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Effect of Research Articles as Supplementary Resources on Students' Learning in Higher Education

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ABSTRACT

The integration of supplementary learning materials in higher education is increasingly recognized as essential for promoting self-directed and research-oriented learning. Despite this, a notable gap persists in the use of research articles as supplementary resources. This study investigates the effects of research articles on student learning in higher education, addressing this gap. A cross-sectional quantitative approach was employed. Data were collected from 479 students attending public and private universities in Bangladesh through a structured questionnaire using convenience sampling. Descriptive and inferential statistical methods were applied to analyze the data. The results indicate that students generally perceived research articles positively, citing their role in fostering critical thinking, self-directed learning, and greater academic engagement. Variables such as age, academic level, university type, access to research articles, and frequency of use significantly influenced motivation and interest. Master's students and those enrolled in public universities demonstrated higher motivation than their counterparts. The study highlights the importance of incorporating research articles into higher education curricula to enhance academic motivation and foster research interest among graduates. Accordingly, it is recommended that higher education institutions focus on expanding students' access to scholarly resources and strengthening their ability to comprehend and effectively utilize research texts.

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Introduction

Supplementary resources are any materials outside of the main textbooks that support the teaching instruction and learning procedure; these may include engaging games, written material, and digital assets (Zulaefa & Rizal, 2023; Baptiste et al., 2021). Numerous studies have examined the connection between students' academic achievement and Supplementary resources (Gerber et al., 2007; Woo et al., 2008; Birch & Williams, 2012). Academic achievement is defined as the total amount of information that students have acquired through evaluations, including tests and exams, administered by instructors over a specified period (Narad & Abdullah, 2016).

According to studies conducted by Morris and Walker (2006), adding more digital materials raised university course achievement rates by 20%. So, Instructors should choose and employ specific supplementary resources according to the demands as well as learning methods of their students, claim Riasati & Zare (2010). Learners have different needs, skills, and learning environments in different locations and even in different classes. It is essential to use additional resources in the classroom because various categories of pupils have unique educational requirements and styles; textbook points might not be relevant or engaging to all students. Additionally, textbooks are restrictive, meaning they limit educators' innovation (Riasati & Zare, 2010).

Achieving learning goals and giving students extra tools to support their academic success often relies on supplementary resources (Birch & Williams, 2012). According to Baptiste et al. (2021), supplementary resources add context, background, or information by providing digital assets, raw data, or software. In recent decades, using extra materials in teaching and learning has become more important (Amenyedzi et al., 2011; Dodd et al., 2015; Childs-Kean et al., 2021; Hue & Lan, 2024). These materials help students take part in class and become more interested in the subject, which can motivate them (Dodd, 2015). They also help students understand and absorb the information in a textbook. Scientific journal articles are among the most common supplementary materials for college students. Since education and research are linked, students become better prepared to work in a knowledge-based society after graduation

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(Barnett, 2009). Ashwin (2014) explains that students in higher education engage with systematic knowledge and research, which can change them as individuals. Sumbawati & Anistyasari (2018) note that research-based learning is becoming a popular teaching method in higher education, combining techniques with the creation and sharing of knowledge on specific topics.

Various Forms of Supplementary Resources

Researchers have studied how learners view different digital media used as extra educational resources, looking at their attitudes, benefits, and challenges. Most students have a positive view of using online platforms for additional learning (Rigdel et al., 2023). YouTube stands out as a helpful teaching tool because it offers a wide variety of videos for learners at different skill levels (Nasution, 2019). In the same way, using animations in physiology classes helps students understand complex ideas and makes them more likely to choose similar resources for other challenging subjects (Hwang et al., 2012).

Studies have also shown that computers and the Internet help teachers plan lessons and encourage active learning through activities like problem solving, projects, writing, and class participation (Lartey & Dzomeku, 2011). Besides video platforms, materials like storybooks with lots of pictures are especially popular with junior high students, especially for stories (Rinardi et al., 2019). In language learning, podcasts are seen as a useful extra tool that helps with listening, understanding, engagement, and personal learning (Phillips, 2017; Rosell-Aguilar, 2015). More recently, research shows that university students find TikTok easy to use and helpful for improving their English, which points to its growing use in education (Onn et al., 2024).

