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An Investigation of Textbook Purchase and Usage Patterns among Undergraduate Students at Kwame Nkrumah University of Science and Technology, Ghana

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ABSTRACT

A textbook is a printed or electronic material that serves as a guideline for instructors and students in the form of a schoolbook, coursebook and workbook. This study investigates textbook purchase and usage patterns among students at Kwame Nkrumah University of Science and Technology. The study is a quantitative observational study. Data were collected using the Collegiate Student Assessment of Textbooks. A convenience sampling technique (N=674) was used to recruit first-year undergraduate students from KNUST in Ghana to complete an online questionnaire using Google Forms. Descriptive statistics were used to examine the demographic data using the Statistical Package for the Social Sciences (SPSS) for Windows Version 26.0. The data consisted of responses to the CSAT, using reliability analysis (Cronbach's Alpha & McDonald's Omega), and Confirmatory Factor Analysis (CFA) to validate the measurement model. The findings revealed that the cost of textbooks did not seem to affect students' textbook purchasing intentions. Textbook usage is positively influenced by features such as study guides, chapter summaries, and alignment with instructor use. In conclusion, this study provides a quantitative examination of the complex factors that influence the purchase and use of textbooks among students at the Kwame Nkrumah University of Science and Technology. We recommend that Departments and libraries within the University, work with publishers to co-create textbooks that fit the local context, curricula, and students' learning needs. This study will serve as a resource material for policymakers, universities, publishers and libraries in textbook development.

Keywords: Textbook Purchase, Textbook Usage, Higher Education, Undergraduate Students, Collegiate Student Assessment of Textbooks

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INTRODUCTION

Textbooks serve as a primary source of structured information, supporting learning objectives and course outcomes in education by offering students access to essential content and exercises that reinforce classroom instruction.[1] However, the decision to purchase and use textbooks is influenced by

[1] Andy Smart et al., "Learning for Uncertain Futures: The Role of Textbooks, Curriculum, and Pedagogy," *Background Paper for the Futures of Education Initiative. Commissioned by UNESCO. Zugriff Am* 29 (2020): 2020.

various factors, including financial considerations, academic requirements, and individual preferences.[2] In contexts such as Ghanaian universities, where financial limitations and resource availability significantly affect student behaviour, understanding these influences becomes even more critical. Despite the increasing availability of digital resources, printed textbooks remain the cornerstone of academic materials in many educational institutions.[3] Textbooks guide students and educators, provide organised curricular content and promote learning efficiency.[4]

Furthermore, they are not just instructional tools but also reflect and promote specific educational goals and curricula.[5] They are designed to follow certain teaching principles and present information better for students to learn and comprehend.[6]Studies have consistently highlighted the role of textbooks as a key educational resource at various levels and disciplines. Zhao et al. stressed the importance of textbooks as a foundation for language learning, while Thompson et al. described textbooks as essential reference materials that guide students and instructors.[7] Textbooks also promote educational equity and gender equality.

Studies estimate that textbooks account for up to 80-95% of classroom time in schools, underscoring their significance in student learning.[8] Several studies have highlighted students' use of textbooks based on their prior knowledge, motivation, and learning styles.[9] Students with existing knowledge of a subject, with higher motivation and a visual learning style have been found to show a greater tendency to use textbooks.[10]

In primary and secondary education, textbooks are typically funded by the public education system, removing the financial burden on students. For example, in the academic year 2020 in the United States, "the public elementary and secondary schools spent approximately 2.56 billion U.S.

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[2] Elaine Correa and Sandra Bozarth, "To Eat or to Learn? Wagering the Price Tag of Learning: Zero Cost Textbook Degree," *Equity in Education & Society* 2, no. 2 (August 26, 2023): 126–37, https://doi.org/10.1177/27526461231154013; Gary White and Mary Warneka, "Affordable Course Content: A Cross-Unit Collaboration to Develop Institution-Wide Strategies at the University of Maryland," *College & Research Libraries News* 84, no. 2 (2023), https://doi.org/10.5860/crln.84.2.75.

[3] Mohanad Alfiras and Janaki Bojiah, "Printed Textbooks versus Electronic Textbooks: A Study on the Preference of Students of Gulf University in Kingdom of Bahrain," *International Journal of Emerging Technologies in Learning (IJET)* 15, no. 18 (2020): 40–52; Anitha Nesa Thanka, Jansirani Natarajan, and Mickael Antoine Joseph, "Preference, Challenges, and Satisfaction with Using E-Books: Is There a Gender Difference among Omani Nursing Students?," *International Journal of Interactive Mobile Technologies (IJIM)* 17, no. 13 (July 4, 2023): 133–47, https://doi.org/10.3991/ijim.v17i13.39409.

[4] Tomáš Janko and Karolína Pešková, "Exploring Teachers' Perceptions of Curriculum Change and Their Use of Textbooks during Its Implementation: A Review of Current Research," 2017; Chun-Sheng Liang et al., "Review on Recent Progress in Observations, Source Identifications and Countermeasures of PM2.5," *Environment International* 86 (January 2016): 150–70, https://doi.org/10.1016/j.envint.2015.10.016.

[5] Janko and Pešková, "Exploring Teachers' Perceptions of Curriculum Change and Their Use of Textbooks during Its Implementation: A Review of Current Research"; Youngshin Kim et al., "Alignment Of Concepts Of Meiosis Among Curriculum, Textbooks, Classroom Teaching And Assessment In Upper Secondary School In Republic Of Korea," *Journal of Baltic Science Education* 21, no. 2 (April 25, 2022): 232–44, https://doi.org/10.33225/jbse/22.21.232.

[6] Monika Mithans and Milena Ivanuš Grmek, "The Use of Textbooks in the Teaching-Learning Process," in *New Horizons in Subject-Specific Education: Research Aspects of Subject-Specific Didactics* (University of Maribor Press, 2020), 201–28, https://doi.org/10.18690/978-961-286-358-6.10.

[7] Y. Zhao et al., "A Study on the Development and Evolution of Foreign Language Textbook Policies in Basic Education over the Past 40 Years of Reform and Opening Up," *International Journal of New Developments in Education* 6, no. 2 (2024): 128–34, https://doi.org/10.25236/IJNDE.2024.060221; Bailey Thompson, Zoie Bunch, and Maia Popova, "A Review of Research on the Quality and Use of Chemistry Textbooks," *Journal of Chemical Education* 100, no. 8 (August 8, 2023): 2884–95, https://doi.org/10.1021/acs.jchemed.3c00385.

