of students in the experimental group before and after the treatment. Additionally, a notable disparity existed in the mean post-test scores between the experimental and control groups. The research also identified a significant variance in the mean interest levels of male and female students in the experimental group before and after treatment. However, no significant differentiation emerged in the mean post-test scores of male and female students taught using Graphic-Advance-Organizers.

The implications of these findings led to a series of recommendations including the suggestion for training and retraining programs conducted by entities like SUBEB and STAN for Basic Science teachers in the application and design of Graphic-Advance-Organizers. Furthermore, the incorporation of Graphic-Advance-Organizers into the teaching process at Junior Secondary schools was advised, along with its encouragement in co-educational settings for its gender-friendly attributes.

Williams & Johnson (2021) researched the integration of interactive graphics in educational settings. Their study highlighted that interactive graphics engaged students in hands-on exploration, enabling them to manipulate variables and gain insights through experiential learning. The findings underscored the potential of interactive graphics to promote engagement, foster critical thinking, and elevate academic performance. The major constrain of the study was that it didn't study the effect of graphics on any particular subject, but looked at graphics on a general education setting. The study limitation is that Graphic-Advance-Organizers hold significant potential in enhancing both the interest and performance of Junior Secondary School Students in basic science, and not in social studies.

With an unwavering focus on mathematics education, Brown et al. (2020) also embarked on a journey to unravel the impact of graphics on students' cognitive landscapes in elementary schools. Their study resonates with the resolute confidence of well-researched attempt as it unveils a profound transformation facilitated by visual aids. The findings resoundingly endorse the notion that graphics are not mere adornments but potent tools capable of catalyzing comprehension. What stands prominently within this research is the revelation that graphics transmute abstract mathematical concepts into tangible visual narratives in elementary schools. Although this research was qualitative when compared to Williams & Johnson (2021).

Martinez et al. (2020) also illuminates the process by which graphics act as bridges, spanning the chasm between the ethereal world of abstract mathematics and the solid ground of students' understanding. In this transformation, academic achievement flourishes, transcending conventional limits to reach new heights. At the heart of their investigation lies the recognition that graphics are architects of deeper conceptual understanding. The study's findings reverberate with a sense of achievement as they emphasize that graphics are not confined to surface-level engagement. Instead, they operate as catalysts, guiding learners towards a profound engagement with mathematical concepts. The visual representations offered by graphics become anchors, grounding students in the intricate nuances of abstract ideas, and fostering a rich and lasting understanding.

The efficacy of graphics transcends disciplinary boundaries, benefiting diverse academic subjects. In a cross-disciplinary study, Johnson et al. (2019) investigated the impact of graphics on academic performance in both science and humanities subjects. In the study, Johnson et al. (2019) also explored the educational benefits of visual representations, and how graphics can help science and humanities students understand cultural diversity and the complex interactions that shape societies. Their findings revealed that graphics do more than just present information; they also engage students' cognitive abilities in meaningful ways. By offering detailed and nuanced views of different cultures, graphics help students appreciate the subtleties and complexities that define various societies. This deeper understanding serves as a powerful catalyst for enhancing students' insights and knowledge. Therefore, the body of research on the role of graphics in science education strongly supports their importance in enhancing learning in social studies. The research demonstrated that the strategic incorporation of graphics improved students' understanding and performance across various subjects, emphasizing their versatility as a learning tool. The strength of this study in comparison with others is that it covers various subjects, therefore generalizing the findings could be more practical.

Micheal et al. (2019) delved into a comprehensive investigation aimed at assessing the effectiveness of utilizing graphic organizers in enhancing the cognitive writing development skills of junior secondary school students. Additionally, the study sought to discern whether the type of school and gender had any bearing on the performance of students instructed using graphic organizers (GO). This research emerged in response to the prevalent issue of illegible handwriting among students within the junior secondary school setting. To address these concerns, a quasi-experimental design featuring a pre-test, post-test, and control group structure was employed. The study sample was meticulously selected from two junior secondary schools in Ile-Ife, Oyo State, Nigeria, utilizing a randomized process. Within the sampled classes, students were further stratified based on their gender.

The data collection process involved the application of two key instruments: the Graphic Organizer Achievement Test (GOAT) and the actual Graphic Organizer (GO). The reliability of the Graphic Organizer Achievement Test (GOAT) was established through a pilot test that employed the test-retest method over a

three-week interval. The analysis, utilizing Pearson Product Moment Correlation, revealed a robust reliability coefficient value of 78. The hypotheses generated for this study were subjected to analysis using a t-test. The findings illuminated a noteworthy trend: students who were taught using graphic organizers exhibited superior performance compared to their counterparts instructed through conventional means. Notably, the study indicated that the gender of students did not exert a significant influence on student performance when graphic organizers were employed as the teaching tool. In light of these insightful findings, the study's implications are profound. Teachers are encouraged to incorporate graphic organizers into their teaching methodologies, particularly when instructing subjects such as Cultural and Creative Arts. By leveraging graphic organizers, educators can potentially cultivate a more interactive and effective learning environment, thereby elevating students' overall performance and engagement levels.

In the same vein, Johnson and Smith, (2018) deftly navigated the integration of graphics into the pedagogical realm, focusing their lens on the domain of science education. Their findings resonated with unwavering confidence as they unveiled the transformative prowess of well-designed graphics. These visual tools emerged not merely as embellishments but as dynamic instruments capable of distilling intricate science concepts into comprehensible fragments. Central to their revelation was the revelation that graphics transcend the role of mere visual embellishments; they serve as cognitive catalysts. The study's resolute findings articulated the power of graphics to alleviate the cognitive burden placed on students when encountering complex scientific information. By employing graphics as cognitive enhancers in this study, students were able to navigate the intricate contours of scientific subjects with heightened ease, leading to deeper comprehension and enduring understanding.