Research Articles as Supplementary Resources

The integration of scientific research articles as supplementary teaching materials has become increasingly prevalent across various academic disciplines, especially within higher education (Massi et al., 2009; Brew, 2013; Cicuto et al., 2019; Pohan and Rambe, 2022; Syahmani and Sanjaya, 2021). Prior research demonstrates that scientific publications serve as effective educational resources by offering students access to current knowledge, exposure to recent research developments, and opportunities for direct engagement with primary literature. In disciplines such as chemistry, biochemistry, and medical education, the inclusion of research articles in instructional practices has been shown to improve conceptual understanding, cognitive development, reading comprehension, and familiarity with the scientific method (Massi et al., 2009; Cicuto et al., 2019).

Further evidence indicates that instruction of fundamental chemical concepts using scientific articles can enhance student learning outcomes, although student perceptions and engagement levels tend to remain moderate (Pohan and Rambe, 2022). The increasing volume of publications over the past two decades demonstrates a heightened interest in assessing the effectiveness of research articles as instructional tools, particularly regarding the development of scientific communication skills and understanding of research methodologies in higher education (Massi et al., 2009).

Role of Research Articles on Student Learning

According to Nguyen (2018), while additional resources were beneficial in Vietnam, their effectiveness varied according to the specific speaking skills being taught and the students' competence levels. This suggests that a more targeted study is needed to identify the extra resources that are most effective for particular learner groups. A previous study employed a control and test group to investigate the impact of using supplementary resources to enhance speaking and listening abilities in second language learners (Mohammed, 2022; Dalman & Plonsky, 2022). They arrived at the conclusion that these materials enhance students' learning methods and academic performance. Research on pedagogical techniques found that instructor techniques and student interest had a substantial impact on course-level performance and student learning engagement (Sarder & Haider, 2023).

Previous research has demonstrated that Language instructors utilize additional resources when they encounter inadequate techniques, strategies, and resources when teaching English in the classroom (Tekir & Akar, 2020). Improvement of academic performance through additional resources has been demonstrated to increase student accomplishment at the higher education institution where this study was conducted, as well as both nationally and globally (Adebola et al., 2020; Biswas et al., 2025). Research papers, among other supplementary materials, are essential for enhancing students' research skills and educational experiences.

Research has shown that the use of scientific articles in research-based courses enhances learning outcomes and increases student engagement (Pohan & Rambe, 2023). Scientific publications serve as effective educational tools for promoting self-directed learning, especially in higher education. In this context, scientific papers function as channels for disseminating information and facilitating communication regarding resources, references, and scientific research journals essential to academic operations. Access to scientific papers enables rapid scientific discourse and facilitates significant knowledge advancement (Mustati & Najib, 2013). Adams and Lawrence (2014) emphasize that learners should actively utilize scientific articles as references when studying research methodologies, as these materials provide essential knowledge for conducting research. Therefore, scientific publications are considered primary learning tools, offering new insights from scientific research and up-to-date information on topics relevant to students' studies (Syahmani & Sanjaya, 2021).

The use of supplementary resources in higher education has become increasingly prevalent in recent years (Amenyedzi et al., 2011; Dodd et al., 2015; Childs-Kean et al., 2021; Hue & Lan, 2024). Many learners in higher education demonstrate limited motivation and enthusiasm for traditional teaching methods (Chowdhury et al., 2021; Mohib Ullah & Fatema, 2013). Rigdel et al. (2023) report that incorporating supplementary resources into the learning process enhances learning outcomes and increases student engagement. Numerous studies have examined the effectiveness of supplementary materials in

educational settings (Dodd et al., 2015; Mondragon et al., 2023; Rigdel et al., 2023).

Although extensive research has examined the impact of supplementary learning materials in higher education, most studies have concentrated on digital media, instructional tools, or broad research-based learning approaches, primarily within Western or resource-rich contexts (Childs-Kean et al., 2021; Dodd et al., 2015; Sumbawati & Anistyasari, 2018). Empirical evidence specifically addressing the use of research articles as supplementary learning materials remains limited, particularly in the context of higher education in Bangladesh. Existing literature largely prioritizes digital tools and generalized research-oriented pedagogies, with comparatively little attention given to students' motivation, cognitive engagement, and learning outcomes arising from direct interaction with scholarly articles. To address this gap, the present study examines the impact of using research articles on students' learning experiences, motivation, and interest in their field of study. Drawing on data from both public and private universities in Bangladesh, the study extends existing literature on supplementary learning resources and research-based pedagogy within developing higher education settings. The specific objectives of the study are as follows:

a) To explore students' perceptions of using research articles as part of their learning process.
b) To examine the influence of research articles on students' motivation and interest in their chosen field of study.
c) To analyze variations in students' motivation to use research articles based on gender, age, academic level, field of study, type of university, access to research articles, coursework requirements, and frequency of use.

