GenAI Fuzziness Towards Constructivist Pillars in Higher Education Institutions in Tanzania

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Abstract: The paper evaluated the constructivist pillars' standpoint in the GenAI integration in the classroom settings among students in the selected Higher Education Institutions (HEIs). Objectives covered were to examine the module instructors' feelings and determine the students' views on constructivist gaps resulting from the utilization of GenAI. The mixed approaches were followed and engaged 5 randomly, and the sample size of 150 respondents was selected from Higher Learning Institutions (HEIs) in Dar es Salaam City, Tanzania. Data were collected through semi-structured interviews and a four-point Likert scale questionnaire, analysed using thematic content and Microsoft Excel. Findings were presented using quotations of the themes, tables, and figures. Findings disclosed that the GenAI deployments disrupted the teaching and learning triangle; instructors required enough time to authentically guide the students on proper usage of GenAI for building constructivist pillars. Findings showed that learners were highly dependent on GenAI for learning (90%) being implying the impacts on constructivist capabilities that need to be accommodated in the learning process. Also, it was found that ChatGPT is the popular GenAI among the students. Still was found knowledge, competencies, contextual comprehension, and social attributes continued to perform well in the constructivist pillars. The practice recommendations are made to HEIs and module instructors to guide the students in balancing the use of GenAI to support the acquisition of constructivist pillars for the attainment of curriculum goals.

Keyword: Constructivism, GenAI, HEIs, Students, Instructors

Introduction

Artificial Intelligence (AI) has been introduced for use in various aspects since 2022 (Noroozi et al., 2024). According to Sengar et al. (2024), AI comprises an innovative dataset that works as Generative Artificial Intelligence (GenAI). Scholars from different education contexts, levels, and perspectives recommended the use of GenAI in two folds: first, as a tool for improving pedagogical practices through assisting language learning, provision of personalized learning and feedback, and supporting the undertaking of the qualitative and quantitative research (Hsiao & Tang, 2024; Chan, Lo & Wong, 2024). Nevertheless, Nutsugah & Senanu (2024) revealed that the second fold of GenAI is vested in its capacity for supporting the acquisition of the intended educational learning outcomes. Moreover, in teaching and learning, there are disadvantages associated with overutilization of GenAI in pedagogical practices, as it leads to fragmentation of learning paths, hindering creativity and innovations, thereby disordered the constructivism and

cognitivism pillars (Noroozi et al., 2024). Additionally, ChatGPT is renowned and famous, accepted GenAI utilized by learners, facilitators, instructors, and researchers because it is built with capabilities to generate digitally-based content in the form of images, audio, texts, and videos (Hsiao & Tang, 2024).

Constructivism as a learning theory is rooted in cognitive psychology (Acharya, 2024; Renninger, 2024). According to Piaget (1969), the constructivist pillars are built on learners' cognitive capability to construct knowledge. Constructivists are further characterized as being dynamic in knowledge construction, receiving, and handling (Sepriyanti & Kustati, 2024). Also, constructivists' attributes pinpointed that learners are pedagogical inputs, who are supposed to engage in designing, assessing, and developing the learning processes, approaches, and outputs (Al Abri et al., 2024). The involvement and engagement of learners in every stage of teaching and learning are to ensure activeness, become goal-oriented, and provide tangible feedback for improvements of the processes. Likewise, learners as the object of the teaching and learning processes are relatively responsible for rebuilding prior knowledge and experiences to build the foundation for the acquisition of new learnt content.

Undoubtedly, under constructivist theory, the instructors' roles in the teaching and learning process are to catalyse and capacitate the learners into actionable strategies and approaches fostered by linking, organizing, assimilating, and transferring the newly learned contents into optimized ways (Wibowo et al., 2025). The origination and dedication of constructivist processes are built on the mental schemas that are engaged in receiving, processing, and temporarily storing the content for use in the working short-term memory; thereafter, transferred, accommodated, stored, and retrieved to and from the long-term memory (Happs, 1985). According to Renninger (2024) and Banele (2023), cognitivism has to be built on Cognitive Load Theory (CLT) and Cognitive Load Optimization (CLO). Cognition optimization is reached when the learners' mental structures are struggling to build the blocks for accommodating the new knowledge based on the nodes of the existing ones, hence simulating the active learning processes (Al Abri et al., 2025; Wibowo et al., 2025). The activation of the knowledge relative to the existing situation differentiated the pieces of information being stored and processed for retravelling from the mental structure for future utilization (Sepriyanti & Kustati, 2024).

The learning materials, skills, knowledge, and competencies acquisition; procedures for preparing, administering, and issuing assessments, evaluations, and research are highly impacted by the GenAI practices (Kolade, Owoseni & Egbetokun, 2024). Subsequently, the education-delivering processes are formally and informally digitalized, indicating lifelong learning, whereas contents are quickly accessible at hand anytime and anywhere through AI innovations (Masrek et al., 2024). On the positive side, GenAI, as machine learning and crowdsourcing, possessed interactive tutors and virtual assistive deployments (Joshi et al., 2024) and offered appropriate learning lightning support at any time, place, and pace (Folman, 2025). Based on Kolade et al. (2024), the utilization of GenAI as cloud spaces enabled instructors to prepare hands-on algorithmic content for different disciplines, including mathematics, statistics, sciences, languages, and others, within a short time frame. Similarly, Lagos-Castillo et al. (2025) insisted on GenAI capacitating the instructors to quickly prepare assignments, quizzes, examinations, and marking, hence providing preciously timely manner. Certainly, the gap in GenAI utilization is vested in the reduction of the instructors' time for engaging in meaningful learners' class tasks and activities for the provision of constructive personalized feedback. The global education system is now

experiencing the dynamics in the learning and teaching processes, whilst personalized techno-mediation takes charge at individual levels. Yet, Sengar et al. (2024) cemented that the grabbed GenAI technologies are trending and appraised the evolution of the 21st century. Despite the advantages, the integration of GenAI in pedagogies has brought undeniable challenges, particularly in an amalgamation of the traditional curriculum and impacting the hypothesis of learning theories, including constructivism and cognitivism (Renninger, 2024).