[8] M Ahmed and Xiaohong Tian, "Gender Biases in Primary School Language Textbooks: A Systematic Review of Literature," *North American Academic Research* 6, no. 11 (2023): 28–41; Pebrina Nurwahyuningsih, Nurianti Nurianti, and Nurlinda Nurlinda, "Gender Representation in EFL/ESL Textbooks in Indonesia: A Literature Review," *ELS Journal on Interdisciplinary Studies in Humanities* 6, no. 4 (2023): 671–75.

[9] Santiago Jácome-Guerrero et al., "Interactive E-Books in Mathematics Learning: A Systematic Mapping Study," in *Emerging Research in Intelligent Systems*, 2024, 339–52, https://doi.org/10.1007/978-3-031-52255-0_24; Harmen Schaap, Liesbeth Baartman, and Elly De Bruijn, "Students' Learning Processes during School-Based Learning and Workplace Learning in Vocational Education: A Review," *Vocations and Learning* 5, no. 2 (2012): 99–117; Aimable Sibomana, Claude Karegeya, and John Sentongo, "Students' Conceptual Understanding of Organic Chemistry and Classroom Implications in the Rwandan Perspectives: A Literature Review," *African Journal of Educational Studies in Mathematics and Sciences* 16, no. 2 (2020): 13–32; Claire E Weinstein and Richard E Mayer, "The Teaching of Learning Strategies.," in *Innovation Abstracts*, vol. 5 (ERIC, 1983), n32.

[10] Bo Jiang, Meijun Gu, and Ying Du, "Recent Advances in Intelligent Textbooks for Better Learning," in *Learning: Designing the Future*, vol. 11 (Springer Nature Switzerland, 2023), 247.

dollars on textbooks."[11] However, rising textbook prices, especially at the college level, have placed a financial burden on students, particularly first-year undergraduates coping with increasing tuition fees.[12] Despite the relatively stable proportion of textbook costs within the overall educational expenses (around 6% over the past three decades in the USA,[13] the perceived high costs continue to drive students away from traditional purchasing methods leading to various coping strategies, including purchasing used books, sharing with peers, or opting for electronic versions.[14] This shift towards alternative methods to access textbooks has become more pronounced as students seek to minimise costs.

However, in the case of higher institutions, the financial burden shifts to students, and the persistence of high textbook prices requires further investigation. While global studies provide a general framework, Ghanaian universities' unique socio-economic and cultural contexts necessitate a localised investigation to understand the factors influencing textbook purchase and use, which can support educational strategies. It can also identify barriers that prevent students from purchasing or using textbooks. Educators and policymakers can take targeted action to improve resource accessibility and student engagement. More importantly, this will help publishers create textbooks that meet students' needs, thereby improving the overall quality of educational materials.

Therefore, this study assessed the motives driving first-year undergraduate students' decisions to purchase and use textbooks. Understanding these patterns is essential for developing more effective educational strategies and policies that can improve academic outcomes and enhance resource accessibility for students. This investigation addresses the following research question: What are the factors that determine textbook purchasing decisions and usage patterns among undergraduate students at KNUST?

LITERATURE REVIEW

Cost and Accessibility of Textbooks

The financial burden of textbook costs on students is widely acknowledged, as highlighted in studies by Stein et al., a concern echoed in other studies.[15] In a study by Stein et al., respondents confirmed that the expensive nature of textbooks often affects access, and students spend more money on textbooks than the other year groups, like the second, third and fourth years.[16] According to McGowan & Stephens, in their study, students prefer to buy textbooks from vendors to reduce cost rather than campus bookshops, such that those who take business courses experience high cost.[17] This finding diverges from other research suggests that high costs can deter students from taking courses and ignore recommended textbooks, which invariably affect their academic success.[18] According to Mlambo, Masuku & Ndebele in their study, the actual purchase of prescribed textbooks went down, and it took

[11] Amber M. Mullens and Bobby Hoffman, "The Affordability Solution: A Systematic Review of Open Educational Resources," *Educational Psychology Review* 35, no. 3 (September 29, 2023): 72, https://doi.org/10.1007/s10648-023-09793-7.
[12] Sarah Stein et al., "Student Views on the Cost of and Access to Textbooks: An Investigation at University of Otago (New Zealand)," *Open Praxis* 9, no. 4 (October 1, 2017): 403, https://doi.org/10.5944/openpraxis.9.4.704.
[13] J. Jacob Jenkins et al., "Textbook Broke: Textbook Affordability as a Social Justice Issue," *Journal of Interactive Media in Education* 1, no. 3 (May 11, 2020): 1–13, https://doi.org/10.5334/jime.549.
[14] Elizabeth Dobler, "E-Textbooks," *Journal of Adolescent & Adult Literacy* 58, no. 6 (March 9, 2015): 482–91, https://doi.org/10.1002/jaal.391.
[15] Stein et al., "Student Views on the Cost of and Access to Textbooks: An Investigation at University of Otago (New Zealand)"; Melissa Ashman, "Faculty and Student Perceptions of Open Pedagogy: A Case Study from British Columbia, Canada," *The Open/Technology in Education, Society, and Scholarship Association (OTESSA) Journal* 3, no. 2 (2023): 1–29; Rajiv Sunil Jhangiani and Surita Jhangiani, "Investigating the Perceptions, Use, and Impact of Open Textbooks: A Survey of Post-Secondary Students in British Columbia," *The International Review of Research in Open and Distributed Learning* 18, no. 4 (June 16, 2017), https://doi.org/10.19173/irrodl.v18i4.3012.
[16] Stein et al., "Student Views on the Cost of and Access to Textbooks: An Investigation at University of Otago (New Zealand)."
[17] Paul R. Stephens, Matthew K McGowan, and Valerie V Pape, "Blended Learning in the Introductory Computer Skills Course," *Issues in Information Systems* 16, no. 3 (2015).
[18] Lindsay Murphy and David Rose, "Are Private Universities Exempt from Student Concerns about Textbook Costs? A Survey of Students at American University," *Open Praxis* 10, no. 3 (2018): 289–303.

the intervention of book allowance to increase access efficiency and effectiveness. [19]The study revealed that the cost of textbooks, if not highly subsidised, influences their purchase and usage by students, which in the long run affects their academic success.

According to Ahmadi and Derakhshan, the effectiveness of textbooks in classroom learning depends on the active use of teachers and students.[20] The importance of researching textbook use has been recognized since the 1955 work of Cronbach et al., highlighting its importance in educational research. More recent studies have extensively examined how teachers use textbooks to focus on student use, as they are the primary users.[21] The goal of textbook design is to support student development and not compromise their educational benefits.

