

To cite this article: Isaack Okeyo Ogol and Dr. Charles Ocharo Momanyi (2024). AN ASSESSMENT ON HOW STUDENTS' TECHNICAL COMPETENCE INFLUENCES INTEGRATION OF ICT ON ACADEMIC PERFORMANCE AMONG FORM THREE STUDENTS IN PUBLIC SECONDARY SCHOOLS IN KISII SOUTH SUB COUNTY, International Journal of Education and Social Science Research (IJESSR) 7 (3): 257-270 Article No. 948, Sub Id 1477

AN ASSESSMENT ON HOW STUDENTS' TECHNICAL COMPETENCE INFLUENCES INTEGRATION OF ICT ON ACADEMIC PERFORMANCE AMONG FORM THREE STUDENTS IN PUBLIC SECONDARY SCHOOLS IN KISII SOUTH SUB COUNTY

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DOI: <https://doi.org/10.37500/IJESSR.2024.7319>

ABSTRACT

The purpose of this study was to investigate the impact of students' technical competence ICT integration on the academic performance of Form Three students in public secondary schools in Kisii South Sub County, Kisii County, Kenya. The study utilized Academic Achievement Theory. A mixed-methods approach with a concurrent triangulation design was employed, combining both quantitative and qualitative methods. The quantitative approach was used to collect numerical data, while the qualitative approach aimed to understand teachers' and students' perceptions of ICT adoption and its impact on academic performance. The target population consisted of 195 teachers, 28 principals, and 530 students, totaling 753 individuals. Purposive sampling was used to select 28 secondary schools in Kisii South Sub County, from which six schools were chosen due to their use of ICT. Simple random sampling was then applied to select 59 teachers and 160 Form Three students, resulting in a total sample size of 225 respondents. Data collection was carried out using questionnaires for principals, teachers, and students. Qualitative data were analyzed narratively, while quantitative data were analyzed using SPSS version 24 and presented through frequency tables, percentages, and descriptive statistics. The study found that 77% of students demonstrated high technical competence. The study recommended that the Ministry of Education, Science, and Technology review and fully implement ICT integration in all public secondary schools. These findings are significant for the Ministry and contribute to the realization of Kenya Vision 2030.

KEYWORDS: competence, ICT, integration, academic achievement, performance

1. INTRODUCTION

With the advancement of information and communication technology (ICT), integrating ICT is becoming a central paradigm in contemporary education. The significant benefits of ICT include facilitating interactions between learners and instructors, as well as among learners themselves, beyond the constraints of time and space through both asynchronous and synchronous learning networks (Katz,

2020). These characteristics of ICT align with the needs of modern society, leading to a high demand for e-Learning in both business and higher education institutions. For example, the Massachusetts Institute of Technology (MIT) has highlighted the strategic importance of e-Learning by making nearly all its courses available online.

Khan (2015) describes ICT in education as encompassing a variety of technologies and delivery methods, such as Computer-Based Training (CBT), Internet-Based Training (IBT), Web-Based Instruction (WBI), Advanced Distributed Learning (ADL), Distributed Learning (DL), Distance Learning, Online Learning (OL), Mobile Learning (m-learning), and Learning Management Systems (LMS). During the 1970s and 1980s, distance learning gained popularity and was primarily conducted via mail until the widespread adoption of the Internet. By the late 1990s, digital learning environments had evolved significantly, with the World Wide Web emerging as a distributed learning platform to support both on-campus and distance learners. This technology enables access to various resources, including discussion forums, multimedia content, chat, video conferencing, and electronic blackboards (Gulatee & Combes, 2017).

In an e-learning system, students can interact with diverse instructional materials (text, audio, images, video, etc.) through the Internet at any time and from any location. Additionally, learners can communicate with instructors and peers individually or in group discussions via message boards, instant messaging, and video conferencing (Al-Ammari & Hamad, 2019). Khan (2015) posits that e-learning systems foster an open, flexible, and diverse learning environment. Moreover, e-learning can be viewed as an innovative approach that delivers a learner-centered, interactive, and facilitated learning experience accessible to anyone, anywhere, at any time. This is achieved by leveraging the features and resources of various digital technologies alongside other types of learning materials suitable for an open, distributed, and flexible learning environment.

