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LEARNING BEYOND THE CLASSROOM: PERCEIVED IMPACT OF A YOUTUBE-BASED DIGITAL PHARMACOLOGY PLATFORM ON MBBS STUDENTS IN BANGLADESH

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Abstract*—Background:*** YouTube is widely used in medical learning, but evidence on structured pharmacology resources in Bangladesh is limited. This study assessed MBBS students' use and perceptions of a pharmacology-focused YouTube platform.

Methods: A descriptive cross-sectional online survey was conducted among MBBS students in Bangladesh. Data were collected from July to August 2026. Eligible students had watched at least one video from the evaluated pharmacology YouTube channel. Descriptive statistics summarised responses from 432 eligible participants.

Results: Among respondents, positive agreement was highest for curriculum alignment (86.34%), clarity (81.25%), and help with difficult concepts (79.86%). Formal supplementary integration was supported by 79.17%; 68.52% rated the platform more or much more effective than classroom teaching, and 92.13% reported a positive or very positive perceived learning impact. Lack of direct instructor interaction was reported by 43.52%.

Conclusions: Students perceived the platform as a useful pharmacology supplement. The findings reflect learner perceptions rather than objectively measured effectiveness.

Keywords*—Pharmacology education; YouTube-based learning; Medical education; MBBS students; Digital learning; Cross-sectional survey; Student perceptions; Bangladesh.*

I. INTRODUCTION

Digital learning is common in medical education and allows students to review topics. Online and video learning can support knowledge, although outcomes vary across settings and study designs [1]–[4]. YouTube is widely used in medical education because it is accessible [5], but video quality varies and popularity does not always indicate educational value [6], [7]. In pharmacology, students need to understand drug mechanisms and apply this knowledge to safe prescribing. Educational interventions, including digital learning approaches, may support pharmacological knowledge and prescribing-related skills among healthcare students [8]–[10]. In low- and middle-income countries, digital learning may improve access, although internet and infrastructure remain challenges [11], [12]. Previous studies from Bangladesh have examined digital resources as supplements to conventional medical education [13]–[15]. However, students' experiences with YouTube-based pharmacology learning remain less well documented. Examining how students use these resources, their perceived benefits, and the challenges they encounter may provide useful insights into their role as supplementary learning tools.

This study assessed MBBS students' use of a YouTube-based pharmacology platform, their perceptions of its educational value, comparison with classroom teaching, and reported limitations and areas for improvement.

II. METHODS

A. Study Design and Participants

Data were collected from July to August 2026 through a descriptive cross-sectional online survey among MBBS students in Bangladesh. The survey was distributed through student and professional networks and was not restricted to a single medical college or geographic division. The survey examined students' experiences with the YouTube-based platform Pharmacology Tricks of the Trade. Eligible participants were MBBS students in Bangladesh who provided electronic informed consent and reported having watched at least one channel video. Responses from students who did not provide consent or did not proceed to the substantive questionnaire were excluded. Of 453 submissions, 18 met these exclusion conditions. Three additional responses were excluded following an eligibility consistency review because their reported exposure histories were inconsistent with or insufficient to verify the requirement of having watched at least one channel video, leaving 432 participants for analysis. No restriction was applied by professional year, medical college type, or geographic division.

B. Sampling and Recruitment

Convenience sampling was used. The survey link was circulated through WhatsApp groups, investigators' professional networks, faculty contacts, and relevant student

groups. Students and medical colleges were not selected randomly. A single-proportion calculation using a 50% anticipated proportion, 95% confidence level, and 5% absolute precision yielded a minimum sample size of 384. After adjustment for an anticipated non-response rate of approximately 10%, the target sample size was 427. The final analytical sample comprised 432 participants. As non-probability sampling was used, the calculated precision should not be interpreted as the actual margin of error, and the findings cannot be considered nationally representative.

C. Study Instrument

The questionnaire collected information on student characteristics, use of the YouTube channel, perceived educational value, comparison with classroom teaching, perceived learning impact, and limitations. Nine five-point Likert-scale items assessed curriculum alignment, clarity, understanding of difficult concepts, retention, academic and examination preparation, motivation, video length and pace, complementarity with classroom teaching, and formal supplementary integration. Multiple-response questions explored patterns of use, useful content, and perceived limitations. Two optional open-ended questions invited suggestions and comments. A pharmacologist reviewed the questionnaire for clarity and relevance, and an MBBS student assessed its usability. A minor modification was made to improve accessibility on mobile devices. This preliminary testing was intended to improve clarity and usability; the questionnaire did not undergo formal psychometric validation.

