

Why Students Tune Out in Online Coding Classes: A Mixed-Methods Study of Distraction Across Parents, Students, and Teachers



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Abstract

Background. Online delivery has become a fixture of programming education, yet the same screen that carries the lesson often carries the distraction away from it. Prior work has linked social media use, technical friction, and weak self-regulation to disengagement in online learning generally (Aagaard, 2015; Singal et al., 2020; Winter et al., 2010), but few studies have examined how distraction plays out specifically in coding classrooms, where missing a single conceptual step can derail an entire session (Shanley et al., 2022). This study asked, simply, what pulls attention away in these classes — and from whose vantage point the answer changes. **Methods.** A mixed-methods, pragmatist design combined structured surveys and semi-structured interviews with 300 participants in and around Dhaka, Bangladesh — 100 parents, 100 students, and 100 teachers connected to online coding instruction. Quantitative items were summarized descriptively; open-ended and interview data underwent inductive thematic coding, with findings triangulated across the three groups. **Results.** Three recurring sources of distraction emerged across all groups: limited real-time oversight, a weakened instructor–student connection, and material that was either too difficult or insufficiently engaging. Convergence across parent, student, and teacher accounts — rather than contradiction — was itself a notable finding. **Conclusion.**

Distraction in online coding classes appears to be a layered, not singular, problem. Building on these convergent findings, we propose an integrated conferencing framework combining real-time monitoring, parental oversight tools, interactive annotation, restricted-browsing quizzes, automatic recording, and dedicated forums as a conceptually grounded, though as yet untested, response.

Keywords

online coding education; student distraction; mixed-methods research; parental monitoring; self-regulated learning

1. Introduction

Something shifts, almost imperceptibly at first, when a programming class moves from a room to a screen. The device meant to deliver the lesson becomes — more often than anyone would like to admit — the thing quietly pulling attention away from it. This isn't a new complaint about technology in classrooms; teachers have voiced some version of it since chalkboards competed with passed notes. But there's a particular sharpness to it in programming instruction, where the logic of the material is

Significance | Identifies converging causes of distraction in online coding classes and proposes a monitoring-based conferencing framework schools could feasibly adopt.

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cumulative rather than episodic. Miss the moment a function gets defined, and the next twenty minutes can feel like watching a film with the subtitles turned off (Shanley et al., 2022).

The scale of the problem, at least as far as existing survey data suggests, is not trivial. One frequently cited figure holds that 65% of online learners admit to being distracted by social networking sites during class, while 43% report that technical glitches — a frozen screen, a call that drops, a login that refuses to cooperate — interrupt their focus before the lesson has properly begun (Singal et al., 2020; TechRepublic, 2020). Read plainly, that means a clear majority of students are, by their own account, drifting somewhere other than the lesson for at least part of it — not, it seems fair to say, because they've stopped caring, but because a notification is a more immediate kind of pull than an explanation of nested loops.

This tension is not new to the literature, though it keeps resurfacing in slightly different forms depending on who is studying it. Aagaard (2015) frames it as a structural feature of digital learning environments themselves: the same flexibility that makes online access possible also opens a door to "off-task" behavior, in his terms, using the technology for anything but the task at hand. Winter et al. (2010) come at a similar problem from the angle of multitasking, describing how students juggle coursework alongside messaging and entertainment in ways that blur, sometimes past the point of usefulness, what "studying" even means in a given moment. Earlier still, Chen (2006) had asked essentially the same question through the lens of flow — whether the absorbed, on-task engagement that characterizes good learning is something the online medium supports or quietly works against.

Programming education adds its own layer of difficulty on top of this general picture. Tamatea and Pramitasari (2018), writing about informal coding classes for underprivileged learners in Bali, make the point that access to "online" resources doesn't automatically translate into participation — socioeconomic context shapes not just whether students can log in, but whether they can meaningfully engage once they have. There is also, as Dutton et al. (2019) suggest, a quieter loss that comes with the absence of physical presence: in a room, a wandering mind is at least somewhat checked by the social fact of being watched; online, that check largely disappears. This shift has been part of the distance-education literature for some time (Allen & Seaman,

2006), and has surfaced repeatedly in adjacent domains — language learning, for instance, where motivation and affect behave differently once the instructor is no longer physically present (Blake, 2011; Bown & White, 2010).

Self-regulation, or the lack of it, appears to sit at the center of much of this. Online learning asks students to manage their own time, attention, and motivation to a degree that in-person instruction rarely demands so explicitly (Andrade, 2012; Andrade & Bunker, 2009; Broadbent & Poon, 2015), and conceptual work on self-regulated learning stresses that this is less a matter of willpower than of how environments are designed — or fail to be designed — to scaffold self-monitoring (Beishuizen & Steffens, 2011). Small interventions, like implementation intentions — deciding in advance, concretely, when and how one will study (Achtziger et al., 2008) — have shown some promise here, suggesting the gap between distraction and focus may be narrower, and more addressable, than it first appears.