According to Siritongthaworn and Krairit (2016), the rapid advancement of information and communication technologies, particularly Internet technologies, has created new opportunities for education. E-learning has the potential to significantly enhance teaching and learning experiences in higher education institutions, improve access to educational resources and programs, expand opportunities through distance learning, and ultimately reduce the costs of education. E-learning is defined as an innovative approach to delivering education via electronic information that enhances learners' knowledge, skills, and performance. E-learning offers numerous benefits, including personalized learning, increased access to information, standardized content delivery, on-demand availability, interactivity, self-paced learning, and confidence building (Bhuasiri et al., 2012). It provides flexible, convenient, and diverse learning environments tailored to meet the varied needs of learners. The e-learning approach can foster a culture of curiosity and inquiry among students and graduates, which is essential for lifelong learning. Compared to traditional learning methods, e-learning can offer more time-efficient approaches and potentially lower costs associated with classrooms, facilities, training, travel, printed materials, and labor (Bhuasiri et al., 2012).

According to Chimombo (2015), education is a critical factor for sustainable development. The importance of education, particularly in Africa, is growing due to the increasing need to compete globally (Hawkins, 2022). Educational settings in developing countries often differ significantly from those in developed nations, characterized by lower quality education and limited access to schools in rural areas due to long distances and high opportunity costs (Chimombo, 2015). Chimombo (2015) suggests that improving country-specific conditions related to compulsory and free education is essential to enhance general access to education. Article 26 of the 1948 UN Universal Declaration of Human Rights already mandates the right to free and compulsory education for all (UN Human Rights, 2018). As connectivity to the global network increases annually, it becomes a vital factor for individual opportunity, success, and fulfilment.

The integration of technology into education has been ongoing for the past two decades. In 1993, William D. Graziadei recorded the first online lecture through the Virtual Instructional Classroom (Cross, 2015). Bhattacharya and Sharma (2017) define e-learning as the delivery of course content through electronic means, including computer-based learning, online learning, and distance education. E-learning incorporates modern technology into classrooms, which can sometimes include independent learning without mediation (Voogt & Knezek, 2019). Schools, colleges, and universities, which are the primary users of e-learning, have focused on this approach to enhance learning processes. For successful e-learning implementation, educational institutions must first assess their e-readiness to integrate the technology (Saekow & Samson, 2011).

Kenya has established a national ICT policy aimed at creating an e-enabled and knowledge-based society by 2015. As technology transforms the world, it is also revolutionizing the learning and teaching environment. Various learning approaches, such as e-learning, blended learning (Maier, 2017), and distance learning, already utilize information and communication technology (ICT). ICT can significantly benefit students in rural areas by enabling them to attend classes remotely and motivating them through initiatives like the "Group Learning Sets" (GLS). While the potential of e-learning is promising, the disparity between developed and developing countries makes knowledge transfer both challenging and costly.

E-learning involves the use of ICT by teachers and learners. Schmidt (2015) defines e-learning as encompassing conventional training, courses, ad-hoc training, selected learning objects, formalization through document collections, and community formation via social software. Numerous e-learning programs are already available in developing countries, developed through various national and international initiatives, such as the GLS program by Computer Aid International in collaboration with Kenyatta University (Kohn et al., 2018).

According to Lockwood and Gooley (2022), the growth of e-learning programs is driven by the need to provide education more cost-effectively, increase access to information, enhance learning, and offer

greater flexibility. Despite the significant interest in e-learning, Stephenson (2021) notes a lack of systematic research into its overall effectiveness as a learning medium. Nonetheless, several e-learning courses aimed at promoting sustainable development demonstrate the potential of e-learning to reach large audiences and inspire change.

The Kenyan government recognizes the benefits of ICT integration in education at all levels, including administrative tasks. The Kenya Economic Recovery Strategy for Wealth and Employment (2013-2017) emphasizes the importance of ICT for curriculum improvement. The Ministry of Education, Science, and Technology (MoEST) envisions ICT as a universal tool for education and training. To achieve this vision, educational institutions need to be equipped with appropriate ICT infrastructure, competencies, and policies (Kenya National ICT Strategy, GoK 2016).