Students' Use of Textbooks

Textbooks are instruments that embody the concepts of curriculum reform and help to initiate and sustain these reforms.[22] Simultaneously, they are the primary instructional materials in schools and serve as vehicles for content delivery by helping students achieve the goals outlined in curriculum standards.[23] Additionally, the availability and use of textbooks can improve students' academic performance in school.[24] Textbooks serve as teaching tools and reflect various social and cultural values. They can influence students' perspectives, convey ideologies, and shape their ideas about the future. They are relevant materials for students and lecturers in the teaching and learning process.[25] It is revealed that students depend on textbooks for their academic work, especially when it is recommended.[26] In the actual sense, students' use of textbooks shows different patterns. Studies by Rezat et al. on how students use textbooks in high school and college show that they selectively use their textbooks, focusing on specific sections or components for different purposes.[27] Furthermore, German secondary school students primarily use textbooks for problem solving, knowledge consolidation, acquiring new information, and interest-related activities.

However, Culver and Hutchens found that students spend less time reading textbooks. This is less than what is recommended in their courses.[28] Holbrook and Cassell reported that with a required assignment as a motivation, students read the textbook.[29] In the case of a study by Heiner, Banet & Wieman majority of students read their textbooks often.[30] Sinapuelas categorized students' textbook usage into four levels: memorizer, programmer, critical thinker, and researcher.[31] Most students fall into the memorizer and proceduralist categories, focusing on recalling fragmented knowledge and making basic connections without a deeper evaluation or application. Also, unfortunately, students do

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[19] Victor H Mlambo, Mandla Mfundo Masuku, and Nduduzo C Ndebele, "Students' Perceptions on the Availability of Prescribed Study Material under the New NSFAS Book Allowance Funding Model," *The International Journal of Learning in Higher Education* 30, no. 1 (2022): 173–91, https://doi.org/10.18848/2327-7955/CGP/v30i01/173-191.

[20] Azam Ahmadi and Ali Derakhshan, "EFL Teachers' Perceptions towards Textbook Evaluation," *Theory and Practice in Language Studies* 6, no. 2 (2016): 260.

[21] Kavita Chavali and Raghava R. Gundala, "The Textbook Dilemma: Digital or Print? Evidence from a Selected US University," *TEM Journal*, February 28, 2022, 242–48, https://doi.org/10.18421/TEM111-30.

[22] Sebastian Rezat, Lianghuo Fan, and Birgit Pepin, "Mathematics Textbooks and Curriculum Resources as Instruments for Change," *ZDM–Mathematics Education* 53, no. 6 (2021): 1189–1206.

[23] Tao Wang, "Competence for Students' Future: Curriculum Change and Policy Redesign in China," *ECNU Review of Education* 2, no. 2 (June 30, 2019): 234–45, https://doi.org/10.1177/2096531119850905.

[24] Agnetta Mwikali, Hellen Kiende, and Norbert Ogeta, "Utilization of Textbooks and Its' Influence on Students' Academic Performance in Public Secondary Schools in Makueni County, Kenya," *Journal of Education* 4, no. 2 (2024): 21–34.

[25] Mithans and Ivanuš Grmek, "The Use of Textbooks in the Teaching-Learning Process."

[26] D. Yin, "A Review of The Research of Vocational Education Textbooks," *International Journal of Education and Humanities* 11, no. 3 (2023): 402–10.

[27] Rezat, Fan, and Pepin, "Mathematics Textbooks and Curriculum Resources as Instruments for Change."

[28] Tiffany Culver and Scott Hutchens, "Toss the Text? An Investigation of Student and Faculty Perspectives on Textbook Reading," *Journal of College Reading and Learning* 51, no. 2 (April 3, 2021): 81–94, https://doi.org/10.1080/10790195.2020.1734884.

[29] Elizabeth Holbrook and Sandy Cassell, "Getting Students to Read Course Material," *Christian Business Academy Review* 19 (April 16, 2024), https://doi.org/10.69492/cbar.v19i1.668.

[30] Cynthia E. Heiner, Amanda I. Banet, and Carl Wieman, "Preparing Students for Class: How to Get 80% of Students Reading the Textbook before Class," *American Journal of Physics* 82, no. 10 (October 2014): 989–96, https://doi.org/10.1119/1.4895008.

[31] Heiner, Banet, and Wieman, "Preparing Students for Class: How to Get 80% of Students Reading the Textbook before Class."

not like thorough reading, which is not a good behaviour, but end up using textbooks when they want to learn.[32]

Despite the various models of curriculum implementation that include textbook use, research on students' textbook usage is limited compared with studies on teachers' use. Theoretical and research paradigms in this area are still developing, and a consensus has not yet been reached. However, as students are the primary users of textbooks, their usage should be a central focus of research. Understanding how students engage with textbooks is crucial to realise the educational potential of these resources.[33] Therefore, more attention and research should be directed towards the students' use of textbooks.

Textbooks are designed to provide structured content, exercises, and references to guide students throughout their courses. However, to excel in their academic endeavour, students extensively engage with textbooks.[34] Contrarily, according to Aagaard and Skidmore students have a strange and complicated relationship with their course textbooks; they buy but rarely read them.[35] They only read regularly when professors take steps to encourage them to take advantage of it. Students who use their textbooks regularly tend to perform better academically. The relationship highlights the need for the factors that encourage textbook use. A study by Qi et al, and Skinner & Howes showed clearly that students often use textbooks when it happens to be accessible and easy to use.[36] One thing that encourages students to use textbooks often is when study guides, chapter summaries, and facilitator-led activities are in the book. Moreover, when instructors actively incorporate textbooks into their teaching, students are more inclined to engage with them.[37]

Despite the recognised benefits, the cost of textbooks remains a significant barrier for many students, and these financial constraints can deter students from purchasing textbooks.. The literature also highlights the impact of individual factors on textbook use. Students' prior knowledge, motivation, and learning styles determine how they use textbooks. For instance, students with previous knowledge of a subject or higher motivation to learn are likely to engage with textbooks. Additionally, students with a visual learning style use textbooks more frequently than those with other learning styles.[38] However, a study to determine students' textbook usage and purchases is crucial to unveil the existing situation at KNUST.