D. Data Collection and Analysis

Survey responses were exported from Google Forms to Microsoft Excel 2021 for data cleaning and descriptive analysis. Google Forms was configured to limit submissions to one response per Google account to reduce the possibility of duplicate participation. Categorical variables were summarised using frequencies and percentages. Likert-scale responses were reported as frequencies and percentages, with positive agreement defined as the combined responses of ‘Agree’ and ‘Strongly agree’. Multiple-response items were analysed descriptively. All mandatory items (Q1–Q22) were complete among the 432 eligible participants. Three responses were excluded following the eligibility consistency review described above. No inferential statistical tests were performed because the study objectives were descriptive.

E. Ethics

Ethical approval was obtained from the Ethics Review Committee, Bangladesh Bioethics Society (ERC-BBS) (Protocol No. 2025/0016-44/2025; approval date: 13 January 2026). Participation was voluntary, and electronic informed consent was obtained from all participants before completing the questionnaire.

III. RESULTS

Of the 432 participants, 257 (59.49%) were aged 22–24 years, 265 (61.34%) were female, and 272 (62.96%) were in the third professional year. Government medical college students accounted for 389 (90.05%) participants; 303 (70.14%) studied in Dhaka Division and 110 (25.46%) in Rangpur Division (Table 1).

TABLE 1. Participant demographic and academic characteristics (N = 432)

Characteristic	Category	n (%)
Age group (years)	19–21	164 (37.96)
	22–24	257 (59.49)
	≥25	10 (2.31)
	<19	1 (0.23)
Gender	Female	265 (61.34)
	Male	162 (37.50)
	Prefer not to say	5 (1.16)
MBBS professional year	1st	29 (6.71)
	2nd	109 (25.23)
	3rd	272 (62.96)
	4th	12 (2.78)
	5th	10 (2.31)
Medical college type	Government	389 (90.05)
	Private	43 (9.95)
Geographic division	Dhaka	303 (70.14)
	Rangpur	110 (25.46)
	Rajshahi	7 (1.62)
	Khulna	5 (1.16)
	Sylhet	5 (1.16)
	Chattogram	2 (0.46)

Note: Percentages were calculated using the total analytical sample (N = 432). Totals may differ slightly from 100% because of rounding.

For duration of use, 259 (59.95%) participants had used the channel for less than one month and 136 (31.48%) for 1–6 months. Rare use was reported by 147 (34.03%), while 125 (28.94%) used it several times a week. Teachers were reported as the first source of awareness by 222 (51.39%) participants (Table 2).

TABLE 2. Exposure to and engagement with the YouTube-based pharmacology platform (N = 432)

Characteristic	Category	n (%)
Duration of use	<1 month	259 (59.95)
	1–6 months	136 (31.48)
	7–12 months	18 (4.17)
	>1 year	19 (4.40)
Frequency	Rarely	147 (34.03)
	Several times per week	125 (28.94)
	About once per week	74 (17.13)
	Several times per month	62 (14.35)
	Daily	24 (5.56)
First learned about channel	Teachers	222 (51.39)
	Classmates/peers	106 (24.54)
	YouTube search	64 (14.81)
	Social media	37 (8.56)
	Other	3 (0.69)

Note: Percentages were calculated using the total analytical sample (N = 432). Totals may differ slightly from 100% because of rounding.

Students generally gave favourable ratings. Positive agreement was 373 (86.34%) for curriculum alignment, 351 (81.25%) for clarity, and 345 (79.86%) for help with difficult concepts. Formal supplementary integration was supported by 342 (79.17%) participants (Table 3).

TABLE 3. Perceived educational value of the YouTube-based pharmacology platform (N = 432)

Item	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)	A + SA n (%)
Curriculum aligned	4 (0.93)	2 (0.46)	53 (12.27)	240 (55.56)	133 (30.79)	373 (86.34)
Clear/easy to understand	5 (1.16)	5 (1.16)	71 (16.44)	239 (55.32)	112 (25.93)	351 (81.25)
Helps difficult concepts	6 (1.39)	5 (1.16)	76 (17.59)	230 (53.24)	115 (26.62)	345 (79.86)
Improves retention	5 (1.16)	9 (2.08)	81 (18.75)	241 (55.79)	96 (22.22)	337 (78.01)
Useful for academic/exam preparation	6 (1.39)	7 (1.62)	80 (18.52)	231 (53.47)	108 (25.00)	339 (78.47)
Increases motivation	9 (2.08)	12 (2.78)	101 (23.38)	206 (47.69)	104 (24.07)	310 (71.76)
Length/pace appropriate	8 (1.85)	19 (4.40)	102 (23.61)	211 (48.84)	92 (21.30)	303 (70.14)
Complements classroom teaching	10 (2.31)	16 (3.70)	96 (22.22)	222 (51.39)	88 (20.37)	310 (71.76)
Formal supplementary integration	9 (2.08)	6 (1.39)	75 (17.36)	229 (53.01)	113 (26.16)	342 (79.17)

Note: SD = Strongly disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly agree. Positive agreement = Agree + Strongly agree.