Traditionally, human interactivity, inferences, perceptions, engagement, and learning materials involvement continued to be pillars for quality education, regardless of these attributes being currently imitated by GenAI (Folman, 2025). On a further note, the deployment and integration of GenAI has to stimulate and boost the cognition and constructivism processes rather than subsiding the actions (Nepal, 2024). Devaki (2025) insisted that in academics, the improper utilization of AI distorts human intelligence, despite not being supposed to disrupt cognitive development. Moreover, the adaptive educational GenAI learning platforms are recognized for being influential and assistive to learners and instructors for engaging in getting quick solutions on various learning contents, fostering personalized learning paths due to supportive built-in interactivity interfaces (Chan, Lo & Wong, 2024). Besides, the limitations found within the GenAI are on learners to spare enough time for engaging in constructivist aspects, taking on the different learning styles and goals for comprehensive knowledge transfer optimization and retention (Baskara, 2024). Despite the GenAI algorithms being comprised of intelligent content for learners and instructors to accommodate knowledge and competence based on personalized learning patterns, Zhao (2024) questioned on GenAI levels for the optimization of the learners' capabilities in language proficiency, reading, writing, and comprehension attributes. Instructors in HEIs, regardless of being scaffolded in knowledge-based or competence-based approaches, are in dialogue on redefining learning processes based on the speed, accuracy, and efficiency brought by GenAI to learners in sorting different learning activities and tasks.

Despite the quick changes in the World of technology, classroom practices in the Higher Education Institutions (HEIs) have been significantly affected in terms of research, teaching, and learning (Singun, 2025). For example, in Korea, Jang and Choi (2025) found that the utilization of AI contributed to the need for paradigm shifts in education, resulting in the impacts on inequalities, minimal teacher influence, and the need for digital enhancements. Abbasi, Wu and Luo (2025) analyzed data from 2,000 HEIs students and faculty from Latin America, Asia, Europe, Africa, and Northen America using the regression model to explore the AI impacts on curriculum; their findings revealed that AI frequency usage, faculty member knowledge, institutional support on promoting the AI engagement in curriculum are influenced with the shortfalls including the personalized learning capabilities, cultural diversities, students adaptability, AIs navigation alignment inabilities and complexities, ethical issues educators and leaders subjectivism are leading AI not being recommended for education. Another comprehensive review conducted by Prather et al. (2025) on research papers from 2023 to 2024 on the current trends in GenAI presented new tools for solving computing, but also, they are disruptive to the teaching and learning theories that fostered implementation of the curriculum.

Certainly, it was insisted by Jarilkapovich (2025) on the need for implementation of the modern education process, focused on encompassing the technologies pedagogies innovativeness for students to develop the constructivist pillars of development of life skills, independent thinking, innovative, and creative approaches. However, there are remarkable trending questions

about the intellectual gaps that are brought by GenAI in supporting the learners' cognition and constructivist processes and practices (Kolade et al., 2024). Likewise, an overwhelming discussion on the learners' cognition brainwashing on too much dependence on GenAI is the vacuum that needs to be filled. Similarly, the integrity and authentication for GenAI integration in the research and projects, particularly in data analysis, reliability, and report writing, are other issues for discussion (Vetter et al., 2024). Certainly, Banele (2023) commented that the essentialities of the utilization of GenAI in teaching and learning processes have to capacitate students' cognitive capabilities rather than displace them. However, the precision of GenAI practices brought wounds that need to be assessed. The papers in hand focused on assessing the fuzziness existing in the utilization of GenAI against the constructivist pillars among the selected HEIs at Dar es Salaam, Tanzania. Specifically, two specific objectives were addressed that are: (1) to examine the feelings on GenAI utilization in building the constructivism pillars, and (2) to determine the levels of constructivism gaps resulting from students' views on GenAI utilization

Methods

Research Area, Sample, and Sampling

The mixed approaches that followed the descriptive design were administered. The study involved 5 selected Higher Learning Institutions (HEIs) offering business studies that were randomly selected from Dar es Salaam City, in Tanzania. The sampled HEIs were selected as they are in the process of designing the restrictive rules and procedures for students and instructors to deploy the GenAI for undertaking the assignments and research activities. The sample frame consisted of two main strata, distributed into business studies module instructors and students. The sample size comprised 158 participants who were either delivering or studying the business studies modules were selected using probability and non-probability approaches. In the non-probability sampling approach, the purposive technique was employed to select 8 instructors located to deliver the business studies module contents for Semester 1 of academic year 2024/25, Furthermore, to overcome biasness, 1 instructor from each of 5 HEI were randomized selected based on the criteria of being located to teach one stream, and the other 3 who were assigned the same module in two streams. On a further note, the sample of 150 students being distributed into 30 from each HEI who were exposed to different GenAI usability and possession of digital devices was selected through a simple random sampling technique under probability approaches.