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[32] Fangfang Li and Lei Wang, "A Study on Textbook Use and Its Effects on Students' Academic Performance," *Disciplinary and Interdisciplinary Science Education Research* 6, no. 1 (January 17, 2024): 4, https://doi.org/10.1186/s43031-023-00094-1.
[33] Evaristo Haulle and Eliud Kabelege, "Relevance and Quality of Textbooks Used in Primary Education in Tanzania: A Case of Social Studies Textbooks," *Contemporary Education Dialogue* 18, no. 1 (January 19, 2021): 12–28, https://doi.org/10.1177/0973184920962702.
[34] D. Brown, "Why and How Textbooks Should Encourage Extensive Reading," *ELT Journal* 63, no. 3 (July 1, 2009): 238–45, https://doi.org/10.1093/elt/ccn041.
[35] Lola Aagaard and Ronald L Skidmore, "College Student Use of Textbooks.," *Online Submission*, 2009.
[36] Chunxia Qi et al., "Recent Advances in Mathematics Textbook Research and Development: Proceedings of the 4th International Conference on Mathematics Textbook Research and Development," 2025; Deborah Skinner and Barbara Howes, "The Required Textbook-Friend or Foe? Dealing with the Dilemma," *Journal of College Teaching & Learning (Online)* 10, no. 2 (2013): 133.
[37] Aagaard and Skidmore, "College Student Use of Textbooks."; Xue Bai et al., "Another Look At Textbook Usage By College Students," *Issues in Information Systems* 20, no. 4 (2019).
[38] Smart et al., "Learning for Uncertain Futures: The Role of Textbooks, Curriculum, and Pedagogy."

Conceptual Framework for Textbook Usage

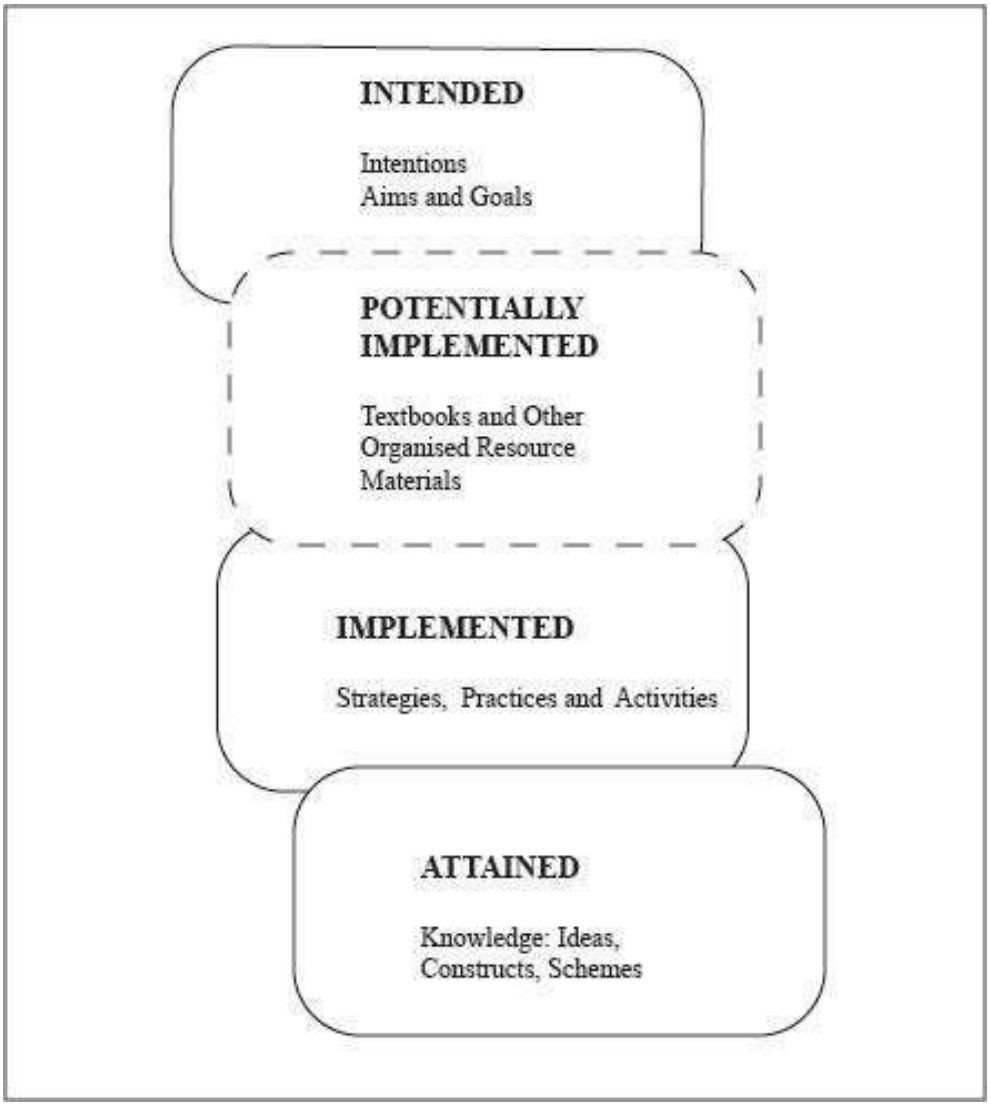

Figure 1: Textbooks and the Tripartite Model

As seen in Figure 1, the educational system and national policy comprise the planned curriculum, which includes "subject standards, curriculum guides, frameworks, or other similar papers".[39] The adopted curriculum is the result of collaboration between classroom practice and the instructor. Gouëdard et al. and Valverde in their study established a strong connection among the various developed curricula for a possible implemented curriculum, which is influenced by the

[39] Gilbert A Valverde, *According to the Book: Using TIMSS to Investigate the Translation of Policy into Practice through the World of Textbooks* (Springer Science & Business Media, 2002), 9.

textbook.[40] Lester proposes a strong relationship between curriculum and textbooks, which he reinforces by referring to the textbook as a "surrogate curriculum."[41] Venezky (quoted in Leung, Robitaille and Travers) expands on this idea by stating that a single set of curricular rules might create excess textbook representations.[42] In this context, the bidirectional relationship between textbooks and curricula is crucial.

METHODOLOGY

The study is a quantitative observational study investigating textbook buying and usage by undergraduate students at KNUST, Ghana. It took place within a period of four months from January 2024 to May 2024. The research instrument adopted for the study was Collegiate Student Assessment of Textbooks.[43] The elements used are listed in Table 1. The study assesses students' impressions of textbooks, emphasising their perspectives on why they buy a textbook, what they appreciate, and what students say motivates them to use it. The initial items comprised 110 questions that measured three core areas (*purchase (buy)*, *like*, and *use*). To offer an understanding of the study by students, a convenience sampling technique was considered to enlist first-year students (*N=674*) of KNUST in the Ashanti Region. Students received email and bulk messages through their university assigned mobile phone SIM cards to complete an online questionnaire on Google Forms. The reason for that SIM card was that every student had been given this SIM with 5gb data every month for learning and communication. Students who were not in their first year or at level 100 were excluded from the present study. The Google form questionnaire was sent to the student through email and SMS messages on their phones. Weekly follow-ups were made to remind students to complete the questionnaire. The students were followed until a required number of respondents was obtained. The questionnaire, adapted from Landrum et al., originally measured students' assessments of textbook purchases, likeness, and usage.[44] The original questionnaire had nine (9) constructs measured with 53 items. However, the present study adopted six of the nine constructs, which consisted of the following 35 elements:

I) Learning and understanding (7 items, $\alpha = .83$),
II) Class Requirement (3 items, $\alpha = .89$),
III) Cost (4 items, $\alpha = .89$),
IV) Student Aids (8 items, $\alpha = .81$),
V) Instructor Use (6 items, $\alpha = .85$), and
VI) Ease of Use (7 items, $\alpha = .82$).