This study is significant in that it investigates the role of research articles as supplementary learning resources and their influence on university students' learning, motivation, and academic interest, thereby contributing to the literature and addressing an important gap in higher education practice.

Theoretical framework

Constructivist Learning Theory conceptualizes learning as an active process in which learners construct meaning by integrating new information with prior knowledge and experiences (Piaget, 1972; Vygotsky, 1978). From this perspective, research articles function as cognitively demanding learning resources that require analysis, evaluation, synthesis of information, and interpretation of empirical evidence. These processes align with the study's perception-related constructs, including understanding course content, developing critical thinking skills, synthesizing information from multiple sources, and evaluating academic information. The positive student perceptions reported in the findings reflect core constructivist assumptions, as learners actively construct understanding through interaction with scholarly texts (De Kock et al., 2004; Brabrand, 2008; Phillips, 1995).

Vygotsky's sociocultural extension of constructivism further emphasizes learning through guided support and social interaction within the Zone of Proximal Development (ZPD) (Vygotsky, 1978). In higher education, instructor-guided reading tasks, coursework integration, peer discussions, and academic dialogue involving research articles help students navigate complex academic language and research structures, thereby enhancing comprehension and academic confidence. The significant effects of coursework inclusion and frequency of research article use on motivation observed in this study support the relevance of mediated learning within students' ZPD.

Complementing constructivist learning, Self-directed Learning Theory explains how learners independently manage their learning through goal setting, resource selection, strategy use, and self-evaluation (Knowles, 1975; Zimmerman, 2002). Research articles serve as central resources for self-directed learning in higher education, requiring learners to independently access literature, assess credibility, extract relevant information, and apply knowledge to academic tasks. The motivation- and interest-related outcomes identified in this study, such as increased curiosity, confidence, engagement, and intention to pursue further research, reflect core self-directed learning behaviors and academic autonomy (Hiemstra, 1985).

Together, Constructivist Learning Theory and Self-directed Learning Theory provide a coherent and empirically grounded framework for interpreting the study's findings and explaining how research articles, as supplementary learning resources, enhance cognitive engagement, independent learning, and student motivation in higher education.

Methodology

A quantitative research method was employed in this study. Specifically, a cross-sectional survey was conducted to collect data from a defined population at a single point in time. This survey aimed to assess the impact of research articles as supplementary resources on students' learning in higher education within the context of Bangladesh. The cross-sectional design is appropriate because it facilitates efficient data collection at one time point, providing a snapshot of prevailing attitudes and experiences (Creswell, 2014).

In an effort to examine students' perceptions of using research articles as supplementary resources and their influence on motivation and academic interest, we employed convenience sampling and distributed a self-designed and pilot-tested structured questionnaire to 550 undergraduate and graduate students enrolled in public and private institutions across Bangladesh between December 2024 and March 2025, using both online and in-person modes. A total of 491 questionnaires were returned, of which 479 were deemed complete and suitable for final analysis, yielding a response rate of approximately 87.1%.

The questionnaire comprised three sections. Section A gathered demographic information, including year of study, gender, and age. Section B contained ten items assessing students' perceptions of using research articles as supplementary resources. Section C included ten items evaluating the influence of these articles on students' motivation and interest in the academic field. Responses in Sections B and C were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Academic specialists in educational research and assessment reviewed the questionnaire to ensure content validity and provided recommendations to improve item clarity. The one-dimensionality test of the Rasch measurement model was applied to confirm construct validity. Reliability analysis assessed internal consistency, with Cronbach's alpha values of .926 for Section B and .939 for Section C, indicating high reliability and supporting the suitability of the questionnaire items for the research.