Technology, somewhat ironically, may also be part of the answer. The platform itself matters — how screen-sharing and recording are handled shapes engagement in ways instructors don't always anticipate (TechRepublic, 2020) — and even social media, usually cast as the villain in this story, has shown some capacity to support learning when deliberately integrated (Aydin, 2012; Chawinga, 2017; Abney et al., 2019). Kedia and Mishra (2023) similarly find that instructor–student interaction and social or technical support meaningfully shape online learning outcomes at the college level, a finding this study leans on directly given its own tripartite design.

This research sits inside that tension — technology as distraction, technology as tool — with a specific focus on coding classrooms, and a specific ambition: not simply to catalogue why students disengage, but to identify which distractions matter most, from whose perspective, and what realistically adoptable interventions might follow. The objectives are threefold: to evaluate how distraction shapes engagement and outcomes in online programming courses specifically; to propose interventions grounded in what institutions can plausibly implement rather than what would be ideal in principle (Arkorful & Abaidoo, 2015); and to identify which pedagogical and technological approaches genuinely sustain motivation, drawing on lessons from large-scale initiatives such as MOOCs (Bonk et al., 2015). The question matters now in a fairly concrete, local sense too: Bangladesh's ongoing

curriculum reform, which removes board examinations before Class 10 (The Business Standard, 2021), is likely to intersect with online delivery in ways that make understanding distraction — and designing around it — more urgent, not less.

3. Methodology

3.1 Study Design

This study used a convergent mixed-methods design set within a pragmatist framework, in which the quantitative and qualitative strands were conducted concurrently, given equal analytic weight, and integrated at the interpretation stage rather than one being used merely to illustrate the other (Kedia & Mishra, 2023). The quantitative strand — structured surveys — was intended to detect patterns in distraction and platform use at a descriptive level; the qualitative strand — interviews and open-ended survey items — was intended to explain those patterns in participants' own terms, an approach consistent with prior findings that boundary-management behaviors around multitasking surface more clearly under open, conversational probing than under closed survey items alone (Winter et al., 2010).

3.2 Setting and Participants

Data collection took place in Dhaka, Bangladesh, with in-person and telephone recruitment supplemented by online survey distribution to reach participants outside the capital, between [insert data collection dates]. A total sample of 300 participants was recruited using [insert sampling method — e.g., convenience/purposive sampling through partner coding schools], stratified across three stakeholder groups directly connected to online coding instruction: 100 parents of enrolled children, 100 currently enrolled students, and 100 instructors delivering online coding courses.

Eligibility criteria. Participants were eligible if they had been directly involved — as a learner, a parent of a learner, or an instructor — in an online coding course within the current academic year at the time of data collection. [Insert any exclusion criteria applied, e.g., minimum course duration, age range for student participants, and how parental consent was obtained for participants under 18.]

Sample size justification. [Insert justification — e.g., a target of 30 per subgroup was set a priori to support stable descriptive percentages, consistent with recommendations

for exploratory survey research; a formal power calculation was / was not conducted.]

3.3 Instruments

Three parallel instruments were developed — one per stakeholder group — sharing a common core of items (demographics, device and platform access, time allocation between study and non-study use, Likert-scale ratings of focus/distraction) while branching into group-specific items: parents were asked about their child's habits and their own oversight difficulties; students reported directly on their own platform use, distraction sources, and preferences; teachers reported on delivery platforms, perceived student behavior, and classroom challenges.

Surveys were administered via [insert platform, e.g., Google Forms], and interview data were collected in person or by telephone and audio-recorded with consent, then transcribed verbatim by [insert transcription method]. [If a pilot test or expert/content validity review of the instrument was conducted, insert details here — this strengthens reproducibility considerably.]

3.4 Data Collection Procedure

Recruitment proceeded through [insert recruitment channel — e.g., partner coding academies, referral through participating teachers]. After providing informed consent, participants completed the structured survey independently; a subset of [insert n] participants per group was then purposively selected for follow-up semi-structured interviews, continuing until thematic saturation was judged to have been reached in each group. Interviews followed a semi-structured guide covering perceived causes of distraction and suggested improvements, allowing follow-up probes tailored to each response.

3.5 Data Analysis

Quantitative survey responses were analyzed using descriptive statistics (frequencies, percentages) in [insert software, e.g., SPSS version XX / Microsoft Excel], summarizing device ownership, platform preference, time-use patterns, and self-rated focus, disaggregated by stakeholder group and visualized for cross-group comparison. [If any inferential comparisons — e.g., chi-square tests of association between group and reported distraction source — were run, insert those statistics here; if not, this is worth adding in revision, since with $n = 300$

across three groups the data can likely support at least a basic test of whether reported causes differ significantly by group.]

Qualitative data (open-ended responses and interview transcripts) were analyzed using inductive thematic coding, broadly consistent with how off-task technology use has been categorized thematically in related research (Aagaard, 2015). Two coders independently coded a subset of transcripts, and discrepancies were resolved through discussion [insert inter-rater agreement statistic if calculated, e.g., Cohen's kappa]. Codes were grouped into higher-order themes (e.g., material difficulty, weakened instructor connection, accessible distraction) inductively rather than against a preexisting framework.