Data Collection and Analysis

Mixed data were collected, whereas the selected module instructors (8) were engaged in the collection of the qualitative data through administering the semi-structured interviews lasting for 30 minutes, towards obtaining the responses for research objective one. Seemingly, the quantitative data was collected from 150 students who were exposed to the four-point ranked Likert Scale questionnaire, towards getting the responses for research objective two. The qualitative data were recorded, transcribed, coded, edited, tabulated, and analysed to obtain the patterns and cases through the thematic content analysis. The qualitative findings were presented by summary Tables and narrations of the emerging themes. Similarly, the quantitative data for research objective two on constructivist pillar gaps related to the utilization of GenAI were coded, edited, tabulated, and analyzed using Microsoft Excel, and findings were presented using Tables and Figures. Also, the standardization of the data collection tools was made through test-retest and amendment of the items, made accordingly. The sample that was involved in re-testing the data collection tools was

not engaged in actual data collection. Similarly, the Cronbach's alpha on the questionnaire was assessed and found to be 0.81, hence considered to possess good reliability on the internal consistency of the items. The ethical considerations were adhered to as the respondents were asked to fill out the consent form for voluntary participation, pseudonyms were used to hide recognitions, no any kind of harm was caused, and permission for data collection was issued

Result And Discussion

Result

The findings on the investigation are presented in the subsections on the feelings on GenAI utilization in building the constructivism pillars, and the levels of constructivism gaps resulting from students' GenAI utilization.

Feelings on GenAI Utilization in Constructivist Practices

The findings on feelings about GenAI utilization in the constructivism pillars and practices among the students were collected through the guided semi-structured interview. Findings as summarized in Table 1, revealed the presence of conflicting feelings on the attributes of social interactions, authentication of the learning process, knowledge construction, metacognition reflection, emotional-affective, and inquiry-based learning.

Table 1. Students' feelings on GenAI utilization attributes contributed to the constructivist pillars

Major Themes	**Key indicative attributes**
Social interactions	Personalization learning
	Distorting triangle of learning
	Limit collaborations and networking.
Knowledge construction	Critical thinking
	Problem-solving
	Authentication
	Reliability
	Practical case scenarios
Authentication of the learning Process	Practical scenarios
	Engaging the contextual Real-life experience
	Personalization of the content
Language Development	Students develop fear in Oral Communication
	Exposure to the Vocabulary
	Fluency and punctuality in written communication
Metacognition reflection	Cognitive learning experiences
	Developing own learning strategies
	Reflections on the strengths and weaknesses of the learning process
Emotional-affective	Individualism learning
	Devices dependability
	Loneliness in the learning process
	Originality of constructed knowledge

Inquiry-based learning	Eagerness to engage in deep learning Contextual exploration of the subject matter

In order to get the internal respondents' feelings, the question posed was *What are the contributions of GenAI in constructivist aspects?* Expressively, the findings disclosed the presence of conflicting feelings on the attribute of social interactions due to the use of GenAI, as it is considered a disruptor of the teaching and learning triangle components that are learners, instructors, and the learning environment, as was cited:

> *… Use of GenAI led to personalization of learners and digital devices, hence distorting the traditional constructivism benefits obtained through multiple collaborations and interactions in the process of multiple sourcing knowledge creation, originally veined among instructors, peers, and the environment interactions (Respondent 5, Interview Session, 2025).*

Similarly, the investigation observed the need for instructors to develop strategies to capacitate learners in actively constructive learning processes. The responses to the item: *How does the GenAI deployment contribute to the knowledge construction?* Respondent mentioned:

> *Instructors have to dedicate time to balance leveraging GenAI benefits parallel with constructivism and cognitivism … the active constructive learning approaches are based on critical thinking, problem-solving, and meaningful social interactions to guide understanding. (Respondent 2, Interview Session, 2025).*

In a similar vein, the respondents are alarmed about the authentication of GenAI vis-à-vis constructivist approaches in the knowledge construction, particularly focusing on the learners' classroom activities, tasks, and assignments embedded into problem-solving, open-ended questions, and critical thinking. In responding to the item, *how does GenAI ethically support the classroom practices?* Respondents mentioned:

> *Instructors need to change the modalities of the questions, activities, and tasks assigned to the learners. … involvement of practical case scenarios with real-life experiences based on the world contexts is essential in accelerating constructivism and cognition capability (Respondent 1, Interview Session, 2025).*

Also, the emphasis was made:

> *… the authenticity of the learners' activities performed in the era of GenAI is doubtful; in most cases, are lack originality and personalization. When learners are asked the same question in a controlled environment, they do mess up. (Respondent 8, Interview Session, 2025)*

Correspondingly, the item about *how the GenAI fosters language development* was posed to the respondents, and the findings showed that the language of learnt content between the use of GenAI and without GenAI was perceived to be another fuzziness. Claims on the vocabulary, and fluency in written language compared to the oral presentations were demarcated as most of the learners were not orally capable of developing and presenting the arguments and defending statements in case of criticism, as was declared:

> *Learners are afraid, in that case, they will be asked to defend the same written assignment contents orally… In the learner's submission, printed paperwork, the higher order of communication language is engaged…. are starting to buzz, become quiet and calm, when asked to present the same contents orally. (Respondent 3, Interview Session, 2025)*