Effective planning is crucial for the successful implementation of ICT integration. Pelgrum and Law (2023) highlight the central role of policymakers and educational planners, noting that there are policy and planning implications at each step of implementation. In Kenya, educational institutions are integrating technology into teaching, administration, and research due to its utility. After years of efforts to embrace technology, the Kenyan government promulgated a National Information & Communications Technology (ICT) Policy in January 2006 to improve the livelihoods of Kenyans by ensuring accessible, efficient, reliable, and affordable ICT services (Farrell, 2017). This policy aims to encourage the use of ICT in schools, colleges, universities, and other educational institutions to enhance the quality of teaching and learning. However, for learning institutions to successfully integrate and benefit from technology, a certain level of readiness is required.

In Kenya, however, it is uncertain to what extent integration of ICT influences academic performance in secondary schools. The success of secondary school pupils is dependent on the knowledge of integration of ICT by the school Management (Musungu & Nasongo, 2014). Similarly, Hassan (2011) says that it is essential to evaluate the administrative effectiveness and success of a school in relation to the academic performance. In other words, such performance comes because of the efficient role of the principal's knowledge of ICT integration.

While it is true that students in Kisii South Sub County have the same access to education as students in neighboring sub counties, a number of public secondary schools have recorded and continue to record low academic performance due to lack of integrating ICT. The results illustrate declining academic performance in secondary schools that are publicly funded. This occurs despite the presence of a leadership strategy that endorses cautious integration of ICT as a remedy for poor academic performance. This distressing performance has continued despite the reality that the majority of institutions in the sub-county are thought to have enough numbers of qualified teachers and suitable ICT facility. As a result of public pressure on school administrators to increase academic performance on assessments of form three students, schools have used a number of performance enhancement strategies to ensure success. Nonetheless, there are occasions when some of the tactics utilized by

schools to enhance academic achievement lack scientific support. Others, like asking students to repeat courses and demanding additional costs, have been proven ineffectual (Getange & Obar, 2016; Irungu, 2020).

Kumari (2023) and Maruf et al. (2022) demonstrate that integration of ICT is among the most successful strategies for enhancing and promoting student performance in schools. It is unknown whether or not school administrators have adopted instructional management tactics, despite the importance of integration of ICT in assisting teachers' instructional practices and students' learning and accomplishment. Second, it is uncertain whether or not use ICT strategies, and third, the impact of these integration on creating outstanding learning and, ultimately, enhanced school performance is unknown. This research examines the integration of ICT in learning and its influence on the academic accomplishment of form three students in public secondary schools at Kisii South Sub-County in Kisii County, Kenya, a gap the ongoing study intends to fill.

Kumari (2023) and Maruf et al. (2022) demonstrate that integration of ICT is among the most successful strategies for enhancing and promoting student performance in schools. It is unknown whether or not school administrators have adopted instructional management tactics, despite the importance of integration of ICT in assisting teachers' instructional practices and students' learning and accomplishment. Second, it is uncertain whether or not use ICT strategies, and third, the impact of these integration on creating outstanding learning and, ultimately, enhanced school performance is unknown. This research examines the integration of ICT in learning and its influence on the academic performance of students in public secondary schools at Kisii South Sub-County in Kisii County, Kenya. As a result of public pressure on school administrators to increase academic achievement on assessments of form three students, schools have used a number of performance enhancement strategies to ensure success. Nonetheless, there are occasions when some of the tactics utilized by schools to enhance academic achievement lack scientific support. Due to the fact that students in Kisii South Sub County have the same access to education as children in neighbouring sub counties, lack of integration of ICT among form three students in public schools in the county has affected students ability to e-learning, causing national test scores to suffer perfection and have consistently shown stagnated learning. According to a statement from a sample of public secondary schools in the year 2022, Kisii South Sub-County, the end year examinations for form three students posted a mean score as follows: 23.6% in 2018, 19.5% in 2019, 18.1% in 2020, 16.3% in 2021, and 11.7% in 2022, indicating a decline in educational outcomes in public secondary schools because of the students' inability to access on-line learning. It's on this backdrop that the researcher feels obliged to conduct a study on integration of ICT and academic performance among form three students in public secondary schools in Kisii South Sub County. Good academic success in form three usually elevates good academic achievements in the national examination in form four.

