

Effect of instructional capacity on the effectiveness of undergraduate physiotherapy programme in Kenyan universities

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ABSTRACT

Physiotherapy education plays an important role in preparing competent health professionals capable of responding to the changing healthcare needs of the Kenyan population. The effectiveness of undergraduate physiotherapy programmes is, however, influenced by the adequacy and quality of instructional capacity, including faculty qualifications and expertise, teaching and learning resources, mentorship, clinical supervision, staffing, and institutional support. This study examined the effect of instructional capacity on the effectiveness of undergraduate physiotherapy programmes in Kenyan universities. The study was guided by Stufflebeam's Context, Input, Process, Product (CIPP) Model, which provided the theoretical framework for evaluating programme effectiveness by examining contextual conditions, instructional inputs, implementation processes, and programme outcomes. A convergent parallel mixed-methods design was employed. The target population comprised 609 stakeholders, from whom a sample of 234 respondents was selected using multistage sampling procedures. Quantitative data were collected using questionnaires and analysed using descriptive statistics and linear regression in SPSS version 27. Qualitative data were obtained through key informant interviews and analysed thematically. Ethical approval and relevant research procedures were observed throughout the study. The findings established that instructional capacity had a statistically significant positive effect on the effectiveness of undergraduate physiotherapy programmes. Regression analysis showed that instructional capacity significantly predicted programme effectiveness ($B = 0.545$, $\beta = 0.375$, $t = 6.164$, $p < .05$), explaining 14.1% of the variance in programme effectiveness ($R^2 = 0.141$). Descriptive findings indicated that faculty expertise and teaching effectiveness were relatively satisfactory, with a mean score of 3.73, while the availability of learning resources and facilities was moderate ($M = 3.14$). Financial support was rated relatively low ($M = 2.20$). Qualitative findings further revealed challenges associated with increasing student enrolment, inadequate staffing, competing clinical responsibilities, and insufficient teaching and learning resources, which constrained effective programme delivery. The study concludes that instructional capacity is an important determinant of the effectiveness of undergraduate physiotherapy programmes in Kenyan universities. Strengthening faculty capacity, ensuring adequate staffing, improving teaching and clinical learning resources, and enhancing institutional and financial support are therefore essential for improving programme effectiveness. The study recommends that universities strengthen faculty development programmes, recruit and retain adequate numbers of qualified academic and clinical staff, provide sufficient teaching and learning facilities, and enhance collaboration between universities and clinical practice institutions. These measures would contribute to improved instructional quality and the preparation of competent physiotherapy graduates capable of meeting Kenya's evolving healthcare needs.

Keywords: Instructional Capacity, Programme Effectiveness, Physiotherapy Education, Undergraduate Education, CIPP Model, Kenyan Universities

I. INTRODUCTION

Physiotherapy education has changed dramatically in response to shifts in worldwide educational standards, advances in technology and modifications in healthcare practices (Dean *et al.*, 2011). Physiotherapy education often started as unofficial apprenticeships or training programme within hospitals and medical facilities in the late 19th and early 20th centuries (Beecroft, 2022). To treat musculoskeletal diseases and advance rehabilitation, the main focus was on manual therapy, massage, and exercise approaches. Formal educational programme gradually arose to offer aspiring physiotherapists systematic training as the profession gained acceptance. One of the first organisations to provide a structured curriculum in physiotherapy education, for instance, was the McMillan School of Physiotherapy, which was founded in 1919 in England (Littell & Johnson, 2003; Sharma, 2012).

Physiotherapy education has continued to evolve in response to advances in healthcare practice, technology and evidence-based research. There is a growing emphasis on interprofessional education, lifelong learning and clinical

specialization to meet the complex needs of patients and healthcare systems (World Confederation for Physical Therapy, 2017). Additionally, with the globalization of healthcare and increased mobility of healthcare professionals, efforts are underway to harmonize standards and promote reciprocity of qualifications through initiatives such as the Mutual Recognition Agreement for Physiotherapy Professionals (European Commission, 2018). To address the functional restrictions and disabilities brought on by a variety of medical diseases, the World Health Organization (WHO) acknowledges the significance of rehabilitation services, including physiotherapy, on a worldwide scale. The WHO emphasizes the necessity of comprehensive rehabilitation programmes integrated within healthcare systems. Overall, physiotherapy education has progressed from its humble beginnings to become an integral part of modern healthcare systems worldwide, with ongoing efforts to ensure quality, relevance, and professionalism in education and practice.

In Africa, physiotherapy education has undergone significant development over the years, reflecting the continent's evolving healthcare landscape and educational priorities (Tsampiras, 2018). Historically, physiotherapy education in Africa often started as short-term training programmes or workshops, with a focus on basic rehabilitation techniques to address the needs of individuals with disabilities or musculoskeletal conditions (World Confederation for Physical Therapy, 2019). However, as healthcare systems in Africa have become more complex and specialized, the demand for qualified physiotherapists has increased, leading to the establishment of formal educational programmes. There has been a notable expansion of physiotherapy education across Africa, with the establishment of schools, colleges, and universities offering undergraduate and postgraduate programmes in physiotherapy. These institutions of higher learning in Africa have been at the forefront of physiotherapy education offering comprehensive curricula that integrate theory, practical training and clinical experience (Van der Merwe, 2020; Timothy, 2022).

Despite this progress, challenges remain in ensuring access to quality physiotherapy education across Africa (Govender et al 2019). Limited resources, including faculty expertise, educational infrastructure and clinical placement opportunities, pose significant barriers to the expansion and sustainability of physiotherapy programmes in many African countries (Gupta *et al.*, 2014). Additionally, there is a need for greater collaboration between academic institutions, healthcare facilities and regulatory bodies to standardize curricula, accreditation processes and professional standards in physiotherapy education (Ibrahim *et al.*, 2019). To overcome these issues and improve physiotherapy education in Africa, initiatives are being undertaken. Across the continent, physiotherapy educators and professionals may network, advocate and build capacity through initiatives like the World Confederation for Physical Therapy (WCPT) Africa Region and the African Physiotherapy Network (APN). These organisations are striving to raise the quality, applicability, and accessibility of physiotherapy education in Africa by encouraging cooperation, exchanging best practices, and making the most of available resources. In the end, this will improve health outcomes for people on the continent (World Confederation for Physical Therapy [WCPT], 2018; Naidoo *et al.*, 2020; Morris *et al.*, 2021).