Apparently, in the aspect of metacognition reflections, the findings delineated the need for module instructors to encourage learners to independently engage in reflective learning practices, assessing the learning processes, thinking, monitoring, and motivating the understanding of the contents, as was declared:

> *In the context that the use of GenAI is taking charge, guidance, monitoring, and supervision are key to ensure learners meet constructive cognitive processes compliance, design their learning strategies that will capacitate engaging in the reflective moment to assess the strengths and weaknesses of their learning rather than supplanting. (Respondent 7, interview session, 2025)*

Harmoniously, findings on the emotional, affective, and inquiry-based learning were revealed as being conflicting with the deployment of GenAI towards constructivism, as one of the respondents cited: -

> *… Instructors had to redesign assignment items with gradually increasing contextual complexities and challenges that demand the engagement of higher-order thinking and creativity for stimulating the mental processes in knowledge and competencies creation. (Respondent 4, interview session, 2025)*

Constructivists' Gaps from Students' Views on GenAI Utilization

In the constructivist gaps, four dimensions were measured, including: frequencies of GenAI usage in learning, levels of device possession for accessing the GenAI, and popular GenAI used by learners. Also, the assessment on the constructivism pillars was categorized into: levels of GenAI deployment relative to the active-learning constructivism, GenAI against personal learning constructivism, and classroom social-constructivism approaches.

Frequencies of GenAI Usage in Learning

The deployment of the GenAI, as a tool supporting students in undertaking the pedagogical activities in the first semester of the academic year 2024-25, was measured in frequencies, whereas in general, the GenAI users were 135 (90%) of the selected students from involved HEIs, as shown in Figure 1. The findings revealed that students in HEIs are digitally conscious and highly use GenAI in learning perspectives.

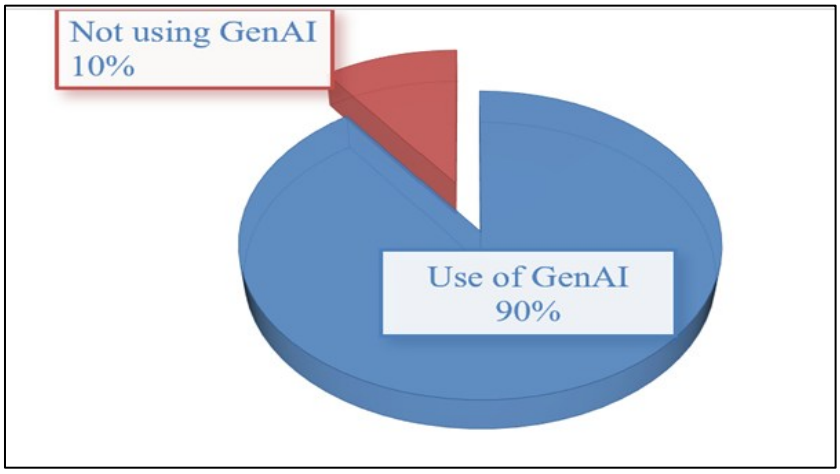

Fig. 1. Level of Students at HEIs Engaged in Utilizing GenAI for learning purposes (n=150)

Levels of Students' Device Possession for GenAI Accessibility

Utilization of digital technological devices has undergone abrupt positive changes in possession among the students in HEIs. Recently, the possession of smart mobile phones, tablets, and laptops has become mandatory among students and instructors in HEIs for communication enhancement, social-media interactions, and mediating the teaching-learning process, to mention a few. In assessing the diversities of on-hand devices possession installed with the GenAI among students, the findings disclosed that smart mobile phones were leading 125 (83%), as shown in

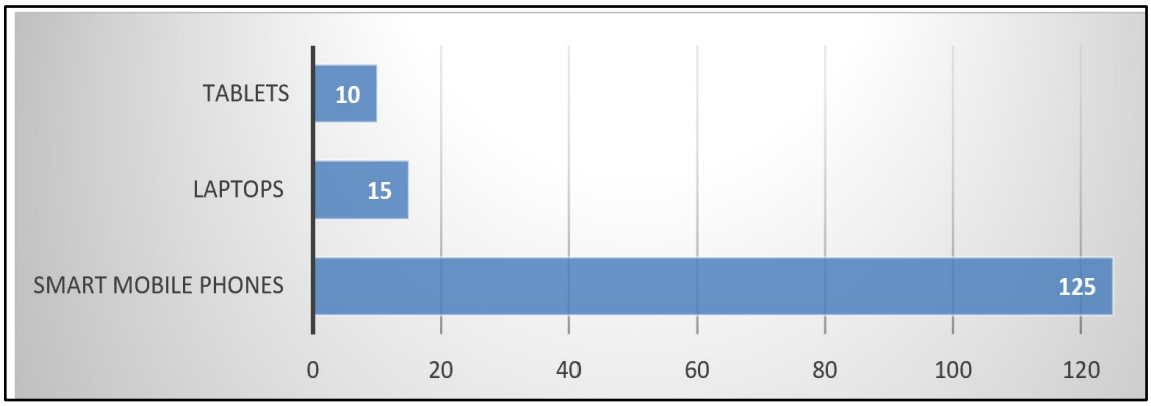

Figure 2.

Fig. 2. Levels of Learners in HEIs Digital Devices Possession for Accessing GenAI (n=150)

Popular GenAI used by Students

Understanding the diversity of GenAI utilized by students was important for the purpose of understanding the digital exposure status. The findings on the common GenAI deployed by the students from the selected HEIs are presented in Figure 3, whereas ChatGPT was the famous, being ranked 98(65%).