2. LITERATURE REVIEW

2.1 Theoretical Literature

The concept of academic achievement, as proposed by Walberg, will also influence this research. According to this theory, learning outcomes are shaped by the psychological characteristics of learners and their immediate learning environments. Walberg (2012) identified nine key factors that affect students' academic achievement: students' aptitude or prior achievements, motivation, age or developmental stage, the quantity and quality of instruction, the classroom environment, parental involvement, the home environment, peer groups, and exposure to mass media outside the classroom. Walberg (2012) underscores the significance of the psychosocial characteristics of classroom learning settings in predicting student progress. These characteristics are vital for curriculum assessment studies and can aid teachers in organizing lessons more effectively.

To enhance educational productivity and efficiency, this study must address both educational process objectives and achievement objectives. This theory is relevant as it interprets educational process goals to include learners' perceptions of the social environment, creativity, self-concept, extracurricular activities, and subject interest. In other words, academic progress and motivation would decline if these emotions and experiences were ignored in favor of conventional goals determined solely by test scores.

2.2 Students' Technical Competence in ICT integration and academic performance

The quality of the lecturer and the student support systems were found to be the most significant variables in the provision of excellent education, as shown by research that was carried out by Hill, Lomas, and McGregor (2023). Research has shown that students who have previous expertise with the use of information technology will, on average, have a higher level of performance in an online learning environment compared to students who do not have such experience. According to Haverila (2011), students' past expertise in utilizing information technology is very significant in e-learning, despite the fact that it is not required. Students respond in a variety of ways to shifting paradigms of learning; hence, in order to guarantee the success of the implementation of e-learning modules, modifications should be applied across the board and tailored to accommodate the various learning styles. In the event that schools do not take such action, they face the danger of experiencing poor success rates or failures during the implementation of e-learning. This is due to the fact that e-learning demands a very high degree of self-motivation, which is usually absent among the majority of learners. The mindset of the learner is another essential component that plays a role in the implementation of e-learning systems. According to a significant body of research (Arbaugh, 2022; Arbaugh & Duray, 2022), the learner's attitude toward computers or information technology is a significant determinant in the level of pleasure they have with e-Learning. Learners' perceptions with regard to their participation in e-Learning activities via the use of computers constitute the concept of learner attitude. Electronic learning is primarily dependent on the use of computers as supplementary instruments. According to Piccoli et al. (2023), a more positive attitude toward information technology (IT) would result in more pleased and productive learners in an e-Learning environment. For instance, when

students are not intimidated of the difficulty of using computers, they will have a more positive attitude toward IT. As an additional point of interest, Hannafin and Cole (2023) suggest that attitude has an effect on learning interest. Attitudes that are favorable toward computers improve the likelihood of successfully learning how to use them, but attitudes that are unfavorable to computers decrease interest. This study thus considers the attitude that learners have towards computers to be an essential component in determining how satisfied they are with their learning.

According to the findings of certain studies, the academic performance of students may be influenced by both the engagement effects and the learning-style effects. Despite the fact that the link between involvement and performance is complicated in general, Carini et al. (2016) discovered that there is a positive correlation between engagement and student performance with regard to engagement. A variety of empirical investigations provide credence to their findings, including the following: In their study, Rodgers and Ghosh (2021) found that the amounts of effort (or engagement) that students put out were significantly relevant in influencing how well they performed on examinations. However, different research that was conducted in the context of e-learning (Davies and Graff, 2015) discovered that participation in online activities did not have a statistically significant influence on the performance of the test. Several other studies have been conducted in this field to investigate the question of what factors impact the length of time that a student spends engaging in e-learning. Arbaugh (2022) contends that this will be contingent upon the mentality of the learner with regard to the perceived value of this distribution medium, as well as the simplicity with which it may be used. The students who spend more time on internet-based courses are the ones who tend to take greater ownership of the learning process, and as a result, they gain the biggest learning benefit (excellent performance as evaluated by grades). This is how it is proposed that students who spend more time on internet-based courses do better. Taking this into consideration, it is possible to draw the conclusion that we should anticipate discovering a strong and favorable connection between the degree of participation in e-learning and academic success. According to Kearsley and 2020, one of the most essential factors in the success of electronic learners is the capacity to efficiently manage their time spent studying. According to Palloff and Pratt (2019), the amount of time that is required to engage in a Web-based course may be two to three times more than the amount of time that is required in a traditional classroom setting. According to Roblyer (2019), students who struggle to manage their time effectively are more likely to do poorly in a remote learning course or to withdraw entirely from the subject altogether. According to Gibson (2018), one of the most important factors that determines the level of persistence of distance learners is their self-efficacy for learning at a distance. Additionally, it was shown that personal views of competence (self-efficacy) are connected to learners' beliefs of their capacity to successfully manage their time.