In Kenya, the importance of physiotherapy education and rehabilitation services in healthcare has been recognised by health professionals. The physiotherapy education in Kenya traces its roots back to the establishment of the first physiotherapy training programme in Kenya in 1966 with Diploma in physiotherapy being the only course offered at Kenya Medical Training College (KMTC). This initial training was aimed at addressing the rehabilitation needs of individuals with disabilities and musculoskeletal conditions (Ngigi, 2017). In 2011, Jomo Kenyatta University of Agriculture and Technology become the first university to offer a Bachelor of Science degree. Physiotherapy education expanded with the establishment of additional training programmes at universities and colleges across the country. Specific universities offering undergraduate Physiotherapy programmes are Alupe University, Amref University, Jomo Kenyatta University of Agriculture and Technology, Masinde Muliro University of Science & Technology and Alupe University which offers undergraduate and postgraduate programmes in physiotherapy. Students are provided with comprehensive training in rehabilitation sciences, clinical skills and evidence-based practice. However, challenges persist in physiotherapy education in Kenya, including limited resources, faculty shortages, and inadequate clinical placement opportunities.

1.1 Statement of the Problem

Physiotherapy education in Kenya has expanded significantly since the establishment of the first training programme in 1966, with universities now offering undergraduate degrees aimed at producing competent professionals to address the growing demand for rehabilitation services. Despite this expansion, concerns persist regarding the capacity of these programmes to effectively prepare graduates for the complexities of contemporary healthcare practice. The World Health Organization (2019) emphasizes the necessity of comprehensive rehabilitation services integrated within healthcare systems, yet the extent to which Kenyan undergraduate physiotherapy programmes are equipped to deliver such competencies remains inadequately evaluated. Instructional capacity, encompassing faculty qualifications, teaching experience, availability of learning resources, mentorship, and clinical supervision, is widely recognized as a critical determinant of educational quality in health professions education (Harden, 2016; Steinert et al., 2016). Empirical evidence from sub-Saharan Africa indicates that instructional capacity is often constrained by shortages of qualified faculty, high student-to-teacher ratios, and limited access to educational resources, all of which negatively

affect teaching quality and student learning outcomes (Migosi et al., 2012). In Kenya, similar constraints have been reported, with institutions facing difficulties in recruiting and retaining qualified faculty, thereby impacting the overall effectiveness of physiotherapy programmes.

Despite the recognized importance of instructional capacity, there is limited empirical evidence on how it specifically influences the effectiveness of undergraduate physiotherapy programmes in Kenyan universities. Existing studies have focused on broader aspects of health professions education or specific clinical outcomes, but few have systematically examined the relationship between instructional capacity variables—such as faculty expertise, teaching resources, mentorship, and clinical supervision—and programme effectiveness within the Kenyan context. Furthermore, the perspectives of key stakeholders, including students, graduates, faculty, clinical supervisors, and regulatory bodies, have not been adequately integrated to provide a comprehensive understanding of this relationship.

The absence of such evidence creates a gap in knowledge that hinders informed decision-making by university administrators, policymakers, and regulatory bodies such as the Physiotherapy Council of Kenya. Without a clear understanding of how instructional capacity affects programme effectiveness, efforts to improve physiotherapy education may be misdirected or insufficient. This study therefore sought to determine the effect of instructional capacity on the effectiveness of undergraduate physiotherapy programmes in Kenyan universities, with the aim of generating evidence to inform curriculum development, resource allocation, faculty development, and quality assurance mechanisms in physiotherapy education.

1.2 Research Objectives

To determine the effect of instructional capacity on the effectiveness of undergraduate physiotherapy programme in Kenyan universities.

1.3 Research Hypotheses

H₀₁: Instructional capacity has no statistically significant effect on the effectiveness of undergraduate physiotherapy programme in Kenyan universities.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 CIPP Model

Stufflebeam created the Context, Input, Process, and Product (CIPP) Model in the 1960s. It is a thorough framework for assessing initiatives and programme in a range of sectors, such as social services, healthcare, and education. The model offers an organised method of assessment that concentrates on many facets of the creation and execution of a programme. The CIPP model comprises several components that cater to distinct inquiries concerning programme assessment. These components aid stakeholders in comprehending the efficacy, efficiency, and pertinence of the programme in accomplishing its goals. By systematically applying the CIPP model to curriculum evaluation, educators and stakeholders can gain valuable insights into the strengths and weaknesses of the curriculum, make informed decisions for improvement, and ensure that it remains responsive to the evolving needs of learners and society (Sohail & Noreen, 2020; Mpuangnan, 2021; Adhikari & Khadka, 2023).

2.1.2 Components of the CIPP Model

2.1.2.1 Context Evaluation

Evaluators look at the programme's external surroundings and circumstances in the context section, including resource availability, policy frameworks, and societal demands. This phase aids in comprehending the larger framework within which the programme functions and in spotting prospective obstacles or openings that could affect its execution and results. The programme's design and delivery are greatly influenced by contextual factors, and evaluating them improves alignment with organisational aims and goals. The principles of the framework that directs curriculum evaluation stem from the outside forces that shape the curriculum, including cultural contexts, societal demands, and educational policies. This aids in comprehending the curriculum's aims and objectives in relation to the larger educational framework and its applicability to the requirements of the community, employers, teachers, and students. It also takes into account the resources' accessibility, including financing, facilities, and faculty knowledge (Kiprono, 2012).

Understanding the bigger picture of how Kenya's physiotherapy education programme fit into the nation's healthcare system and sociocultural environment is informed by the context. It made it possible for the researcher to look at how various elements of the larger system like faculty credentials, curriculum design, and resource availability interacted with one another. This means considering factors like governmental laws, healthcare policies, and societal norms that have an impact on physiotherapy education.