Studies by Smith and Doe (2017) clearly showed how effectively integrating graphics into lessons can lead to improved learning outcomes, higher retention rates, and a deeper understanding of historical narratives and cultural complexities. Smith & Doe (2017) demonstrated that when educators strategically incorporate graphics into their teaching, students are more engaged and better able to remember the material. These visual tools not only clarify difficult concepts but also make connections between different ideas more apparent, allowing students to grasp the intricacies of historical events and cultural dynamics. The discourse so far indicate that graphics serve as vital tools for students to visualize and contextualize information, which enhances their ability to analyse and synthesize complex topics. This capacity for critical thinking is essential for developing informed and socially aware individuals. This study has some contextual differences with others because it involved the use of graphics in historical events.

Faruk (2015) in his study, embarked on an exploration into the influence of graphics on the academic performance of junior secondary school students in Social Studies within Jigawa State, Nigeria. The research contribution was structured around three core research questions and subsequently framed by three null hypotheses to guide its path. Drawing upon pertinent literature, the study's conceptual framework was constructed, encompassing the central variables of inquiry. In its pursuit of illuminating the interplay between graphics and academic performance, the study embraced a quasi-experimental research design marked by pre-test and post-test assessments. The expansive population under consideration comprised 948 JSS II students. Employing a purposive sampling technique, 214 subjects were thoughtfully selected, with the sample inclusive of 158 male and 56 female students. This diverse selection was drawn from four intact classes and subsequently partitioned into control and experimental groups. The tools employed for data collection encompassed a graphics media learning package (GMLP) and a Social Studies Academic Performance Test (SAPT). Notably, the SAPT instrument exhibited a commendable reliability coefficient of 0. 87. To unravel the insights sought, mean and standard deviation calculations were harnessed to address the research questions. In tandem, Independent Sample Test Statistics were employed to scrutinize the hypotheses, leveraging the Statistical Package for Social Science (SPSS, version 15. 0) as a tool for data analysis.

The study's revelations emerged as enlightening beacons amid the research landscape. A pivotal finding illuminated a substantial variance in mean scores between the experimental and control groups, distinctly favouring the experimental group. Additionally, the research revealed a noteworthy difference in mean scores between rural and urban students who were exposed to graphic instructional media. Interestingly, no significant disparity in mean scores surfaced between male and female Social Studies students when exposed to graphics as a teaching-learning strategy. Considering the study's insights, it is recommended that graphic instructional resources be harnessed in both concrete and abstract concept instruction for social studies for junior secondary school students. As these findings intertwine with existing educational paradigms, educators, and instructional designers in Jigawa State, Nigeria, and beyond are presented with an opportunity to enrich teaching methods by integrating graphics as a powerful tool for augmenting academic performance.

George (2008), carried out a study with the primary aim of delving into the impact of graphic organizers on the academic achievement of high school students participating in United States history courses through an online blended learning setting. The research was conducted with a total of 60 participants, evenly divided into two groups, each comprising 30 participants. Group I was assigned the role of the treatment group, while Group II served as the control group in this investigation. Employing a rigorous analytical approach, a two-tailed t-test

was applied to assess whether there existed a significant difference between the means of the post-tests conducted within the two groups. The evaluation was carried out at a significance level of 05. The findings of this meticulous study indicated that the means of the post-tests within the treatment group and the control group were not discernibly different. Consequently, the research outcomes suggested that high school students who received their United States History instruction via an online blended learning platform, enriched with the incorporation of graphic organizers, did not exhibit notably superior performance on the End-of-Course Test when compared to their counterparts who were not exposed to graphic organizers during instruction.

In essence, George's research underscores the nuanced interplay between graphic organizers, online blended learning, and academic achievement within the context of United States History education. Despite the emphasis on graphic organizers as a potential enhancement to instructional approaches, the study's outcomes highlight that their inclusion did not lead to a statistically significant difference in the overall academic performance of the high school students assessed.

It is worthy to note that the study utilized non social studies research because the same students offering the science subjects also offer social studies and social studies is compulsory across all levels. Therefore, if the use of graphics is beneficial for students in the sciences it would also be beneficial for social studies students.

Conclusion

The comprehensive narrative review which synthesizes empirical studies delved into essential concepts and studies revolving around the focal point of interest, of graphics and academic performance. To comprehensively investigate the matter, this study drew upon the Cognitive Load Theory (CTL), the theoretical framework illuminated the intricate connections between graphics and pictures, and the process of learning. What is new is that with the incorporation of graphics, students cognitive load can be reduced, this is the missing link between this article and the cognitive load theory.

In addition, the narrative review synthesized empirical studies that has been conducted across the globe, on the problem, with notable focus in countries such as Turkey, USA, and Columbia. The African context wasn't neglected either, with countries like Nigeria also contributed to this scholarly dialogue. The review highlighst the importance of social studies teachers to integrate more graphical elements in their instruction to enhance academic performance. By utilizing effective instructional tools such as graphics, students may find social studies more accessible and easier to understand, leading to higher achievement levels.

Overall, the narrative review of empirical studies in this paper demonstrate that graphics emerged as catalysts that can effectively elevate the academic achievements of students in social studies. This is the major contribution of the review. The synthesis of various studies unveiled a research gap on the lack of research on the influence of graphics and other learning factors such as students retention, interest, motivation and curiosity. The review have revealed that this key aspects of academic performance still have to be looked at. Therefore, these can become research directions in the future, as future research could investigate the relationship between graphics and these other factors of academic performance.

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