The channel was used to understand difficult concepts by 301 (69.68%) participants, and concept-explanation videos were selected as useful content by 276 (63.89%). Compared with classroom teaching, 296 (68.52%) rated the platform as more or much more effective. A positive or very positive perceived impact on pharmacology learning was reported by 398 (92.13%) (Table 4).

TABLE 4. Patterns of use, useful content, perceived comparative effectiveness, and perceived impact (N = 432)

Domain	Response	n (%)
Use of channel*	Understand difficult concepts	301 (69.68)
	Tricks/mnemonics	149 (34.49)
	Revise lecture topics	114 (26.39)
	Supplement classroom teaching	107 (24.77)
	Improve long-term retention	88 (20.37)
	Prepare professional examinations	86 (19.91)
Useful content*	Concept-explanation videos	276 (63.89)
	Pharmacology tricks/mnemonics	180 (41.67)
	Clinical application videos	117 (27.08)
	Drug mechanism explanations	116 (26.85)
	Examination-focused discussions	103 (23.84)
	Short revision videos	100 (23.15)
	Case-based learning videos	97 (22.45)
Perceived effectiveness compared with classroom teaching	Much more effective	95 (21.99)
	More effective	201 (46.53)
	About the same	110 (25.46)
	Less effective	22 (5.09)
	Much less effective	4 (0.93)
Perceived impact on learning	Very positive	109 (25.23)
	Positive	289 (66.90)
	No noticeable impact	29 (6.71)
	Negative	3 (0.69)
	Very negative	2 (0.46)

*Note: *Multiple responses were permitted; percentages may therefore sum to more than 100.00%. Comparative effectiveness and impact are self-reported perceptions.*

Lack of direct interaction with an instructor was reported by 188 (43.52%) participants. Internet dependence was reported by 110 (25.46%), variable quality of online content by 105 (24.31%), and distraction from non-educational material by 93 (21.53%). The optional improvement question received 155 responses. Suggestions included clearer explanations, broader curriculum coverage, more animations and diagrams, better organisation, greater clinical and examination orientation, opportunities for clarification, and improved video quality. The final optional question received 124 responses. Favourable comments often referred to difficult concepts, revision, and self-paced learning, while several students stressed that digital resources should supplement rather than replace classroom and practical teaching (Table 5).

TABLE 5. Perceived limitations of YouTube-based pharmacology learning (N = 432)

Limitation	n (%)
Lack of direct interaction with instructors	188 (43.52)
Dependence on internet connectivity	110 (25.46)
Variable quality of online content	105 (24.31)
Distractions from non-educational content	93 (21.53)
No significant limitations	81 (18.75)
Difficulty clarifying doubts immediately	72 (16.67)
Limited opportunities for practical/clinical application	70 (16.20)

Note: Multiple responses were permitted; percentages may therefore sum to more than 100.00%. 'No significant limitations' could be selected alongside other options and is reported descriptively.

IV. DISCUSSION

Overall, students viewed the platform positively, particularly for curriculum alignment, clear explanations, understanding difficult concepts, examination preparation, and retention. Formal supplementary integration was supported by 342 (79.17%) participants. These findings describe students' perceptions rather than proven educational effectiveness. This study did not measure knowledge gain, examination performance, prescribing competence, or clinical outcomes. The results therefore show how learners experienced the platform, not whether it produced better learning than another teaching method.

Understanding difficult concepts was a consistent theme in the survey. It was a frequent reason for using the channel, and concept-explanation videos were frequently selected as useful content. This pattern suggests that students frequently used the platform to understand and revise pharmacology rather than for a single examination-related purpose. These findings are broadly consistent with previous systematic reviews suggesting that online and video-based educational approaches can support learning in health-professions education, although the nature and strength of the evidence vary across studies [1]–[4]. Previous reviews have also reported the potential of digital educational approaches to support pharmacological knowledge and prescribing skills [8], [9].

The findings suggest that students perceive YouTube-based pharmacology learning as a potentially useful supplement to classroom teaching rather than a replacement for conventional instruction. Although 296 (68.52%) students considered the platform more or much more effective than classroom teaching, this was based on self-reported perception rather than a direct comparison in an educational trial. A total of 110 (25.46%) rated the two approaches similarly, while 26 (6.02%) considered the platform less or much less effective. Classroom teaching allows direct discussion and clarification, whereas asynchronous videos provide flexible and repeatable learning opportunities. These different strengths support a complementary role rather than a conclusion that one approach is superior.