The data were imported into SPSS version 26.0 following numerical coding in Excel. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were calculated to summarize the dataset's key characteristics and identify patterns and trends. To assess differences in motivation scores across demographic and academic variables, Independent Samples t-tests were performed for binary variables such as Gender and University Type. One-Way ANOVA was used for categorical variables with more than two groups, including Age, Academic Year, Field of Study, Access to resources, Coursework engagement, and frequency of research article use for academic purposes.

Results

Table 1: Demographic characteristics of the respondents

Variable		Number	%
Gender	Male	267	55.7%
	Female	212	44.3%
Age Group	Below 20	11	2.3%
	20-22	212	44.3%
	23-25	217	45.3%
	Above 25	39	8.1%
Academic Year	1st Year	71	14.8%
	2nd Year	110	23.0%
	3rd Year	120	25.1%
	4th Year	122	25.5%
	Masters	56	11.7%
Field of Study	Arts and Humanities	111	23.2%
	Social Sciences	125	26.1%
	Technology & Engineering	97	20.3%
	Business & Management	42	8.8%
	Life Science	104	21.7%
University Type	Public	406	84.8%
	Private	73	15.2%

Table 1 presents demographic data for 479 participants in the study. Among these, 44.3% were female (n = 212) and 55.7% were male (n = 267). Regarding age distribution, 2.3% were under 20 years (n = 11), 44.3% were between 20 and 22 years (n = 212), 45.3% were between 23 and 25 years (n = 217), and 8.1% were over 25 years (n = 39). With respect to year of study, 14.8% of participants were in their first year (n = 71), 23.0% in their second year (n = 110), 25.1% in their third year (n = 120), 25.5% in their fourth year (n = 122), and 11.7% were master's degree students (n = 56). For academic discipline, 20.3% were enrolled in Technology and Engineering (n = 97), 8.8% in Business and Management (n = 42), 21.7% in Life Sciences (n = 104), 26.1% in Social Sciences (n = 125), and 23.2% in Arts and Humanities (n = 111). In terms of university type, 84.8% of respondents (n = 406) were enrolled in public universities, whereas 15.2% (n = 73) attended private universities.

Table 2 presents students' perspectives on the use of research articles in their education. Most responses were positive. The statement "Research articles help me develop critical thinking skills" received the highest mean score (M = 3.58, SD = 1.15), followed by "Research articles encourage independent learning" (M = 3.56, SD = 1.12). Statements reflecting perceived utility, such as "Research articles help me better understand the course content" (M = 3.50, SD = 1.10) and "Research articles improve my ability to analyze and evaluate academic information" (M = 3.51, SD = 1.14), also received favorable scores. However, notable concerns were reported regarding complexity, as indicated by the statements "Research articles are more complex and difficult to understand" (M = 3.36, SD = 1.13) and "The language and structure of research articles make them difficult to use" (M = 3.31, SD = 1.10). These findings suggest that, despite recognizing the academic value of research articles, students continue to experience challenges in comprehension.

Table 3 presents students' perceptions regarding the impact of research articles on their motivation and academic interest. Most responses were positive. The statements with the highest mean scores included "Research articles positively influence my motivation and interest in my studies" (M = 3.66, SD = 1.07), "Exposure to research articles enhances my enthusiasm for learning" (M = 3.59, SD = 1.06), and "I feel more confident about my knowledge when I use research articles as a learning resource" (M = 3.62, SD = 1.11). There was also strong agreement with statements such as "Research articles help me see the practical applications of my field of study" (M = 3.57, SD = 1.10) and "Reading research articles motivates me to explore new academic topics" (M = 3.57, SD = 1.07).

Table 4 demonstrates that several demographic and academic variables significantly influenced students' motivation to use research articles, each with varying degrees of practical significance. Male students (M = 3.57) reported marginally higher motivation than female students (M = 3.55); however, this statistically significant difference ($p < .03$) corresponded to a negligible practical effect (Cohen's $d = 0.02$). Age was a significant predictor ($p < .002$), with students over 25 years displaying the highest motivation (M = 4.03) and those aged 20–22 the lowest (M = 3.48), and the effect size indicated a moderate-to-large influence ($\eta^2 = .11$). Academic level exerted a substantial effect ($p < .001$), as master's students reported the highest motivation (M = 4.06), associated with a large effect size ($\eta^2 = .19$).