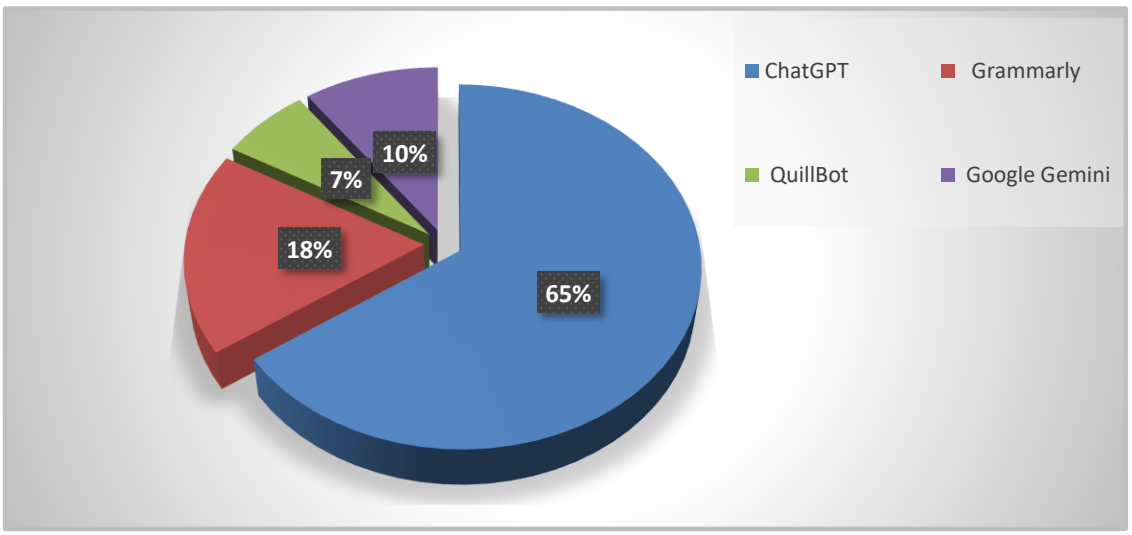

Fig. 3. Distribution of Common GenAI Utilized by Learners in HEIs (n=150)

GenAI Deployment against Constructivist Pillars

The aspects of sources of knowledge creation, capacitating the confidence, and competences acquisition in learning in Figure 4 were ranked by students relative to the GenAI utilization against the constructivism procedures, where multiple learning material sources are encouraged.

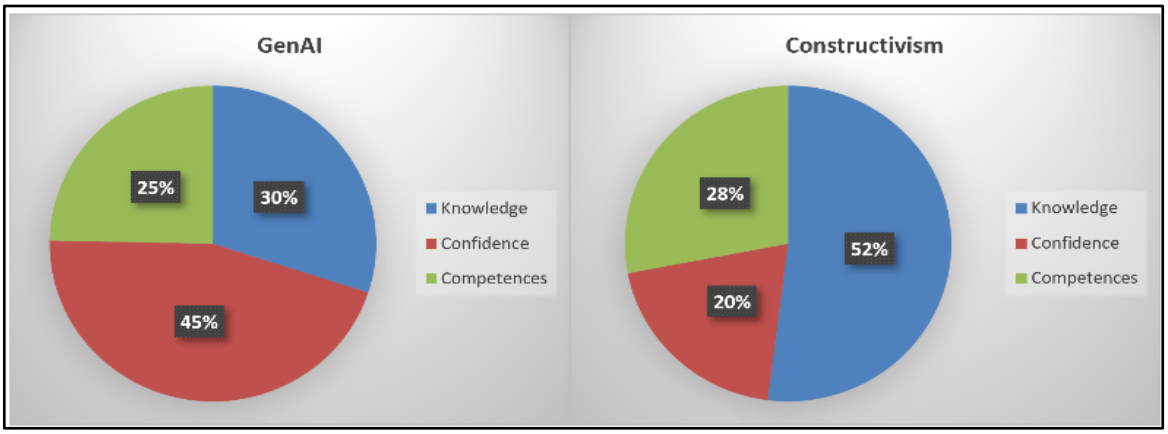

Fig. 4. Comparative levels of GenAI Deployment against Constructivism Pillars among the HEIs Students (n=150)

GenAI utilization against Personal Learning Constructivism

Nevertheless, the findings in Figure 5 present the findings on the usage of GenAI towards content screening, organizing, and contextually comprehending the module content in supporting the constructivist acquisition attributes. The findings disclosed that the GenAI was doing well in supporting the attribute of module content screening 80 (53%), while the constructivism was ranked higher in capacitating the contextualization of the learnt content 83 (55%).