The total number of constructs was six. From "Strongly disagree" (1) to "Strongly agree (5), every item was assessed according to a Likert scale. Examples of questions under textbook purchase or buying were "*I purchase textbook for a class…, because I need to take the time to read the material to fully understand it." and* "*I use textbooks when reviewers are involved which contain matching terminologies and definitions.*"[45] The textbook purchase scale was classified as "*Learning and Understanding, Classroom Requirement and Cost."*[46] Moreover, three core components, such as *"Study Aids, Instructor Use, and Ease of Use",* also fall under textbook use. Also, sample items for

[40] P. Gouëdard et al., "Curriculum Reform Curriculum Reform: A Literature Review to Support Effective Implementation," December 11, 2020, https://doi.org/10.1787/efe8a48c-en; Valverde, *According to the Book: Using TIMSS to Investigate the Translation of Policy into Practice through the World of Textbooks*; Qi et al., "Recent Advances in Mathematics Textbook Research and Development: Proceedings of the 4th International Conference on Mathematics Textbook Research and Development."
[41] Frank K Lester, *Second Handbook of Research on Mathematics Teaching and Learning: A Project of the National Council of Teachers of Mathematics* (IAP, 2007).
[42] D. F. Robitaille and K. J. Travers, "International Studies of Achievement in Mathematics," in *Handbook of Research on Mathematics Teaching and Learning: A Project of the National Council of Teachers of Mathematics* , ed. D. A. Grouws (Macmillan Publishing Co, Inc., 1992), 687–709.
[43] R. Eric Landrum, Regan A. R. Gurung, and Nathan Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance," *College Teaching* 60, no. 1 (January 2012): 17–24, https://doi.org/10.1080/87567555.2011.609573.
[44] Landrum, Gurung, and Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance."
[45] Landrum, Gurung, and Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance," 19.
[46] Landrum, Gurung, and Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance," 19.

textbook use are itemised in Table 2, factor Loading. The survey data are presented in statistical tables according to mean and standard deviation. The mean learning and understanding were used to represent the average value for learning and understanding items. This is used to assess textbook purchase and usage perception. The mean for the scale 1-5 was 3.0. which means that the results are positive.

In the study, there were a total of 674 year one students. The sample size comprises 445 males (66%) and 211 women (33.1%); 17 participants did not report on their sex (2.5%). 20years with a SD=4.0 was the average age of respondents. The demographic factors included age, sex, and college. The data was analysed with the Statistical Package for the Social Sciences (SPSS) version 26.0. Several statistical procedures were used to verify the validity and reliability of the results. The Cronbach's alpha (α) and McDonald's omega (ω) reliability coefficients were used to evaluate the internal consistency of the instrument. The results indicate high reliability, with coefficients of $\alpha = 0.973$ and $\omega = 0.975$, which confirms a strong internal consistency of the measured constructs.

Descriptive statistics that included measures of central tendency (mean, median, mode) and va riability (standard deviation) were used to analyze the Likert-scale survey responses.
These statistical measures were applied to key constructs such as Learning and Understanding, Classroom Requirement, Cost, Study Aids, Instructor Use, and Ease of Use to ensure an understanding of the distribution and trends within the data. Additionally, to verify the structural validity of the theoretical constructs in the questionnaire, confirmatory factor analysis (CFA) was used.

Factor loadings were analysed to determine whether the questionnaire items measured the intended latent variables, thus ensuring the robustness of the study's measurement model.

Study Area

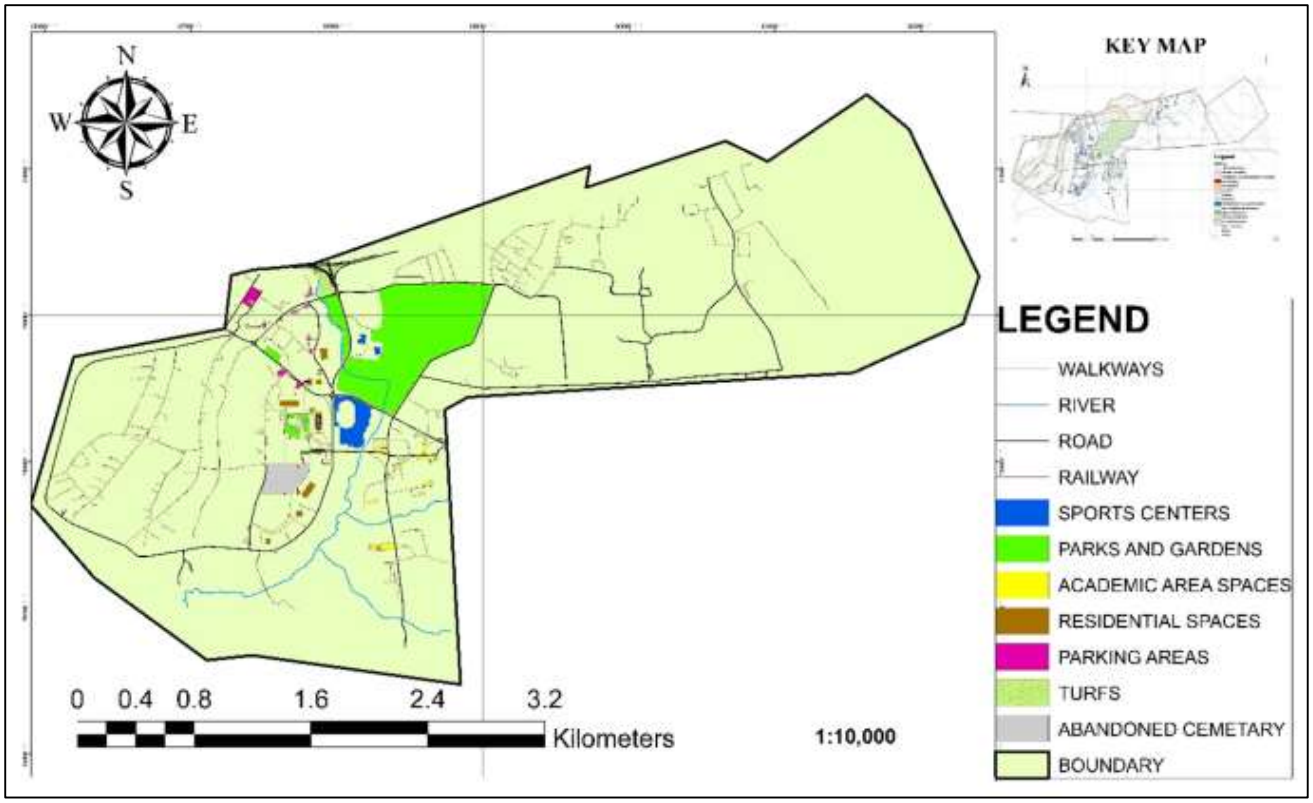

Figure 2: Location of the Study (Source: KNUST website 2025)

Ethical Considerations

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title " An Investigation of Textbook Purchase and Usage Patterns among Undergraduate Students at Kwame

Nkrumah University of Science and Technology, Ghana", which is the second part of the directive, were taken.