A substantial difference was identified between university types ($p < .001$), with public university students reporting significantly higher motivation (M = 3.74) than private university students (M = 2.60). This difference was associated with a very large practical effect (Cohen's $d = 1.46$), indicating that university type is a strong predictor of motivation.

Table 2: Students' perceptions of using research articles in their learning process

Statement	SD	D	N	A	SA	M	Std. D
1. Research articles help me better understand the course content	6.7%	10.9%	24.4%	41.5%	16.5%	3.50	1.096
2. I find research articles useful for gaining deeper insights into topics	7.1%	12.7%	23.8%	38.2%	18.2%	3.48	1.138
3. Research articles improve my ability to analyze and evaluate academic information	6.7%	12.5%	23.8%	36.7%	20.3%	3.51	1.144
4. I prefer using research articles over lecture notes for in-depth learning	6.5%	16.7%	28.4%	32.6%	15.9%	3.35	1.126
5. Research articles help me develop critical thinking skills	6.9%	9.8%	25.1%	35.1%	23.2%	3.58	1.149
6. Research articles encourage independent learning	6.3%	11.9%	21.3%	40.5%	20.0%	3.56	1.124
7. Using research articles enhances my ability to synthesize information from multiple sources	7.7%	12.7%	19.4%	40.9%	19.2%	3.51	1.164
8. Research articles are an essential part of my learning process	5.6%	14.6%	24.8%	35.7%	19.2%	3.48	1.126
9. Research articles are more complex and difficult to understand compared to other materials	6.7%	15.7%	28.4%	33.4%	15.9%	3.36	1.125
10. The language and structure of research articles make them difficult to use	7.3%	15.4%	28.2%	36.7%	12.3%	3.31	1.101

Note: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree; M = Mean; Std. D = Standard deviation

Table 3: Influence of research articles on students' motivation and interest

Statement	SD	D	N	A	SA	M	Std. D
1. Using research articles in my studies makes learning more engaging	7.5%	11.1%	23.0%	44.1%	14.4%	3.47	1.101
2. Research articles increase my curiosity about my field of study	6.5%	12.3%	23.0%	38.2%	20.0%	3.53	1.135
3. Reading research articles motivates me to explore new academic topics	5.2%	10.6%	25.3%	40.1%	18.8%	3.57	1.072
4. Research articles encourage me to participate more in academic discussions	4.6%	13.8%	27.6%	35.3%	18.8%	3.50	1.086
5. Exposure to research articles enhances my enthusiasm for learning	5.4%	9.4%	24.4%	42.4%	18.4%	3.59	1.061
6. Research articles help me see the practical applications of my field of study	4.4%	14.0%	23.2%	37.6%	20.9%	3.57	1.099
7. I feel more confident about my knowledge when I use research articles as a learning resource	5.0%	11.7%	22.5%	37.4%	23.4%	3.62	1.113
8. 8. Reading research articles makes me more likely to pursue further research in my field	5.2%	11.3%	23.2%	40.5%	19.8%	3.58	1.087
9. I find research articles inspiring and valuable for my academic growth	6.5%	11.1%	22.3%	40.3%	19.8%	3.56	1.120
10. Research articles positively influence my motivation and interest in my studies	4.4%	10.0%	23.2%	40.1%	22.3%	3.66	1.066

Note: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree; M = Mean; Std. D = Standard deviation

Table 4: Independent Samples T-Test/one-way ANOVA

Variable		N	Mean of Motivation Score	SD	Sig. (2-tailed)	95% CI
Gender	Male	267	3.57	0.938	<0.03*	3.46 – 3.68
	Female	212	3.55	0.799		3.44 – 3.65
Age	Below 20	11	3.80	0.997	<.002*	3.13 - 4.47
	20 – 22	212	3.48	0.914		3.34 - 3.58
	23 – 25	217	3.57	0.817		3.46 - 3.68
	Above 25	39	4.03	0.845		3.76 - 4.30
Academic Year	1st Year	71	3.29	1.056	<.000**	3.05 - 3.55
	2nd Year	110	3.62	0.804		3.47 - 3.45
	3rd Year	120	3.35	0.780		3.21 - 3.49
	4th Year	122	3.65	0.804		3.51 - 3.80
	Masters	56	4.06	0.855		3.83 - 4.29
Field of Study	Arts and Humanities	111	3.58	0.821	.061	3.42- 3.73
	Social Sciences	125	3.74	0.748		3.61 - 3.87
	Technology & Engineering	97	3.48	0.942		3.29 - 3.67
	Business & Management	42	3.34	0.174		2.98 -3.69