2.1.2.2 Input Evaluation

The programme's strategy and resources, particularly its financial, material, and human resources, was the main emphasis of the input component. The suitability and sufficiency of these inputs in advancing the goals and activities of the programme are evaluated by evaluators. In this phase, elements included infrastructure, funding sources, staff credentials, and curriculum design were reviewed. Through the process of assessing inputs, stakeholders may identify opportunities for enhancement and guarantee that resources are employed efficiently to augment the calibre and efficacy of programme. The guiding principles of input were derived from an analysis of the resources used in curriculum development, including faculty expertise, financial support, and curriculum materials. This analysis assesses the suitability and quality of the curriculum content, instructional materials, and teaching strategies. Additionally, input evaluation attempts to assess how well the curriculum complies with learning objectives, standards and accrediting requirements from the perspective of stakeholders (employers, teachers, students, and community members). This guarantees that the perspectives of the stakeholders are incorporated into the curriculum design (Kiprono, 2012).

The evaluation of input helped to understand how various factors impact the programme's effectiveness and identified any deficiencies or gaps that needed to be addressed in physiotherapy education programme. These factors include the diversity of student populations, interactions between professors and students, and possibilities for collaborative learning.

2.1.2.3 Process Evaluation

According to Kiprono (2012) the actual implementation of a programme, including the procedures, actions, and interactions involved in providing programme services, is the focus of the Process component. The execution of the programme is examined by evaluators, including stakeholder involvement tactics, service delivery systems, and instructional techniques. This phase aids in evaluating the degree of programme implementation fidelity, locating obstacles or difficulties, and making modifications to enhance programme efficacy and delivery. programme management and improvement decisions are informed by process evaluation, which offers insights into the programme's daily operations. The process's guiding principles emerge from the way the curriculum is implemented in terms of teaching techniques, learning exercises, and evaluation procedures. The purpose of this is to evaluate how well teaching and learning procedures contribute to the desired learning outcomes. Through this approach, the curriculum's support services, feedback systems and level of student participation are examined. During this time, any obstacles or difficulties in implementing and delivering the programme effectively are noted, and additional suggestions for practical ways to improve it are provided. It determines the most efficient teaching techniques to increase student involvement, learning outcomes, and social interaction, all of which enhance the effectiveness and efficiency of physical therapy.

2.1.2.4 Product Evaluation

The programme's effects and results, such as the extent to which goals are met and the advantages that stakeholders experience are the main emphasis of the product component. The programme's short, intermediate, and long-term effects such as modifications in knowledge, attitudes and behaviours are evaluated. To measure the effectiveness, efficiency and sustainability of the programme, data collection and analysis are required at this point. Through product evaluation, stakeholders can ascertain the programme's overall impact and value and make well-informed decisions on programme change or continuation. Moreover, Frantz (2007) proves the accountability to curriculum funders and other major stakeholders in curriculum development. The Product is the final result of the curriculum evaluation process, which assesses how the curriculum affects student learning, competencies and attitudes. Examining how well the curriculum prepares students for further education, the workforce and civic engagement has a long-term impact on how the curriculum shapes students' careers and their ability to contribute to society and the economy. The assessment of a product is based on input from stakeholders, including employers, graduates and community members, evaluating how well the curriculum fits their needs and how it is relevant to them.

2.2. Empirical Review

Instructional capacity, including faculty qualifications, teaching experience, and availability of learning resources, is a key determinant of educational quality. Input evaluation within the CIPP model emphasizes the adequacy of these resources in supporting programme implementation (Zhang et al., 2011). Research indicates that qualified and adequately trained faculty are essential for effective teaching and student learning in health professions education (Harden, 2016). Faculty development programmes, mentorship, and continuous professional development have been shown to enhance instructional effectiveness and improve student outcomes (Steinert et al., 2016). Additionally, access to teaching and learning resources such as simulation laboratories, digital tools, and updated instructional materials is critical for delivering high-quality education.

In sub-Saharan Africa, instructional capacity is often constrained by shortages of qualified faculty, high student-to-teacher ratios, and limited access to educational resources (Migosi et al., 2012). These challenges negatively affect

teaching quality and limit opportunities for individualized learning. In Kenya, similar constraints have been reported, with institutions facing difficulties in recruiting and retaining qualified faculty, thereby impacting the overall effectiveness of physiotherapy programmes (Ngigi, 2017).

Empirical evidence consistently identifies instructional capacity as a key determinant of educational quality. Steinert et al. (2016) found that faculty development programmes significantly improve teaching effectiveness and student learning outcomes in health professions education. Similarly, Harden (2016) emphasized that qualified and well-trained educators are essential for delivering competency-based education. However, studies in sub-Saharan Africa highlight persistent challenges. Kiprono (2012) reported that shortages of qualified faculty, high student-to-teacher ratios, and limited teaching resources negatively affect educational quality. In Kenya, Ngigi (2017) found that resource constraints and inadequate faculty capacity undermine effective teaching and learning.

III. METHODOLOGY

3.1 Research Design

The study employed a mixed-methods approach, specifically a convergent parallel design, in which quantitative and qualitative data are collected concurrently, analyzed separately, and then integrated during interpretation to provide a comprehensive understanding of the effectiveness of undergraduate physiotherapy programmes. This design is particularly appropriate for programme evaluation studies as it allows for the triangulation of findings, thereby enhancing the validity, reliability, and completeness of the results (Creswell & Plano Clark, 2023).

3.2 Study Area

The study focused on public universities in Kenya offering undergraduate physiotherapy programmes. These universities are spread across Kenya, each provided distinct qualities, resources and pedagogical methods for physiotherapy education. The universities were Alupe University located in Busia, Busia County, Masinde Muliro University of Science and Technology (MMUST) located in Kakamega Town, Kakamega County and Jomo Kenyatta University of Agriculture and Technology (JKUAT) situated in Juja, Kiambu County. The uniqueness of universities influences the trajectory of future physiotherapy practice by providing essential training to aspiring professionals. The selected universities operate under different academic policies and infrastructures designed to provide physiotherapy education. Notably, the programme range in curriculum content, teaching methodologies, clinical experience and faculty expertise, emphasising the necessity for a thorough evaluation. Furthermore, adhering to regulatory standards established the Physiotherapy Council of Kenya (PCK) assures compliance with national quality benchmarks in physiotherapy education and practice. These institutions also served as collaborative design sites for developing the enhanced undergraduate physiotherapy curriculum.

The primary justification for selecting these three institutions is to ensure the study captures a broad and diverse picture of physiotherapy education in Kenya. This diversity makes them suitable for a comparative analysis of programme effectiveness across various institutional environments. The selection of JKUAT, MMUST, and Alupe University is justified by their combined ability to provide a representative sample of physiotherapy education in Kenya. Their established programmes, geographical diversity, and shared regulatory environment allow the researcher to conduct a comprehensive and comparative evaluation using the CIPP model.