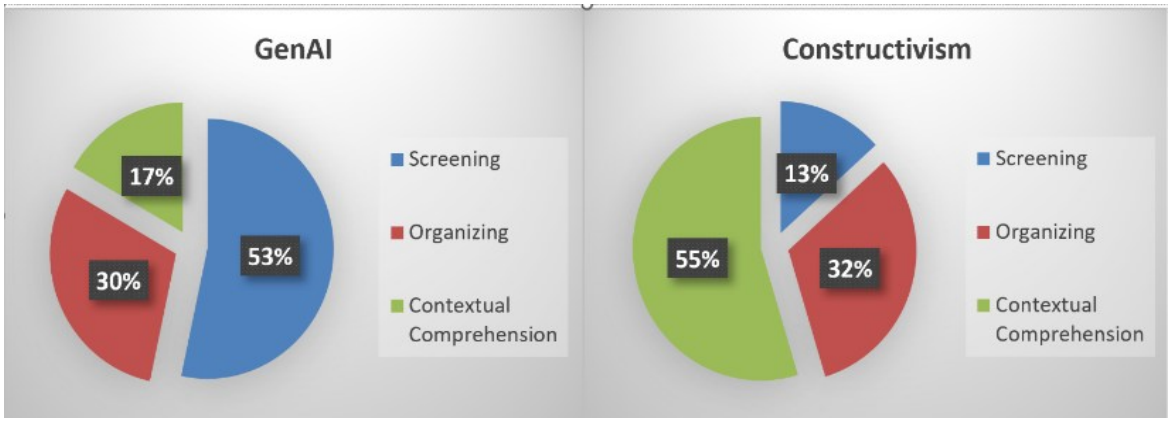

Fig. 5. Levels of Students' GenAI utilization against Personal Learning Constructivism attributes (n=150)

Classroom Social-Constructivism Approaches to the GenAI

In the constructivist processes, the social interaction and learning materials are part of the processes to stimulate cognition towards the knowledge and competencies. In the aspect of social-constructivism was found being doing well in the assessed attributes: levels of peers in learning processes 105 (70%), instructor-students interaction 120 (80%), students engagement in undertaking administered individual learning activities 95 (63%), students collaborating group assignment 107 (71%), timely provision of feedbacks 88 (57%); time spent to engage on the learning tasks and activities 126 (84%), collaboration and dialogue 112 (75%), motivation to drive the learning environment 106 (71%). However, on the side of dependability to GenAI was found to be less on the studied attributes as shown in Figure 6.

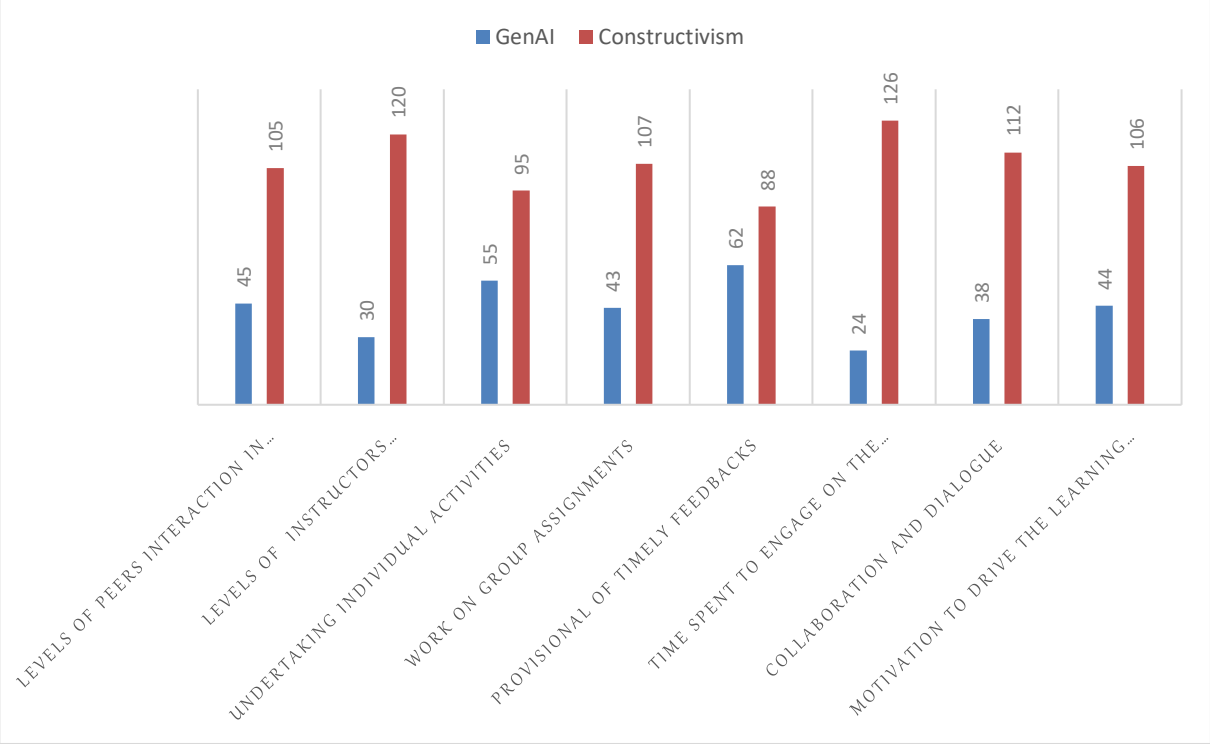

Fig. 6. Students' Levels of Classroom Social-Constructivism attributes against GenAI in HEIs (n=150)