Flexible access may partly explain why students valued the videos. Recorded lessons can be paused, replayed, and reviewed when needed, including before examinations. This may be useful in pharmacology, where students often need repeated exposure to drug mechanisms, classifications, and clinical applications. However, video-based learning also has limitations. Recorded lessons cannot fully replace teacher interaction, practical sessions, or immediate clarification of difficult points. This is consistent with our finding that lack of direct instructor interaction was reported by the highest proportion of participants (188, 43.52%). A blended approach may therefore be practical, with classroom teaching providing interaction and guidance and structured videos supporting revision and self-paced learning. The strong support for formal supplementary integration should be interpreted as support for adding digital resources to existing teaching rather than replacing face-to-face teaching.

Content quality is another important consideration. Reviews have shown considerable variation in the educational quality of medical content on YouTube, and engagement measures such as views or popularity do not necessarily reflect educational quality [6], [7], [16]. This study examined a structured pharmacology channel rather than individual videos identified through an open YouTube search. Although a structured channel can organise content according to the curriculum, this study did not independently evaluate the scientific or educational quality of individual videos. Student ratings should therefore not be considered an independent measure of content quality.

The local context should also be considered. Previous studies have reported both opportunities and infrastructure-related challenges in digital medical education in low- and middle-income and resource-constrained settings [11], [12]. Studies from Bangladesh have also described students' experiences with e-learning and online resources as supplements to traditional teaching [13]–[15]. Our study adds evidence on students' perceptions of a pharmacology-focused YouTube platform in Bangladesh. However, the findings should not be interpreted as national estimates because convenience sampling was used and most participants were from government medical colleges in Dhaka and Rangpur divisions.

Similar digital learning approaches may be worth exploring in other South Asian settings, although the findings of this study cannot be generalized beyond the surveyed population. Structured educational videos may offer opportunities for self-paced revision and reinforcement of difficult pharmacological concepts.

Students' concerns also indicate possible areas for improving the platform. Limited instructor interaction, dependence on internet access, variable content quality, distraction, and difficulty obtaining immediate clarification suggest the value of curriculum-aligned content, clear sources, regular updates, visual and mechanism-based explanations, clinical or case-based material, quizzes, and practical ways for students to ask questions. These suggestions may guide future development of the platform, but this study cannot establish whether these features would improve learning outcomes.

This study focused specifically on pharmacology, included more participants than the calculated minimum sample, and examined several aspects of students' experiences. Optional comments also provided additional context for the structured survey findings. However, several limitations should be considered. The study was cross-sectional and relied on self-reported perceptions. Convenience sampling and self-selection may have introduced bias, and representation by medical college type and geographic division was uneven. The questionnaire underwent limited pretesting but was not formally validated psychometrically. The study evaluated a single YouTube-based pharmacology platform, and participants were recruited partly through faculty and professional networks. Some students may have been familiar with the platform or its educators, which could have influenced their responses. Most participants had also used the platform for only a short period. In addition, open-ended responses were analysed descriptively rather than using formal qualitative methods. The limitations question also allowed participants to select 'No significant limitations' together with specific limitations.

Future studies should include students from a wider range of medical colleges and assess objective outcomes such as knowledge, examination performance, long-term retention, prescribing skills, and clinical application. Such studies

would help determine whether positive student perceptions are associated with measurable educational benefits.

V. CONCLUSION

Overall, MBBS students perceived the YouTube-based pharmacology platform as a useful supplementary learning resource, particularly for understanding difficult concepts and revising curriculum-related topics. Limited instructor interaction, internet dependence, and concerns about online content quality remained important challenges. Structured educational videos may complement conventional pharmacology teaching, but further studies using objective learning outcomes are needed to establish their educational effectiveness.

CONFLICT OF INTEREST

The YouTube-based educational platform evaluated in this study is not monetized and receives no sponsorship or financial benefits. An author has a professional involvement with the platform, which is disclosed as a potential nonfinancial conflict of interest. The authors declare no other relevant conflicts of interest.

AUTHORS' CONTRIBUTIONS

Sujit Kumar Sarker: Conceptualization, Methodology, Data Curation, Formal Analysis, Writing – Original Draft, and Supervision. Kawsar Jahan Moon: Investigation, Writing – Original Draft, and Writing – Review & Editing. Jannatul Ferdous Hreedy, Nazia Akter, Priyanka Moitra, and Fouzia Alima: Investigation and Writing – Review & Editing. All authors reviewed and approved the final manuscript and agreed to be accountable for all aspects of the work.

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AI-ASSISTED WRITING DISCLOSURE

AI-assisted tools were used for language editing, including grammar, spelling, and clarity. The authors reviewed and approved the final manuscript and take full responsibility for its content.

DATA AVAILABILITY STATEMENT

The datasets generated and analyzed during this study are not publicly available due to participant confidentiality and ethical considerations.

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