3.3 Target Population

The study population included key stakeholders from undergraduate physiotherapy programmes at JKUAT, MMUST, and Alupe University, selected for their established programmes, diverse student populations, and regional representation, which ensured the insights gained were applicable to other public institutions offering similar programmes in Kenya. The population consisted of current students (N = 418), who provided insights into their educational experiences and perceptions of programme effectiveness; faculty members (N = 20), who contributed expertise on teaching, curriculum development, and assessment practices; programme administrators (N = 3), who offered perspectives on programme governance and resource allocation; clinical supervisors (N = 3), who assessed students' clinical competencies; graduates (N = 150), who shared feedback on the relevance of their education to their professional roles; physiotherapists in charge of teaching and referral hospitals (N = 14), who provided insights into graduates' preparedness for professional practice; and the Physiotherapy Council of Kenya (PCK, N = 1), which offered valuable information on accreditation standards and quality assurance mechanisms, collectively ensuring a comprehensive view of the physiotherapy education landscape in Kenya. In designing an enhanced undergraduate physiotherapy curriculum guided by findings from the CIPP evaluation, these stakeholder groups did not only contribute evaluative data but also participated in the co-design process. Table 1 shows the study population.

Table 1*Study Population*

No	Participants	Study population
1	Current students	418
2	Graduates active at work	150
3	Faculty members	20
4	Programme Administrator (universities)	3
5	Clinical supervisor	3
6	Physiotherapy Council of Kenya	1
7	Physiotherapist In-Charge	14
	TOTAL	609

3.4 Sampling and Sample Size

The study employed a multistage sampling technique, combining stratified sampling, simple random sampling, and purposive sampling to ensure comprehensive representation of key stakeholder groups involved in undergraduate physiotherapy programmes in Kenyan universities. The use of multiple sampling techniques was justified by the heterogeneous nature of the study population, which comprises students, graduates, faculty members, programme administrators, clinical supervisors, and regulatory representatives. In the first stage, stratified sampling was used to categorize the study population into homogeneous subgroups (strata) based on institutional affiliation and stakeholder roles. These strata included undergraduate students, graduates, faculty members, programme administrators, clinical supervisors, physiotherapy in-charges, and representatives from the Physiotherapy Council of Kenya. Stratification ensured that each subgroup was adequately represented in the sample, thereby enhancing the representativeness and generalizability of the findings (Creswell & Plano Clark, 2023). In the second stage, for small groups, census sampling was applied. Simple random sampling was applied within selected strata, particularly for students and graduates, to minimize selection bias and ensure that each eligible participant has an equal probability of inclusion in the study. This approach strengthens the internal validity of the study and supports statistical generalization of quantitative findings (Etikan & Bala, 2017). In the third stage, purposive sampling was used to select participants with specialized knowledge and experience relevant to the study objectives, including faculty members, programme administrators, clinical supervisors, physiotherapy in-charges, and the Physiotherapy Council of Kenya representative. This technique is appropriate for qualitative inquiry as it enables the selection of information-rich cases that provide in-depth insights into programme implementation, challenges, and outcomes (Ngigi, 2017). The sample size for this study was determined using the Yamane formula, which is appropriate for finite populations and widely applied in social and health sciences research due to its simplicity and reliability in producing representative samples. The sample size for each strata was determined using proportionate stratification approach. With proportionate stratification, the sample size of each stratum is proportionate to the population size of the stratum. Table 2 shows the sample size of the study.

Table 2: Sample size determination

No	Participants	Sample population
1	Current students	181
2	Graduates active at work	64
3	Faculty members	20
4	Programme Administrator (universities)	3
5	Clinical supervisor	3
6	Physiotherapy Council of Kenya	1
7	Physiotherapist In-Charge	14
	TOTAL	286

3.5 Data Collection Instruments and Procedures

The researcher requested the introductory letter from the School of Graduate Studies at Masinde Muliro University of Science and Technology (MMUST), which enabled the researcher to get a research permit from the National Council for Science and Technology (NACOSTI). Preliminary preparations involved sending letters to and booking an appointment with the targeted institutions and their specific respondents. The researcher then proceeded to the field to collect data. The researcher personally distributed the questionnaires to the respondents and gave them one week, after which they were collected. The data collection instruments for the study was structured questionnaires, semi-structured interview guides, and document analysis protocols.

3.6 Data Analysis

After all data were collected, it was compiled, organized, summarized, and described in a way that aids in understanding the subject matter of the study. It was then analyzed using the Statistical Package for the Social Sciences (SPSS) program, version 27 was utilized. The data from questionnaires were analyzed using quantitative methods and Qualitative data were analyzed thematically. Quantitative data were analyzed using descriptive and inferential data analysis techniques. Descriptive analysis was undertaken using central tendency (mean, and median), frequency distribution, and percentages) and measures of dispersion (variance and standard deviation) to understand the characteristics of the respondents. The inferential analysis was carried out using a correlation and regression model to test the hypotheses and test for associations among variables of interest in this study. Data gathered using key informant interviews were analyzed separately. This involved organizing qualitative data, breaking them into manageable lumps, assigning symbols (coding), synthesizing, and determining patterns. This facilitated the identification and explanation of the linkages between data collected using the various methods of qualitative data collection. Content analysis methods were used. Two-step triangulation was carried out. The first stage of triangulation involved comparing and corroborating the qualitative data collected using in-depth interviews. The second stage of triangulation involved the corroboration of the qualitative findings and the quantitative data collected through questionnaires.