Students are more likely to learn and/or do better than students who do not have strong time management skills. This is because students who spend their time effectively are more likely to learn. Students need to be able to manage their time well, have self-control, and be proficient in computer skills in order to be successful in the era of e-learning. A student's past experience with information

technology, such as owning a computer at home, as well as their attitude toward e-learning, is essential to the success of e-learning. According to the findings of study conducted by Beyth-Marom, Chajut, Roccas, and Sagiv (2023), e-learning courses are found to be positively compared to conventional learning, and students who participate in e-learning courses perform at a level that is comparable to or even higher than students who participate in traditional learning. This indicates that students are more likely to adopt e-learning if it makes their learning easier and gives them the opportunity to study whenever and whenever they choose, in the manner that best suits them (Papp, 2021).

3. MATERIALS AND METHODS

3.1 The materials

The research utilized a mixed-methods approach, incorporating both quantitative and qualitative methods. According to Creswell (2019), quantitative methods involve asking specific questions, gathering quantifiable data from a large number of participants, analyzing this data using statistical techniques, and conducting the inquiry in an objective and unbiased manner. For this study, quantitative data was collected through questionnaires, interviews, and focus groups. In contrast, the qualitative approach relies on participants' views, with the researcher describing and analyzing these responses based on the study's objectives.

Oso and Onen (2015) define the target population as the total number of subjects that are of interest to the researcher. In this study, the target population consisted of teachers, school principals, and students in Kisii South Sub-County. The sub-county has an estimated population of 674 teachers and 14,000 students, with 33 secondary schools (Embu County Director of Education, 2015). Specifically, the study targeted 195 secondary school teachers, 33 principals, and 530 Form Three students, resulting in a total target population of 758 respondents. The target population and respondents is listed in the table 1;

Table 1: Target population

Respondents	Target population
Teachers	195
School principals	33
Form three students	530
Total	758

Source, field 2023

3.2 Methods

Orodho (2018) noted that data analysis involves manipulating collected data using statistical tools to compute various figures or percentages. In this study, data was analyzed quantitatively using descriptive techniques. Mugenda & Mugenda (2023) define data analysis as the process of organizing,

structuring, and finding meaning in the collected information. Quantitative data will be analyzed using descriptive statistical methods, including mean and standard deviation.

Likert scale items in the questionnaire, which measure implementers' attitudes towards different aspects of e-learning, range from strongly agree (SA) to strongly disagree (SD). This approach allows the qualitative data to be analyzed quantitatively using SPSS, yielding measures such as mean, standard deviation, and percentages. The data collected through the questionnaire was thoroughly edited and checked for completeness and clarity. Quantitative data will be organized according to the questionnaire outline to ensure accurate coding for each variable. The data was then be cleaned, tabulated, and analyzed using the Statistical Package for Social Sciences (SPSS 24.0). The results were presented in tables, graphs, charts, and written discussions.