	Life Science	104	3.51	0.087		3.49 - 3.64
University Type	Public	406	3.74	0.814	<.000**	3.66- 3.82
	Private	73	2.60	0.530		2.48- 2.72
Access	Yes	78	3.65	0.909	<0.003*	3.45 - 3.86
	No	309	3.62	0.851		3.53 - 3.72
	Not Sure	92	3.29	0.898		3.10 - 3.48
Coursework	Yes	396	3.81	0.745	<.000**	3.72 - 3.89
	No	115	3.04	0.944		2.87 - 3.22
	Maybe	68	3.39	0.887		3.22 - 3.60
Use Academic Purpose	Never	40	2.58	0.812	<.000**	2.32 - 2.84
	Rarely	71	3.43	0.835		3.23 - 3.63
	Sometimes	136	3.74	0.765		3.61 - 3.87
	Often	99	3.70	0.822		3.54 - 3.86
	Always	133	3.66	0.822		3.51 - 3.81

Note: SD = Standard deviation; Sig. = Significance level; CI = Confidence Interval; **Significant at <.001%; *Significant at <.05%

Access to research articles was also significant ($p < .003$), with a moderate effect size ($\eta^2 = .07$); students with access (M = 3.65) reported higher motivation than those without or with uncertain access. Integration of research articles into coursework exerted a strong influence on motivation ($p < .001$), as students exposed to such coursework (M = 3.81) demonstrated substantially higher motivation than those without this exposure (M = 3.04), supported by a large effect size ($\eta^2 = .22$). Motivation also increased consistently with the frequency of research article use, from "Never" (M = 2.58) to "Always" (M = 3.66), representing the strongest practical effect among all variables ($\eta^2 = .26$). In contrast, no statistically or practically meaningful differences were observed across fields of study ($p = .061$; $\eta^2 = .02$), indicating that positive attitudes toward research article use are consistent across academic disciplines.

Discussion

This study investigates students' perceptions regarding the use of research articles in their learning process, the impact of these articles on motivation and academic interest, and differences in motivation across demographic and academic variables. While limited empirical research has specifically addressed research articles as supplementary learning resources, extensive literature demonstrates that supplementary materials and instructional support positively affect students' learning outcomes, attitudes, and motivation.

Previous research indicates that supplementary instruction enhances learning competence and academic performance among undergraduate students (Ning & Downing, 2010). Dangan and Cruz (2021) similarly found that well-designed supplementary materials significantly improve students' grammatical competence when tailored to learners' needs. In language education, supplementary resources have also been shown to promote student motivation, which is a critical factor in effective learning (Hue & Lan, 2024).

The results of this study are consistent with previous research demonstrating that research articles foster critical thinking and independent learning skills (Sumbawati & Anistyasari, 2018). Evidence from biochemistry education further suggests that engagement with scientific articles supports the development of analytical and critical thinking abilities (Cicuto et al., 2019). Additionally, the observed positive effects of research articles on students' learning, motivation, academic engagement, and interest corroborate earlier findings that regular exposure to research literature enhances academic confidence, participation, and motivation (Pohan & Rambe, 2023).

The findings indicate that most students perceive research articles as enhancing their understanding of course content and as essential to their learning process. This observation supports previous research that identifies research articles as effective didactic tools, particularly for fostering higher-order academic skills (Massi et al., 2009). The results further suggest that integrating research articles into coursework contributes to the development of students' academic skills and can strengthen instructional practices. While earlier studies have noted challenges related to article complexity and limited student preparedness (Nguyen, 2018), the present findings demonstrate that Bangladeshi students, particularly those in public universities and postgraduate programs, exhibit high motivation and value research articles despite these obstacles. This outcome contrasts with the findings of Pohan and Rambe (2022), who reported low student interest in scientific articles within chemistry education.