Discussion

GenAI utilization in building the constructivist pillars

The findings about the conflicting feelings on GenAI utilization in building the constructivist pillars among the students disclose the presence of two junctures. On the one hand, GenAI was found to be powerful in capacitating the acquisition of multiple competencies and virtual interactions, as was insisted in the constructivist theory. Another finding revealed that the utilization of GenAI discarded the classroom social and peer interactions, among the integrative triangle of the teaching and learning processes components of students, instructors, and learning materials. According to the findings, the GenAI utilization has distorted the capacities for sharing and acquisition of diverse skills, knowledge, and competences among the HEIs students. According to the case study conducted by Ojukwu and Dlamini (2025) in South Africa, relative to the social constructivism theory, it was found that the deployment of GenAI in HEIs for teaching and learning has been redefining the teaching and learning output and rephrasing the knowledge processing frameworks. Subsequently, the findings justified the need for the HEIS and instructors to ensure there is a balance in the GenAI utilization among the learners without leading to bias, absorption of the negative constructivism pillars, and fostering the cognitive processes. On a further note, the study by Noroozi et al. (2024) emphasized that constructivist theory has been supportive in capacitating the pedagogical practices learning pathways compared to GenAI. Also, it was insisted by Hsiao and Tang (2024) that GenAI has been fuzzy on the habitually focuses on individualism for being characterised by personalized learning.

Afterward, scholars supported that the habitual use of GenAI contravened the constructivist pillars built on the fact that learners have to be dynamic in constructing, receiving, and handling knowledge (Sepriyanti & Kustati, 2024); learners had to be involved in designing, assessing, and developing learning processes, approaches, and outputs (Al Abri et al., 2024). This paper's remarks

are sent to the module instructors in HEIs to appropriately guide learners in the integrative utilization of GenAI with the constructivist approaches to bring efficiency and effectiveness in the learning processes, towards the achievement of the intended curriculum objectives and goals. Correspondingly, other findings showed that the automated GenAI on social constructivism pillars perpetuated the presence of unpleasant learners' attitudes and authentication gaps in language development, and distorted presentation capabilities in different learning contexts. Also, the findings disclosed the existence of displaced communication and language gaps among the learners relative to GenAI utilization across time frames in capturing and the reasonable vocabulary utilization, presenting clear statements, punctuations, and paragraph setting were observed during oral presentation compared to GenAI written presentations. The argument was made by Wibowo et al. (2025) that module instructors had to apply constructivism by encouraging and capacitating learners to engage in actionable strategies and approaches to foster linking, organizing, assimilating, accommodating, transferring, storing, and retraveling of the learned contents.

Despite GenAI fostering personalized learning processes, the study by Al Abri et al. (2025) insisted that in teaching and learning, social interactions are valuable for enhancing and supporting the metacognition, reflection, and higher-order cognition acquisitions. Also, it was warned by Sepriyanti and Kustati (2024) that the GenAI practices are not meant for the replacement of mental structure capabilities. Seemingly, based on the findings, the recommendations are made to the instructors and learners that GenAI has been developed for catalyzing and mimicking some mental processes, natural language processing, and sentiment analysis rather than otherwise. Nevertheless, the implications are made that the utilization of GenAI without proper guidance caused hostile learning behaviours to the students, henceforth, distorted constructivist pillars due to the persistence capacity for dominating the mental processes. The researcher emphasized to the module instructors who are responsible for appropriately guiding learners to engage in the cognitive processes that are built on Cognitive Load Theory (CLT) and Cognitive Load Optimization (CLO) rather than only depending on retrieved information from the GenAI dataset. The conclusion is made to the HEIs to improve the practices through ensuring are developing mechanisms for monitoring the module instructors to administer the classroom activities that stimulate learners' schemas to initiate the learning emotions, thoughts, and cognition activities initiated through interacting with the classroom tasks and activities. The recommendations are made to the module instructors to ensure they are providing the classroom activities that fix learners to engage in mixed methods, motivating, engaging, and timely provision of constructive feedback, rather than leaving them to typical dependence on GenAI.

Constructivists' gaps in students' GenAI utilization

The findings on Constructivists' gaps from students' GenAI utilization revealed the presence of a paradigm shift. Findings disclosed that a large proportion of learners, 135 (90%) out of 150, were using the GenAI. Furthermore, there are revolutions in the possession of handheld devices, whereby the smart mobile phones among students were 125 (83%) in the engaged HEIs. Seemingly, the ChatGPT magnitude was the highest GenAI used among the students, 98 (65%). The argument is made that the learners' possession of different handheld devices has raised easier accessibility to GenAI and its deployment in academic perspectives. Based on the study findings, a large percentage of possession of handheld devices and the magnitude of using different GenAI clearly indicated that students in HEIs were independently engaged in the use of GenAI without

proper guidance on the pros and cons. However, the scholars warned against the deployment of GenAI tools to focus on capacitating rather than destroying education (Zlotnikova & Hlomani, 2024). Besides, there are other warnings on heavily relying on GenAI for accessibility of learnt contents and research being compromised, the quality, hence instigating the HEIs' educational values (Hoernig, Ilharco, Pereira & Pereira, 2024). On a further note, despite the GenAI fuzziness, Shaznay (2025) emphasized that module instructors and learners at HEIs need to be trained and equipped with valuable skills, competencies, and knowledge on emerging technologies for sustainability in the future labour market. The researcher provided the practice recommendations to the HEIs' instructors to guide students in ethical proficiency regarding the GenAI deployment.