4. RESULTS AND DISCUSSION

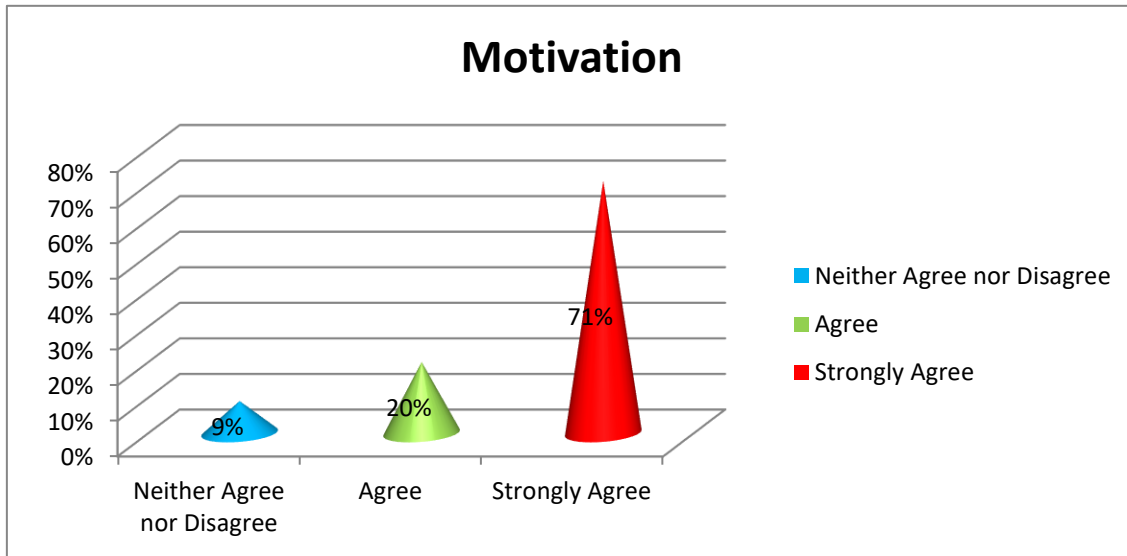
4.1 Response Rate

The response rate was 205 (91%). Out of 225 questionnaires and interview schedules distributed, 205 were returned, while 20 (9%) were not returned. A response rate of 91% is considered reliable, as it exceeds the minimum acceptable threshold of 70%.

4.2 To examine how student competence in e-learning influence academic performance in public secondary, school

The researcher wanted to find out whether the respondents were motivated to complete the online courses. The findings revealed that the respondents were enthusiastic about the online courses since they offered more content and were more interactive. Thus, the respondents were motivated to complete the online courses. These findings were as illustrated in figure 1 below

Figure 1: motivation



The findings above show that 71% of the respondents indicated that they strongly agree that they were motivated to complete their online courses. A further 20% agreed that they were motivated to complete the courses and finally 9% were unsure as to whether or not they were motivated to complete the online courses.

4.2.1 Does your school have access to commercial power supply?

The researcher sought to find out whether the schools had access to a commercial power supply. The findings were as shown.

Table 2: Access to commercial power supply

Response	Frequency	Mean	(%) mean score	
Yes	43	21.5	77	3.04
No	13	6.5	23	2.89
Total	56	28	100	

Source: Data Analysis 2023

The findings illustrated that the majority of the respondents 43 (77%) with mean score of 3.04 had access to power at their schools. This, they attributed to the rural electrification program. This ensured power to the computer labs thus resulting in uninterrupted learning. However, as the findings indicated, 13 (23%) respondents with a mean score of 2.89 stated that they had no power supply. Power was supplied by the Kenya Power company while others have generators and are in the process of acquiring the commercial power supply. This finding contradicts the findings of Johnson, (2015) who reported that there was a relationship between student learning style and academic performance and nothing with power supply.

5.1 Conclusion

This study aimed to evaluate the impact of e-learning adoption on academic performance in public secondary schools. With the advent of information technology, access to information has become global, leading schools to adopt e-learning modules to complement traditional teaching methods. This exposure has broadened the scope of information available to teachers and students and improved communication by making information sharing easier. However, many students struggle with the complexities of e-learning, as it requires a high level of commitment and familiarity with IT as a learning tool. Students' technical competence, indicated by their engagement level and commitment, impacts their adoption of e-learning modules.

5.2 Recommendations

Based on the findings of the study, which revealed that the integration of ICT positively correlates with and enhances the academic performance of learners, the researcher makes the following recommendations:

The Ministry of Education, Science, and Technology should integrate ICT in all public secondary schools nationwide. Adequate mechanisms should be established to recognize teachers' efforts, and the working age should be re-evaluated to ensure teachers' ability to engage in online studies.

The Ministry of Education, Science, and Technology should ensure that quality computers are installed in schools to enhance performance. This will enable teachers to efficiently deliver on educational objectives.

The Ministry of Education, Science, and Technology should implement efficient and timely supervision of computer use to improve teachers' online teaching and learning, ensuring the completion of syllabi.

Linkages should be organized with the communities surrounding the schools to foster improved positive relationships between teachers and students, leading to better academic performance.

Many teachers in the Sub-County have indicated difficulties in making the subjects they teach among the best-performed subjects. The Ministry of Education should identify and enforce ways to improve ICT for online learning to achieve better results in KCSE examinations.

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