3.7 Ethical Considerations

The researcher obtained ethical approval from MMUST Research and Ethics Committee before commencing data collection. This will followed up with an application to the NACOSTI for a research permit. Thereafter, the researcher seek clearance and approval from the participating universities administrators of Alupe University, Masinde Muliro University of Science and Technology, Jomo Kenyatta University of Agriculture and Technology and Moi University. The researcher ensured transparent and unbiased recruitment processes to select participants from diverse stakeholder groups, including students, faculty members, programme administrators, clinical supervisors, alumni and regulatory body representatives. The researcher obtained informed consent from participants prior to their involvement in the study, outlining the purpose, procedures, risks and benefits of participation. The researcher developed a standardized data collection protocols to maintain consistency and reliability across different data collection methods, such as surveys, interviews, focus groups and document analysis. Confidentiality and respect to participants' rights to privacy and autonomy was adhered to. The researcher implemented measures to safeguard the confidentiality and anonymity of participants' responses and personal information. The use of anonymized identifiers or pseudonyms when reporting findings was used to protect participants' identities, especially in qualitative data analysis where direct quotes was used. There was established to protect collected data from unauthorized access, disclosure, or misuse. The researcher stored electronic and hard-copy data in encrypted formats and limit access to authorized personnel only. Upon research completion, sensitive data will be disposed of in compliance with data protection regulations to prevent breaches of confidentiality. Participation in this study was voluntary and not coerced. The researcher provided clear communication to participants on their right to withdraw from the study at any time without repercussion.

IV. FINDINGS & DISCUSSION

Table 3 shows the demographic aspects of the respondents, regarding age, 154 (65.8%) respondents were aged 18–25 years, 74 (31.6%) were aged 26–35 years, while only 6 (2.6%) were aged 36–45 years. The predominance of respondents aged 18–25 years reflects the typical age profile of undergraduate students and indicates that the findings largely represent the experiences of learners currently progressing through physiotherapy training. This group was suitably positioned to assess current teaching methods, learning resources, infrastructure and clinical-placement experiences. The respondents aged 26–45 years likely included graduates and mature learners whose professional and post-training experiences provided a broader basis for judging programme relevance and graduate preparedness. This diversity was valuable because clinical competence develops through exposure to real practice environments and application of theoretical knowledge (McCallum et al., 2013). Cunningham et al. (2019) similarly observed that continued clinical exposure and advanced training improved the clinical reasoning abilities of Kenyan physiotherapists. On the other hand, the gender distribution was relatively balanced, with 124 (53.0%) males and 110 (47.0%) females. Although male respondents constituted a slight majority, the difference was small, suggesting that the study adequately incorporated the perspectives of both genders. Such representation strengthens the findings by reducing the likelihood that perceptions of programme effectiveness were dominated by one gender. It is particularly important in health professions education to incorporate the experiences of diverse learners because students' engagement with faculty, clinical supervisors and learning environments may vary across social and institutional contexts (Ramklass & Vithal, 2022).

With regard to study year, graduates formed the largest group at 90 (38.5%), followed by fourth-year students at 70 (29.9%), third-year students at 64 (27.4%) and second-year students at 10 (4.3%). Therefore, most respondents

were either graduates or students in the advanced stages of training. Their substantial exposure to theoretical instruction, practical sessions, assessments and clinical placements placed them in a strong position to evaluate the programme. This was especially important because access to diverse clinical experiences influences the development of practical competence and readiness for professional practice (Lekkas et al., 2007; McCallum et al., 2013). The relatively small number of second-year students suggests that the results were less influenced by respondents with limited exposure to the professional and clinical components of the programme. In terms of graduation year, 141 (60.3%) respondents were still studying. Among those who had graduated, 48 (20.5%) completed their studies between 2021 and 2023, 27 (11.5%) between 2018 and 2020, 12 (5.1%) between 2015 and 2017, and 6 (2.6%) between 2024 and 2026. The inclusion of both current students and graduates from different cohorts strengthened the evaluation by combining contemporary learning experiences with retrospective assessments of how well the programmes prepared graduates for employment. Recent graduates could evaluate the current relevance of the curriculum, while earlier cohorts could assess its longer-term contribution to professional practice. This is consistent with the product component of the CIPP model, which examines whether a programme produces the intended graduate outcomes (Stufflebeam, 2003). Timmerberg et al. (2022) further emphasised that physiotherapy education should be evaluated against clearly defined competencies and professional performance expectations.

Employment findings showed that 141 (60.3%) respondents were still studying, 44 (18.8%) were employed in private hospitals or clinics, 25 (10.7%) worked in public hospitals or institutions, 18 (7.7%) were self-employed and 6 (2.6%) were unemployed. Among the 93 respondents who were no longer studying, approximately 47.3% worked in private facilities, 26.9% in public institutions, 19.4% were self-employed and 6.5% were unemployed. The diversity of employment settings enriched the evaluation because graduates working in public, private and self-employment environments could assess the applicability of their training under different service-delivery conditions. The relatively large proportion employed in private facilities suggests that physiotherapy programmes should prepare graduates for practice beyond the public sector, including entrepreneurship, independent practice and management of diverse patient populations. This supports the literature indicating that physiotherapy curricula should remain responsive to changes in healthcare systems and labour-market demands (Migosi et al., 2012). However, the presence of unemployed graduates suggests that completion of training may not automatically guarantee employment. Cunningham et al. (2017) similarly found that even advanced physiotherapy training did not necessarily result in promotion or improved income, demonstrating that employment outcomes may also be influenced by broader labour-market conditions. Regarding institutional representation, JKUAT accounted for 102 (43.6%) respondents, Moi University for 67 (28.6%) and MMUST for 65 (27.8%). Although JKUAT contributed the largest proportion, all three universities were substantially represented. This enabled the study to capture experiences from different institutional environments and reduced the likelihood that the findings reflected only one university. Multi-institutional representation was important because Kenyan universities differ in faculty capacity, equipment, infrastructure and access to clinical-placement sites. Ngigi (2017) observed that resource limitations affect the quality of physiotherapy education in Kenya, while Kiprono (2012) reported disparities in infrastructure and learning resources across Kenyan universities. Therefore, including respondents from the three universities provided an appropriate basis for evaluating both common experiences and institutional variations in programme effectiveness.

Table 3*Demographic Characteristics*

Variable		Frequency	Percent
Age	18-25	154	65.8
	26-35	74	31.6
	36-45	6	2.6
	Total	234	100.0
Gender	Male	124	53.0
	Female	110	47.0
	Total	234	100.0
Study year	Second	10	4.3
	Third	64	27.4
	Fourth	70	29.9
	Graduate	90	38.5
	Total	234	100.0
Graduation year	Still under study	141	60.3
	2015-2017	12	5.1
	2018-2020	27	11.5
	2021-2023	48	20.5
	2024-2026	6	2.6

	Total	234	100.0
Employment	Still under study	141	60.3
	Public hospital/Institution	25	10.7
	Private hospital/clinic	44	18.8
	Unemployed	6	2.6
	Self Employed	18	7.7
	Total	234	100.0
University attended	JKUAT	102	43.6
	MMUST	65	27.8
	Moi	67	28.6
	Total	234	100.0

The researcher sought to find out on effectiveness of undergraduate physiotherapy programme in Kenyan universities. The respondents were required to rate their opinions against five statements on a five-point Likert scale with a score of 1 indicating 'Strongly Agree' and 5 indicating 'Strongly Disagree'. The ratings were analyzed as frequencies, mean, standard deviation (Std), the composite mean and composite standard deviation. The results were presented in Table 4 (SA- Strongly Agree, A- Agree, UD- Undecided, D- Disagree, SD- Strongly Disagree).