Ethical review board name: Humanities and Social Science Research Ethics Committee (HuSSREC), Kwame University of Science and Technology.

Date of ethics review decision: January 2024

Ethics assessment document issue number: EIST-EC/REF No: January 01,2024

PRESENTATION OF FINDINGS

Reliability of the Questionnaire

To evaluate the internal consistency of the six (6) CSAT constructs, Cronbach's alpha (α) was comput ed with overall scale reliability classified as excellent (a ≥ 0.90). Additionally, the Cronbach's Alpha Coefficient for the questionnaire was α = 0.956, indicating internal consistency reliability. The constructs, textbook purchases, and textbook use also illustrated good coefficients for a and b, respectively.

Table 1: Reliability Statistics Scale

	Cronbach's α	**McDonald's ω**
Overall	0.973	0.975
Learning and Understanding	0.930	0.931
Class Requirement	0.898	0.899
Cost	0.884	0.888
Study	0.944	0.945
Instructor Use	0.924	0.924
Ease of Use	0.957	0.957

Source: authors on the field survey, 2024

Table 1 shows scale reliability statistics for the survey and the questionnaire. Cronbach's alpha (α) and McDonald's omega (ω) were the reliability coefficients used in this Table. Both reliability coefficients measure internal consistency, a property that reflects the extent to which all scale items measure the same construct.

The overall reliability coefficients for the entire scale were 0.973 for Cronbach's alpha and 0.975 for McDonald's omega. These indicate a high internal consistency, which is a reliable measure of the construct that it intends to measure. Cronbach's alpha and McDonald's omega reliability coefficients for *Learning and Understanding* were 0.930 and 0.931, respectively. This subscale also had high internal consistency.

Class Requirement: The reliability coefficient for this subscale was 0.898 for Cronbach's alpha and 0.899 for McDonald's omega. This had moderate internal consistency. Cost**:** The reliability coefficient for this subscale was 0.884 for Cronbach's alpha, and 0.888 for McDonald's omega. This had moderate internal consistency. *Study***:** The reliability coefficient for this subscale was 0.944 for Cronbach's alpha, and 0.945 for McDonald's omega. This has a high internal consistency. *Instructor Use:* The reliability coefficient for this subscale was 0.924 for Cronbach's alpha and 0.924 for McDonald's omega. This has a high internal consistency. *Ease of Use:* The reliability coefficient for this subscale was 0.957 for Cronbach's alpha and 0.957 for McDonald's omega. This has a high internal consistency.

Confirmatory Factor Analysis (CFA)

Table 2: Factor Loadings

Purchase items	**Learning and Understanding**	**Class Requirement**	**Cost**
"I purchase a textbook for a class…"			

because I need to take the time to read the material in order to fully understand it	0.830		
so that I can read ahead and be better prepared for each class session	0.846		
because reading the textbook makes the lectures more understandable	0.828		
because you cannot learn as much from a lecture	0.706		
because you can learn a lot from textbooks	0.824		
because I learn best by reading	0.771		
when I want to learn as much as possible about the topic	0.873		
for every class when it is required		0.873	
for every class when it is required because I believe I will be better prepared when it is required, no matter what.		0.812	
when it is required because I will understand the material better using the textbook		0.901	
I purchase a textbook for a class only if the bookstore will buy back the book at the end of the semester			0.881
I purchase a textbook for a class when the cost of the book is less than 50 cedis (for each book)			0.855
I purchase a textbook for a class only when the price is less than the suggested retail price			0.915
I purchase a textbook for a class only when I can get a used copy			0.783
Use items	**Study Aids**	**Instructor Use**	**Ease of use**
"I am more likely to use a textbook when…"			
reviews are included that involve matching terms with definitions	0.766		
when multiple-choice review questions are included throughout the chapters	0.850		
when discussion questions are included.	0.852		
reviews are included that involve fill-in-the-blank answers.	0.781		
multiple-choice items are used as study aids.	0.871		
online study aids are provided.	0.715		
each section concludes with a summary of the basic points	0.881		
the concepts are simplistic.	0.877		
quizzes are given about the book content.		0.850	
homework is assigned from the book.		0.840	
an instructor gives pop quizzes.		0.785	
an instructor calls on students in class with questions from the book material.		0.782	
in-class activities involve concepts in the book.		0.830	
the instructor refers to the book often.		0.809	

the end-of-chapter summaries are included.			0.869
I understand the vocabulary used.			0.871
key points are summarised in bullet format.			0.867
difficult words are defined.			0.888
tough concepts are summarised with figures/tables.			0.900
it takes little effort to learn quickly from the book.			0.826
it has a simplistic concept			0.889

Source: authors on the field survey, 2024 and (Landrum et al, 2012)

Demographic Analysis

Demographic variables (age, sex, college affiliation) and CSAT responses from a sample of 674 students were analysed using descriptive statistics in SPSS 26.0, with results clearly summarised in Tables 2-4. From Table 2, the males formed the majority (66.0%) of the survey sample, whereas females formed the minority (31.3%), indicating that male students dominated the study. As shown in Table 3, the ages of most of the participants range from 15 to 20 years, representing 70.6% of the respondents. Participants had a mean age of 18 years (SD = 0.575, n = 674), reflecting minimal age differences within the cohort.

Table 3: Gender Distribution

Gender		**Frequency**	**Percent**
Valid	Male	445	66.0
	Female	211	31.3
	Prefer not to say	18	2.7
	Total	**674**	**100.0**

Source: Authors on the field survey, 2024

Table 3 presents a breakdown of participants by gender. Of the 674 participants, the majority, 445 individuals (66%), identified as male. A significant proportion, 211 individuals (31.3%), identified as female. A smaller group of 17 participants (2.7%) chose not to disclose their gender.