Certainly, the comparative contradictory findings were obtained on the attributes of knowledge creation, capacitating confidence, and competencies acquisition in learning, along with the GenAI utilization for constructivism. The findings in the pillar of knowledge creation with GenAI were 30% while those of constructivist knowledge creation without GenAI were 52%. Further, the findings disclosed the slightly significant changes in competence acquisition along constructivism (28%) and GenAI (25%). Also, GenAI was performing well (45%) in assisting students to build confidence compared to constructivism (20%). Author of this paper insisted that the learning process is not inert but relatively passive and interconnected, being built on interpersonal interactions among the peer learners who possessed the backgrounds diversities; being capacitated by module instructors during the content delivering thereafter learners engaged and receiving; learners schedule time to engage into deep reading from different sources being printed and digital textbooks, manuals, and reference books to support captivity, transferring and stored the knowledge for future use. According to the study by Rasul et al. (2024), GenAI brought the dialogical dilemma in authentications of the learning processes despite its capacities in bridging the existing pedagogies gaps. Besides, the utilization of multiple sources and the processing of the content learnt are emphasized in building Self-Regulated Learning (SRL) and Self-Directed Learning (SDL), and autonomy as the building blocks of constructivism (Kharroubi & ElMediouni, 2024). Further, the utilization of GenAI in an educational perspective has been proven for limiting the constructivist full support, whereas the learning process is characterized by engaging the multiple interactions under SRL (Banihashem et al., 2022; Zajda & Zajda, 2021). The paper in hand provided the practice recommendations to the HEIs on the need to provide support to students on appropriate approaches for knowledge acquisition, competencies, and confidence-building envisaged by constructivist theory.

Seemingly, it was found in this study that the personal learning processes on the attributes of capacitation of content screening were 53% in GenAI, while constructivism 13%. Likewise, the module content organization in constructivism was found (32%) on the side of GenAI (30%). Also, the findings on the attribute of contextual comprehension of the learnt content in GenAI were 17% compared to constructivism 55%. According to the findings, the learners were assisted by the GenAI in content screening, being highly ranked. Researchers emphasized that the screening enabled the learners to get a clear picture of the module contents, hence stimulating schemata for receiving, accommodating, storing, and engaging in the retention processes in the long-term memory (Tarigan, Sipahutar & Harahap, 2023; Meylani, 2024; Granda et al., 2024). Despite the findings showing that the organization of the learnt content and comprehension through GenAI being at slightly different levels, there are indications of students copied and pasted the classroom activities text retrieved from GenAI and printed for submission without engaging

on thoroughly reading and reflexivity. Module instructors in HEIs are encouraged to capacitate and provide classroom activities to learners to engage and stimulate the self-comprehension attributes. Similarly, was insisted by scholars that constructivism emphasized that learners had to be assessed on dynamic capabilities in constructing, receiving, and handling knowledge (Sepriyanti & Kustati, 2024). Nonetheless, the module instructors in HEIs are encouraged to motivate students to comprehend and evaluate the learning analytics from multiple viewpoints, to build cognitive advancement. The conclusions are made to the HEIs and module instructors to make sure that the students are appropriately integrating the GenAI with adherence to the constructivist theory attributes, so as to shed light on learners' SRL approaches in self-organizing and comprehending the new content relative to the existing content. Nonetheless, students from the HEIs had to engage in the constructivist processes whereby the social and learning materials interactions are part and parcel in stimulating the cognition processes in the knowledge and competencies acquisition.

In the aspect of social attributes, the constructivism was found being doing well among HEIs learners involved in the study in comparison to the context of GenAI: levels of peers in learning processes 105 (70%), instructor-learner interaction 120 (80%), learners engagement in undertaking administered individual learning activities 95 (63%), learners collaborating in group assignment 107 (71%), timely provision of feedbacks 88 (57%); time spent to engage on the learning tasks and activities 126 (84%), collaboration and dialogue 112 (75%), motivation to drive the learning environment 106 (71%). A case study conducted by Khalid et al. (2025) concurred with the findings of this paper, as it was emphasized that the social constructivist pillars in the digital era have been the curriculum drivers among the students for better inclusivity, achievement, engagement, and utilization of the resources. Also, it was found by the study by Folman (2025) that human interactivity, perceptions, engagement, and learning materials involvement are important education pillars, despite currently being imitated by GenAI. The instructors from HEIs are recommended to improve the education provision practices through inspiring learners to engage in human interaction, most of the time, rather than overdependence on GenAI. The conclusions are made to the HEIs and instructors to capacitate the learners in the acquisition of competences for engaging in GenAI that are based on social constructivist pillars for the learning processes through envisioning creativity, critical thinking, self-efficacy, collaboration, and analytics.

Conclusion

The conclusion is made that the GenAI deployment in the teaching and learning processes has to ensure is integrated with the constructivism pillars, henceforth building the cognition attributes rather than replacing them. Also, the innovations brought by GenAI in education perspectives are to be illuminated as supportive in teaching and learning processes, rather than the displacement of module instructors' and learners' responsibilities. On a further note, the recommendations are made to module instructors and learners in HEIs to ensure there is a balance in the use of GenAI to support the constructivism pillars' acquisitions. Moreover, the recommendations are made to the educators to develop positive attitudes towards GenAI as supportive tools for teaching and learning processes; and policy makers to develop policies, rules, procedures, and regulations to guide the adaptation and utilization of GenAI for supporting human cognition that are built on different education theories, including constructivism for

academic integrity for excellence. The recommendations are made to the scholars on the future research areas:

(1) The HEIs' instructors' guidance approaches for students' GenAI deployments towards academic excellence.
(2) The students' self-regulated learning approaches through GenAI: A case of selected secondary schools.
(3) Can GenAI in learning be exemptible? Analysis of the secondary schools' take-home activities.

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