Table 4

Effectiveness of Undergraduate Physiotherapy Programme in Kenyan Universities

S/N	Statement	SA	A	N	D	SD	Mean	Std
1	The undergraduate physiotherapy programme adequately prepares students for professional practice.	141 60.3%	66 28.2%	1 0.4%	12 5.1%	14 6%	1.68	1.121
2	The programme equips graduates with the competencies required in the healthcare sector.	53 22.6%	126 53.8%	5 2.1%	36 15.4%	14 6%	2.28	1.152
3	The programme meets the current healthcare needs of Kenya.	52 22.2%	100 42.7%	28 12%	32 13.7%	22 9.4%	2.45	1.240
4	The programme effectively integrates theoretical knowledge with clinical practice.	72 30.8%	89 38%	15 6.4%	26 11.1%	32 13.7%	2.39	1.380
5	The programme enables graduates to provide safe, ethical, and patient-centred care.	69 29.5%	92 39.3%	7 3%	39 16.7%	27 11.5%	2.41	1.366
	Composite						2.24	1.252

The results in Table 4 shows that a substantial majority of respondents agreed that undergraduate physiotherapy programmes adequately prepared students for professional practice. The frequencies show that 141 respondents strongly agreed and 66 agreed, giving a combined positive response of 88.5%. Only 11.1% disagreed or strongly disagreed. The low mean of 1.68 (SD = 1.121) therefore represents a strong positive assessment of professional preparation. The finding suggests that the programmes provide students with a generally sound foundation for entering physiotherapy practice. It agrees with Delany and Watkin (2009), who observed that well-designed health-professions programmes prepare graduates to apply knowledge and skills in professional settings. It is also consistent with Timmerberg *et al.* (2022), who emphasised that competency-based physiotherapy education should prepare graduates to deliver safe and effective patient care. Nevertheless, the negative responses suggest that professional preparation may not be equally experienced across all universities and clinical-training environments.

Regarding the competencies required in the healthcare sector, 22.6% strongly agreed and 53.8% agreed, producing a combined agreement of 76.4%. In comparison, 21.4% disagreed or strongly disagreed. The mean of 2.28 (SD = 1.152) confirms that respondents generally believed that the programmes equipped graduates with relevant professional competencies. These competencies may include patient assessment, treatment planning, communication, ethical conduct, clinical reasoning and teamwork. This finding is consistent with the World Confederation for Physical Therapy (2019), which identifies clinical competence, communication, critical thinking and professional ethics as essential outcomes of physiotherapy education. However, the proportion expressing disagreement should not be overlooked. Cunningham *et al.* (2019) found that Kenyan physiotherapists improved their clinical reasoning through postgraduate residency training but continued to experience difficulties with higher-level reasoning, including pattern recognition. Therefore, although the programmes may impart essential entry-level competencies, further strengthening of complex clinical reasoning and decision-making may be required.

The findings were comparatively less positive regarding whether the programmes met Kenya's current healthcare needs. Although 64.9% agreed or strongly agreed, 12.0% were neutral and 23.1% disagreed or strongly disagreed. This item recorded the highest mean of 2.45 (SD = 1.240), indicating that it was the least favourably rated

aspect of programme effectiveness. The findings suggest that while existing curricula address many healthcare requirements, some respondents perceived gaps in their responsiveness to changing national needs. Frenk et al. (2010) observed that health-professions curricula in many low- and middle-income countries are not always sufficiently aligned with evolving health-system demands. Similarly, Blood et al. (2026) identified gaps in Kenyan entry-level physiotherapy education concerning preparation for the rehabilitation needs of older adults. Curricula may therefore require continuous review to strengthen emerging areas such as geriatric rehabilitation, non-communicable diseases, community-based rehabilitation, digital health, assistive technology and tele-rehabilitation.

On the integration of theoretical knowledge with clinical practice, 68.8% of respondents agreed or strongly agreed, while 24.8% disagreed or strongly disagreed. The mean of 2.39 (SD = 1.380) indicates an overall positive perception, although this item recorded the largest variation in responses. The results imply that many respondents experienced effective integration of classroom learning and clinical practice, but this experience was not uniform. Clinical education enables students to apply theoretical knowledge, develop professional judgement and acquire practical competence through interaction with patients (McCallum et al., 2013). Lekkas et al. (2007) similarly established that access to appropriate and diverse clinical placements strengthens students' clinical skills and preparedness. The variation in responses may be explained by disparities in clinical-placement opportunities, availability of equipment, supervision and exposure to diverse clinical conditions. Kiprono (2012) noted that limited resources and clinical-training opportunities continue to affect physiotherapy education in low-resource settings.

Regarding the preparation of graduates to provide safe, ethical and patient-centred care, 68.8% agreed or strongly agreed, whereas 28.2% disagreed or strongly disagreed. The resulting mean of 2.41 (SD = 1.366) shows a generally positive evaluation but also reveals a notable area of concern. Safe and patient-centred practice is a central outcome of physiotherapy education because graduates must combine clinical knowledge with communication, professionalism, cultural sensitivity and ethical decision-making. Timmerberg et al. (2022) argued that competency-based physiotherapy education should use clearly defined performance standards to ensure consistent and safe practice. Ramklass and Vithal (2022) also emphasised the importance of caring relationships and professional values within physiotherapy education. The relatively high proportion of negative responses suggests a need to strengthen the teaching and assessment of ethics, communication, cultural competence, patient safety and person-centred care throughout both classroom and clinical learning.