Table 4: Age Distribution

Age	***Frequency***	***Percent***
15-20	476	70.6
21-25	178	26.4
26-30	12	1.8
31 and above	8	1.2
Total	**674**	**100.0**

Source: authors on the field survey, 2024

Table 4 presents a breakdown of participants based on their age groups. Of the 674 participants, the majority, 476 individuals (70.6%), fall within the 15-20 age range. A significant portion, 178 individuals (26.4%), belong to the 21-25 age group. A smaller group of 12 participants (1.8%) are in the 26-30 age range, and only 8 (1.2%) are 31 and above.

Table 5: Distribution of Colleges of Affiliation

College	***Frequency***	***Percent***
College of Humanities & Social Sciences	130	19.3
College of Science	142	21.1

College of Engineering	135	20.0
College of Agriculture & Natural Resources	66	9.8
College of Art and Built Environment	172	25.5
College of Health Sciences	29	4.3
Total	**674**	**100.0**

Source: authors on the field survey, 2024

Table 5 shows the distribution of colleges. These are the various colleges in the university from which the student came. According to Table 5, 172 first-year students, representing 25.5% are from the College of Art and Built Environment and responded to the questions on the Google form. Followed by 142 students from the College of Science (21.1%), while 29 students from the College of Health Sciences answered the questions. The overall impression was that, except for the College of Health Science, the remaining colleges contributed to the success of this study.

Table 6: Textbook Purchase

TEXTBOOK PURCHASE	***N***	***M***	***Median***	***Mode***	***Std.D***	***Sum***
LEARNING AND UNDERSTANDING						
I purchase a textbook for a class because I need to take the time to read the material in order to fully understand it	674	3.77	4.00	4	1.143	2542
I purchase a textbook for a class so that I can read ahead and be better prepared for each class session	674	3.88	4.00	4	1.182	2616
I purchase a textbook for a class because reading the textbook makes the lectures more understandable	674	3.76	4.00	4	1.246	2533
I purchase a textbook for a class because you cannot learn as much from a lecture	674	3.41	4.00	4	1.266	2296
I purchase a textbook for a class because you can learn a lot from textbook	674	3.59	4.00	4	1.152	2417
I purchase a textbook for a class because I learn best by reading	674	3.45	4.00	4	1.205	2325
I purchase a textbook for a class when I want to learn as much as possible about the topic	674	3.70	4.00	4	1.178	2496
OVERALL MEAN		**3.651**				
CLASS REQUIREMENT						
I purchase a textbook for a class for every class when it is required	674	3.31	4.00	4	1.180	2228
I purchase a textbook for a class for every class when it is required because I believe I will be better prepared when it is required, no matter what.	674	3.48	4.00	4	1.176	2348
I purchase a textbook for a class for every class when it is required because I will understand the material better using the textbook	674	3.46	4.00	4	1.175	2331
OVERALL MEAN		**3.417**				
COST						

I purchase a textbook for a class only if the bookstore will buy back the book at the end of the semester	674	3.06	3.00	4	1.353	2060
I purchase a textbook for a class when the cost of the book is less than 50 cedis (for each book)	674	3.35	4.00	4	1.366	2258
I purchase a textbook for a class only when the price is less than the suggested retail price	674	3.27	3.00	4	1.298	2203
I purchase a textbook for a class only when I can get a used copy	674	3.18	3.00	4	1.286	2142
OVERALL MEAN		**3.215**				

Source: authors on the field survey, 2024, (Landrum et al, 2012)

Table 6 is divided into three categorical groupings such as Learning and Understanding, Classroom Requirements and Costs. The justification for the groupings was to isolate each textbook purchase item and evaluate the mean of each textbook purchase to show the differences within their specific grouping. The value of the mean for each item ranged from 1 to 5, with a dominant result below 3.0. This is interpreted as a week's textbook purchase. In all, the mean value of students' textbook purchase indices on all three (3) constructs ranges from 3.215 to 3.651, with a total mean score of 3.428. This value falls within the range of "Not sure" and ''Agree".

This reveals a strong textbook purchase intention among students and may reflect the status of textbook purchase of other undergraduate students. Also, the detailed analysis of the data revealed the textbook purchase categories with the highest purchase intention. From Table 6, Learning and Understanding had the highest or strongest textbook purchase intention among the students, with a mean of 3.651, followed by Classroom Requirements, with a mean of 3.417.

Table 7: Textbook Usage

USE	***N***	***M***	***Median***	***Mode***	***Std.D***	***Sum***
STUDY AIDS						
I am more likely to use a textbook when reviews are included that involve matching terms with definitions	674	3.67	4.00	4	1.143	2474
I am more likely to use a textbook when multiple-choice review questions are included throughout the chapters	674	3.86	4.00	4	1.101	2600
I am more likely to use a textbook when discussion questions are included.	674	3.89	4.00	4	1.103	2621
I am more likely to use a textbook when reviews are included that involve fill-in-the-blank answers.	674	3.62	4.00	4	1.133	2441
I am more likely to use a textbook when multiple-choice items are used as study aids.	674	3.83	4.00	4	1.070	2583
I am more likely to use a textbook when online study aids are provided.	674	3.57	4.00	4	1.153	2407
I am more likely to use a textbook when each section concludes with a summary of the basic points	674	3.91	4.00	4	1.102	2638
I am more likely to use a textbook when the concepts are simplistic.	674	3.88	4.00	4	1.132	2614
OVERALL MEAN		**3.825**				

INSTRUCTOR USE						
I am more likely to use a textbook when quizzes are given over the book content.	674	3.82	4.00	4	1.133	2576
I am more likely to use a textbook when homework is assigned from the book.	674	3.64	4.00	4	1.178	2453
I am more likely to use a textbook when an instructor gives pop quizzes.	674	3.53	4.00	4	1.145	2377
I am more likely to use a textbook when an instructor calls on students in class with questions from the book material.	674	3.43	4.00	4	1.169	2312
I am more likely to use a textbook when in-class activities involve concepts in the book.	674	3.62	4.00	4	1.135	2442
I am more likely to use a textbook when the instructor refers to the book often.	674	3.56	4.00	4	1.176	2400
OVERALL MEAN		**3.6**				
EASE OF USE						
I am more likely to use a textbook when the end-of-chapter summaries are included.	674	3.84	4.00	4	1.124	2586
I am more likely to use a textbook when I understand the vocabulary used.	674	3.79	4.00	4	1.165	2554
I am more likely to use a textbook when key points are summarised in bullet format.	674	3.82	4.00	4	1.159	2573
I am more likely to use a textbook when difficult words are defined.	674	3.84	4.00	4	1.178	2586
I am more likely to use a textbook when tough concepts are summarised with figures/tables.	674	3.81	4.00	4	1.158	2568
I am more likely to use a textbook when it takes little effort to learn quickly from the book.	674	3.74	4.00	4	1.176	2518
I am more likely to use a textbook when it has a simplistic concept.	674	3.85	4.00	4	1.139	2596
OVERALL MEAN		**3.813**				

Source: author's field survey, 2024, (Landrum et al, 2012)

Table 7 shows the results of the responses from the items divided into three groupings: Study Aids, Instructors' Use and Ease of Use. The textbook usage categories were used to isolate each textbook usage item to assess the differences. The mean value of students' textbook usage on all three (3) constructs ranges from 3.6 to 3.825, with a total average score of 3.746. This value falls between "Not sure" and "Agree". This implies that there is strong textbook usage among students. Further analysis also indicates that the category of textbook use with the highest usage is Study Aids, with a mean of 3.825 followed by Ease of Use with an average of 3.813.