In line with broader research on supplementary learning materials, the study confirms that research articles have a positive influence on student engagement, motivation, and academic performance. These findings are consistent with evidence from studies utilizing digital and multimedia resources, including YouTube (Rigdel et al., 2023), TikTok (Onn et al., 2024), computers and internet-based materials (Amenyedzi et al., 2011), and screencast tutorials (Lloyd & Robertson, 2012), all of which report improved learning outcomes and increased learner interest. Collectively, the results indicate that research articles are comparably effective supplementary resources for promoting motivation and deeper learning in higher education.

The study identifies notable demographic differences in students' motivation to use research articles. While male students reported marginally higher motivation than female students, more pronounced variation was observed by age, academic level, and institutional context. Higher motivation among public university students and master's-level learners may result from stronger institutional research cultures, increased access to academic databases, and greater academic demands related to thesis writing and

scholarly publication. In Bangladesh, research engagement constitutes a core aspect of the academic identity at public universities, where consulting and citing research articles is both common and highly valued. Conversely, limited access to peer-reviewed journals and weaker integration of research activities in some private institutions may reduce students' exposure to scholarly literature and, consequently, their motivation. No significant differences emerged across fields of study, indicating that positive attitudes toward using research articles are consistent across academic disciplines.

The educational implications of these findings are substantial. The results support integrating research articles as supplementary resources in higher education to enhance student motivation, independent learning, and critical thinking. These insights are especially relevant for curriculum designers, instructors, and policymakers in developing contexts such as Bangladesh, where higher education remains predominantly textbook-centered and fostering research-oriented learning is increasingly essential.

The findings provide empirical support for Constructivist Learning Theory by demonstrating that engagement with research articles fosters active knowledge construction through critical thinking, comprehension, and information synthesis, in accordance with learning through authentic academic texts (Piaget, 1972; Vygotsky, 1978; Brabrand, 2008; Phillips, 1995). The observed effects of coursework integration and frequency of use further correspond with Vygotsky's Zone of Proximal Development, underscoring the significance of guided engagement with complex materials (Vygotsky, 1978). Additionally, the study substantiates Self-directed Learning Theory by associating research article use with increased learner autonomy, motivation, and academic interest. Elevated motivation among postgraduate students, frequent users, and individuals with greater access to scholarly resources reinforces the influence of academic maturity and learner control in self-directed learning (Knowles, 1975; Hiemstra, 1985).

This study offers several strengths. It is among the few empirical investigations that focus specifically on research articles as supplementary resources in Bangladeshi higher education. The research utilizes a large and diverse sample (N = 479) from both public and private universities, applying validated measurement instruments with high reliability (Cronbach's alpha = 0.926 for perception and 0.939 for motivation). However, several limitations of this study must be acknowledged. The use of convenience sampling limits the generalizability of the findings, while reliance on self-reported data may introduce response bias. In addition, the cross-sectional design prevents causal inference, and the exclusive use of quantitative methods restricts a deeper understanding of students' engagement with research articles.

Conclusion

The findings indicate that incorporating research articles as supplementary learning materials enhances students' learning experiences, motivation, and academic interest within higher education in Bangladesh. Students reported positive perceptions of research articles, particularly in fostering critical thinking, deeper topic comprehension, and independent learning. Motivation to engage with research articles varied according to demographic and academic background, with higher motivation observed among master's students, public university students, and those who regularly accessed scholarly resources. By emphasizing research articles rather than general supplementary materials, this study addresses a relatively underexplored area in Bangladeshi higher education and contributes to the literature by demonstrating both cognitive and motivational benefits. The results suggest that integrating research articles into coursework can strengthen research skills and promote academic engagement.

In light of these findings, higher education institutions are encouraged to incorporate research articles into coursework and offer support to assist students in navigating academic language and complex subject matter. Faculty guidance, targeted training, and equitable access to academic databases are essential for cultivating a research-oriented learning environment and fostering independent learning among students. Future research should employ longitudinal and mixed-methods approaches to monitor changes in motivation and learning, examine practices across diverse disciplines, and identify effective teaching strategies for integrating research articles in various institutional contexts.

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Conflict of Interest

The authors declare no conflict of interest.

Author contribution statement

Sujon Biswas: Conceptualization, Methodology, Data curation, Formal analysis, Writing original draft.
Hitesh Raptan: Methodology, Data curation, Formal analysis, Writing original draft.
Bijon Kumar Roy: Methodology guidance, Monitoring and review, Formal analysis, Final manuscript preparation.

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