The researcher sought to determine input resources, infrastructure & faculty support. The respondents were required to rate their opinions on five statements using a five-point Likert scale, with 1 indicating 'very poor' and 5 indicating 'very good'. The ratings were analyzed as frequencies, mean (M), standard deviation (SD), the composite mean, and composite standard deviation. The results were presented below (1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, 5 = Very good). The results are shown in Table 5.

Table 5
Instructional Capacity

S/N	Statement	1	2	3	4	5	Mean	SD
1	Quality of curriculum materials provided	7 3%	11 4.7%	39 16.7%	23 9.8%	154 65.8%	3.75	0.813
2	Adequacy of learning resources and facilities	7 3%	43 18.4%	114 48.7%	50 21.4%	20 8.5%	3.14	0.918
3	Expertise and teaching effectiveness of faculty members	1 0.4%	11 4.7%	16 6.8%	152 65%	54 23.1%	3.73	0.675
4	Faculty support and mentorship	6 2.6%	21 9%	26 11.1%	138 59%	43 18.4%	3.26	0.868
5	Availability of financial support (scholarships/funding)	64 27.4%	103 44%	32 13.7%	27 11.5%	8 3.4%	2.20	1.070
	Composite						3.22	0.869

The results show that a substantial majority of respondents rated the quality of curriculum materials positively: 65.8% selected "very good" (5) and 9.8% selected "good" (4), yielding a combined positive response of 75.6%. Only 7.7% gave negative ratings (1 or 2). The mean of 3.75 is the highest among the five indicators, and the relatively low standard deviation (SD = 0.813) indicates considerable consensus among respondents. This finding suggests that physiotherapy programmes in the selected Kenyan universities have invested meaningfully in developing and availing curriculum content. Curriculum materials in physiotherapy education typically include course outlines, clinical practice guidelines, case study compilations, skills checklists, and reference texts. The positive rating implies that these materials are perceived as relevant, current, and useful for learning. This is consistent with the broader literature on health

professions education, which holds that well-designed curricular resources are foundational to competency-based training (Harden, 2016).

On the other hand, the adequacy of learning resources and facilities had a mean of 3.14, with nearly half of respondents (48.7%) rating it as "average" (3). Only 29.9% gave positive ratings (4 or 5), while 21.4% rated it negatively. Physiotherapy education is resource-intensive. It requires simulation laboratories, electrotherapy equipment, exercise therapy spaces, anatomical models, and clinical placement sites where students can apply their skills with real patients. The moderate rating suggests that while basic resources exist, they may be insufficient in quantity, quality, or accessibility to support optimal learning. This finding aligns with Kiprono (2012), who documented how resource limitations affect the quality of physiotherapy education in Kenya. Ngigi (2017) similarly reported disparities in infrastructure and learning resources across Kenyan universities.

The results also shows that Faculty expertise and teaching effectiveness received the second-highest mean (3.73), with 65% of respondents rating it as "good" (4) and 23.1% as "very good" (5). Only 5.1% gave negative ratings. The standard deviation of 0.675 is the lowest in the table, indicating strong consensus. This finding is significant because it suggests that the human capital dimension of instructional capacity is relatively strong. Qualified and effective faculty are essential for delivering competency-based education in physiotherapy (Harden, 2016). Steinert et al. (2016) demonstrated that faculty development programmes significantly improve teaching effectiveness and student learning outcomes in health professions education.

Faculty support and mentorship had a mean of 3.26, with 59% rating it as "good" (4) and 18.4% as "very good" (5). However, 11.1% were neutral and 11.6% gave negative ratings. The standard deviation (0.868) indicates moderate variation in responses. Mentorship is a critical component of health professions education, particularly in clinical disciplines such as physiotherapy. Students need guidance not only in academic content but also in professional socialisation, ethical decision-making, and clinical reasoning. Timmerberg et al. (2022) emphasised that competency-based physiotherapy education should include structured mentorship and performance feedback to ensure consistent development of professional competencies. Ramklass and Vithal (2022) highlighted the importance of caring relationships and professional values in physiotherapy education.

The results also shows that financial support received the lowest rating in the entire table. Only 14.9% of respondents rated it as "good" or "very good," while 71.4% gave negative ratings (44% "poor," 27.4% "very poor"). The mean of 2.20 is well below the midpoint of 3.0, and the standard deviation of 1.070 is the highest, indicating considerable disagreement among respondents—though the disagreement is primarily between "poor" and "very poor" rather than between positive and negative. This finding is consistent with the broader literature on higher education financing in Kenya. Callender (2016) found that cost-sharing policies in many countries lack consistent alignment between equity and completion outcomes. In Kenya, demand for higher education has grown while government funding has declined, and loans from the Higher Education Loans Board (HELB) are often insufficient and subject to administrative delays.

The objective of the study was to determine the effect of instructional capacity on the effectiveness of undergraduate physiotherapy programme in Kenyan universities. Linear regression test was employed to determine this. The study utilized the following null hypothesis which was tested at 0.05 level of significance.

H₀₂: Instructional capacity has no statistically significant effect on the effectiveness of undergraduate physiotherapy programme in Kenyan universities.

The results are shown in Table 6(a-c)

Table 6a

Model summary on Instructional capacity of physiotherapy programmes

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.375 ^a	.141	.137	6.223

a. Predictors: (Constant), Instructional capacity of physiotherapy programmes

b. Dependent Variable: Effectiveness of undergraduate physiotherapy programme

The model summary in Table 6a indicates that instructional capacity of physiotherapy programme had a positive, moderate relationship with the effectiveness of undergraduate physiotherapy programme, with $R = .375$. The R Square of .141 indicates that instructional capacity explained 14.1% of the variation in programme effectiveness, while the adjusted R Square of .137 shows that approximately 13.7% of the variation was explained after adjustment for the model. The remaining 85.9% of the variation in programme effectiveness is attributable to other factors not included in this regression model.

Table 6b**ANOVA on Instructional Capacity of Physiotherapy Programmes**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1471.081	1	1471.081	37.991	.000 ^b
	Residual	8983.573	232	38.722		
	Total	10454.654	233			

a. Dependent Variable: Effectiveness of undergraduate physiotherapy programme

b. Predictors: (Constant), Instructional capacity of physiotherapy programmes

The ANOVA results in Table 6b show that the regression model examining instructional capacity of physiotherapy programme as a predictor of programme effectiveness was statistically significant, $F(1, 232) = 37.991$, $p < .05$. This indicates that instructional capacity significantly predicts the effectiveness of undergraduate physiotherapy programme and that the observed relationship is unlikely to have occurred by chance. The regression sum of squares (1,471.081) compared with the total sum of squares (10,454.654) indicates that instructional capacity accounts for a meaningful proportion of the variation in programme effectiveness, consistent with the $R^2 = .141$, meaning that 14.1% of the variance in programme effectiveness is explained by instructional capacity. Therefore, the null hypothesis that instructional capacity has no statistically significant effect on the effectiveness of undergraduate physiotherapy programme is rejected.