DISCUSSION

Textbook Purchase Intention

The objective was to assess how much the students felt that a textbook was worth, and how they would use it. The study's findings suggest an initial success. There are three reasons students acquire textbooks: (a) learning and understanding, (b) classroom requirements, and (c) cost. Students demonstrated how the textbook they buy transform their lives and their academic performance. In line with that, Landrum et al. suggest that students buy textbooks because of their practical application to

students' lives, convenience, and accessibility.[47] Furthermore, textbooks adhere to specific cognitive norms that ensure that information is digested didactically and subsequently understandable to students.[48] Therefore, textbooks should incorporate scientific terminology, logic, and content using so-called didactic transformations, which shorten, simplify, and prioritize content.

Surprisingly, Aagaard and Skidmore found that many students purchase every textbook required for their courses, even though many of them will never be used.[49] Others simply buy such texts after waiting a week to see which texts will be used. A few students share textbooks, usually those whose roommates/housemates are enrolled in the same programme and classes. Students are encouraged to exchange or postpone purchasing textbooks for financial reasons. The bookshop listed them as necessary, and lecturers had asked students to buy them, or "just in case I need them, though I don't have them," were some justifications for buying textbooks.

Also, the study found that textbook cost does not really affect students' textbook purchasing intention. This means that the price or accessibility of textbooks cannot be a factor in students' decisions to enrol in a course. First-year students, in most cases, purchase textbooks based on recommendations from their lecturers since they have little or no knowledge about higher education and learning style and performance. As a result, they were unable to question the expectation or make an informed decision about how to determine a set of textbooks. However, a study revealed that the cost of textbooks hurts student behaviours.[50] In a study at the University of New Zealand, more than half of the respondents believed that the price of textbooks has an adverse effect on their academic progress.[51]

Textbook Usage

The findings revealed that students use textbooks as study guides when they are user-friendly. It is also considered when chapter summaries are provided and when used by the instructor.[52] It seems to make sense that students prefer textbooks with easy-to-use content.[53] Hilton confirmed that they use textbooks because they require them.[54] Students were more likely to engage with the textbook when professors provided an advanced organiser to guide their reading and incorporate textbook content into assessments. When instructors recommend specific reading or study strategies, students follow their advice. Additionally, students' interest in the textbook often mirrored that of their professors, suggesting a strong dependence on instructor influence.[55] In this context, the motivation to acquire and use textbooks is largely driven by instructor encouragement, readability, and ease of use.

RECOMMENDATIONS

First, textbook publishers should pay attention to user-friendly design and pedagogical considerations that promote understanding and self-directed learning. In addition, faculty should be encouraged and trained to consciously align their teaching strategies with the curriculum and the textbook content. In addition, institutions should invest in adopting open educational resources or subsidised textbook options to ensure broader access for students. Furthermore, universities should consider models to improve textbook affordability, such as bulk purchasing, institutional licensing agreements, and greater integration of open educational resources (OER). In addition, faculty members should be encouraged

[47] Landrum, Gurung, and Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance."
[48] Mithans and Ivanuš Grmek, "The Use of Textbooks in the Teaching-Learning Process."
[49] Aagaard and Skidmore, "College Student Use of Textbooks."
[50] Ashman, "Faculty and Student Perceptions of Open Pedagogy: A Case Study from British Columbia, Canada"; Jhangiani and Jhangiani, "Investigating the Perceptions, Use, and Impact of Open Textbooks: A Survey of Post-Secondary Students in British Columbia"; Michael Troy Martin et al., "Analysis of Student and Faculty Perceptions of Textbook Costs in Higher Education," *Open Praxis* 9, no. 1 (January 1, 2017): 79, https://doi.org/10.5944/openpraxis.9.1.432.
[51] Stein et al., "Student Views on the Cost of and Access to Textbooks: An Investigation at University of Otago (New Zealand)."
[52] James E. Monogan, "A Review of Textbooks for Teaching Undergraduate Methods," *Political Science and Politics* 50, no. 2 (April 2017): 549–53, https://doi.org/10.1017/S1049096516003176.
[53] Landrum, Gurung, and Spann, "Assessments of Textbook Usage and the Relationship to Student Course Performance."
[54] John Hilton, "Open Educational Resources and College Textbook Choices: A Review of Research on Efficacy and Perceptions," *Educational Technology Research and Development* 64, no. 4 (August 19, 2016): 573–90, https://doi.org/10.1007/s11423-016-9434-9.
[55] Aagaard and Skidmore, "College Student Use of Textbooks."; Bai et al., "Another Look At Textbook Usage By College Students."

to align their teaching practices with accessible and cost-sensitive learning materials to improve the use of textbooks. In all, this study contributes to a growing body of literature that examines the interaction between students and resources in developing countries. Departments and libraries within the university should work with publishers to co-create textbooks that fit the local context, curricula, and student learning needs.Further research should focus on ensuring affordable and pedagogically efficient learning resources tailored to students' needs.

CONCLUSION

This study provides a quantitative examination of the complex factors that influence the purchase and use of textbooks among students at the KNUST. The findings highlight the central role of economic and academic considerations in influencing their textbook behaviour. Key influencing factors include the high cost of textbooks, the availability of alternative learning materials (such as online resources and lecture notes), students' perceived relevance of textbooks to their academic success, and lecturers' commitment to the prescribed materials. The data show that while students recognise the value of textbooks to their academic development, they often opt for low-cost or easily accessible alternatives. The preference for free or low-cost digital content, including OER, reflects a broader shift towards digital literacy and commercial pragmatism in higher education.

In addition, the study highlights that lecturer engagement and referral practices significantly influence textbook use, suggesting a need to increase lecturers' awareness of the need to promote resource use. From a policy and institutional perspective, these findings call for strategic interventions. It provides evidence-based recommendations for academic institutions, educators and policymakers to promote more equitable and effective access to learning resources in higher education.

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