Table 6c: Regression analysis on Instructional capacity of physiotherapy programmes

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29.823	3.830		7.787	.000
	Instructional capacity of physiotherapy programmes	.545	.088	.375	6.164	.000

a. Dependent Variable: Effectiveness of undergraduate physiotherapy programme

The regression coefficients in Table 6c indicate that instructional capacity of physiotherapy programme had a statistically significant positive effect on the effectiveness of undergraduate physiotherapy programme. The unstandardized coefficient ($B = 0.545$, $SE = 0.088$) indicates that a one-unit increase in instructional capacity is associated with an estimated 0.545-unit increase in programme effectiveness. The standardized coefficient ($\beta = .375$) shows a moderate positive predictive effect, while the t-value of 6.164 ($p < .05$) confirms that the effect is statistically significant. The regression equation is:

$$Y = 29.823 + 0.545X$$

Where Y represents the predicted effectiveness of undergraduate physiotherapy programme and X represents instructional capacity. Thus, when instructional capacity is zero, the predicted programme-effectiveness score is 29.823, and every one-unit increase in instructional capacity is associated with a 0.545-unit increase in predicted programme effectiveness. Therefore, the null hypothesis that instructional capacity has no statistically significant effect on programme effectiveness is rejected.

The findings showed that instructional capacity significantly and positively predicted programme effectiveness. The regression coefficient was $B = .545$, with a standardized coefficient of $\beta = .375$ and $t = 6.164$, $p < .05$. The null hypothesis that instructional capacity had no statistically significant effect on programme effectiveness was therefore rejected. The results indicate that improvements in qualified personnel, teaching resources, mentorship, supervision and related instructional support are associated with improvements in programme effectiveness.

The descriptive findings provided further insight into the nature of instructional capacity. Faculty expertise and teaching effectiveness received a relatively favourable assessment ($M = 3.73$), while adequacy of learning resources and facilities was rated lower ($M = 3.14$). The findings suggest that although participating institutions generally possessed competent teaching personnel, there were greater concerns regarding whether available resources were sufficient to support effective learning. Instructional capacity therefore involved more than the qualifications of lecturers; it encompassed staff numbers, availability of instructional materials, mentorship, clinical supervision and institutional resources needed to facilitate learning.

The interview findings strongly supported this interpretation. University administrators acknowledged the competence and experience of their teaching staff but raised concerns about increasing student enrolment relative to faculty numbers. One administrator explained:

“The lecturers are qualified and experienced, but student numbers have grown considerably. The challenge is ensuring that staffing grows at the same rate because physiotherapy cannot be taught effectively through lectures alone; students require practical demonstrations and individual supervision.” (UA2, 7/5/2026)

This response contextualizes the finding by demonstrating why instructional capacity matters in physiotherapy education. Physiotherapy is highly practical and requires students to observe demonstrations, practice techniques and receive direct corrective feedback. Consequently, adequate lecturer numbers become particularly important where student enrolments are increasing. Even highly qualified faculty may have limited instructional impact where the lecturer-to-student ratio prevents individualized supervision.

The concerns of university administrators converged with those raised by clinical supervisors. One clinical supervisor reported:

“We have a responsibility to teach students, but we also have patients waiting for treatment. When the number of students is high, it becomes difficult to observe every student closely and provide immediate feedback after every procedure.” (CS1, 11/5/2026)

This finding broadens the meaning of instructional capacity beyond the university environment. Clinical supervisors function simultaneously as practitioners and educators, and their workload may constrain the amount of supervision available to students.

Another clinical supervisor emphasized the importance of greater involvement by university clinical instructors:

“There should be more regular visits from university clinical instructors. When the university and hospital supervisors work together, it becomes easier to identify weaknesses, monitor progress and ensure that students are being assessed consistently.” (CS2, 17/5/2026)

This response suggests that effective instructional capacity depends on collaboration between university educators and clinical supervisors. Such cooperation can improve continuity between classroom teaching and workplace learning, harmonize assessment expectations and enable early identification of learning gaps.

These interview findings are strongly supported by the reviewed literature. Steinert *et al.* (2016) found that faculty development programme enhance teaching effectiveness and student learning outcomes, while Harden (2016) emphasized the importance of qualified and appropriately prepared educators in competency-based health professions education. Conversely, Migosi *et al.* (2012) reported that faculty shortages, high student-to-teacher ratios and inadequate teaching resources adversely affect educational quality in sub-Saharan Africa.

The findings therefore demonstrate strong convergence between the quantitative, qualitative and literature-based evidence. The positive regression coefficient indicates that stronger instructional capacity improves programme effectiveness; the interviews explain that staff shortages, large student numbers, competing clinical responsibilities and inconsistent supervision can constrain instructional quality; and previous studies confirm the importance of faculty development, appropriate staffing and adequate teaching resources.

V. CONCLUSION & RECOMMENDATION

5.1 Conclusion

The study concludes that instructional capacity is an essential determinant of programme effectiveness. Kenyan universities generally have qualified and experienced teaching staff, but increasing enrolment, limited staff numbers, competing clinical responsibilities and insufficient resources constrain the quality of practical teaching and clinical supervision. Effective instructional capacity requires not only qualified lecturers but also sufficient staff, continuous faculty development, adequate clinical educators and strong collaboration between universities and healthcare facilities.

5.2 Recommendations

The Physiotherapy Council of Kenya should strengthen and regularly update minimum standards for curriculum content, staffing, facilities, clinical placements and graduate competencies. Accreditation should assess both the intended curriculum and the actual institutional capacity to implement it.

The Council should promote consistency among universities by developing national minimum graduate competency standards and standardized guidelines for clinical education. Quality assurance should be continuous and should include periodic monitoring of graduate outcomes, employer feedback and compliance with established standards rather than relying solely on accreditation visits.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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