3.6 Triangulation and Trustworthiness

Quantitative and qualitative findings, and findings across the three respondent groups, were deliberately cross-referenced; convergence — for example, around the salience of easily accessible distraction across all three groups — was treated as a marker of credibility rather than assumed. [If member-checking, negative-case analysis, or an audit trail was used, insert here — these are standard trustworthiness criteria a methods reviewer will look for.]

3.7 Ethical Considerations

The study was approved by [insert IRB/ethics committee name and protocol number]. Participation was voluntary, informed consent was obtained from all adult participants and from parents/guardians on behalf of minor participants, and confidentiality was maintained throughout collection, storage, and analysis, with identifying information withheld from reported results.

4. Results and Discussion

4.1 Overview of Respondent Groups

Three hundred people took part in total — 100 parents, 100 students, and 100 teachers — with responses analyzed separately by group rather than pooled, since the comparative structure was itself central to the study's design (**Figure 1**). What follows works through each group in turn, then draws the threads together.

4.2 Parents: What They See, and What They Don't

Most parents described children who begin coding relatively early, with a visible cluster in the earlier school

years (**Figure S1**) — a pattern that, if anything, may intensify given Bangladesh's curriculum reform removing board exams before Class 10 (The Business Standard, 2021), though that connection remains an inference rather than something this dataset can confirm directly. Device access was broadly adequate, with smartphones the dominant choice (**Figures S2, S3**).

The starkest finding here was temporal: parent ratings of study-related versus off-task screen time diverged sharply, with off-task use climbing toward the high end while study-related use stayed consistently low (**Figure 2**) — a pattern corroborated by what children reportedly do online, where gaming and YouTube substantially outpace schoolwork (**Figure S4**).

Asked why, parents most often pointed to material that was simply too difficult to follow (32%), a pattern that aligns with Aagaard's (2015) broader finding that lesson difficulty and disengagement track together (**Figure S5**). A weakened sense of instructor connection followed at 25.7%, consistent with Kedia and Mishra's (2023) emphasis on instructor–student interaction as a driver of online learning effectiveness; easy access to distracting content (23.9%), disengaging material (7.2%), and the child's age (11.3%) rounded out the picture. Parents' own barriers centered on simply not knowing what their child was doing once class began, and not having time, given work demands, to intervene (**Figure S6**) — a finding that speaks less to parental disengagement than to a structural gap in visibility.

Improvement preferences leaned heavily toward oversight: restricting unsanctioned browsing with shared parent–teacher visibility topped the list, followed by real-world lesson relevance, more playful material design, remote monitoring capability, and quick formative quizzes (**Figure S7**). A smaller subset (6.9%) wanted teacher activity itself made visible, underscoring that the appetite for oversight was not directed solely downward at students.

4.3 Students: Where the Attention Actually Goes

The 100 student respondents spanned a wide grade range, with clustering in early classes and a notable presence at playgroup/nursery level (**Figure S8**), reinforcing the early-start pattern parents had already suggested. Device access was near-universal, with smartphones again leading (37.2%), followed by desktops (32.4%), laptops (21.4%), and tablets (6.9%); 2.1%

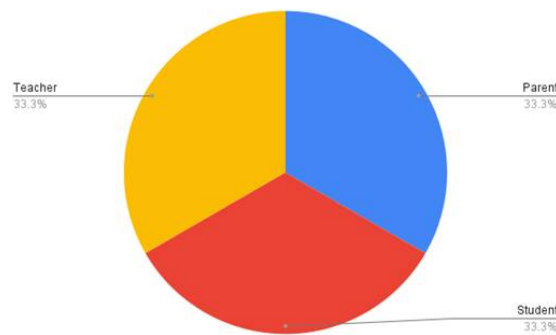


Figure 1. Distribution of study participants by stakeholder group. Composition of the total sample (N = 300), divided equally among parents (n = 100), students (n = 100), and teachers (n = 100) of online coding classes.

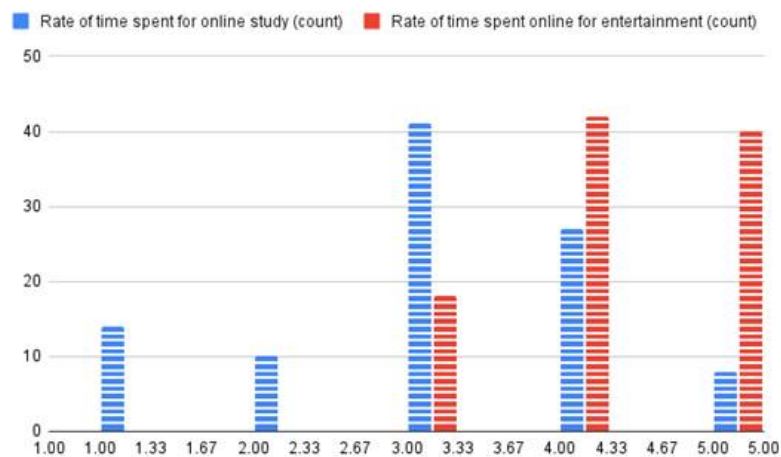


Figure 2. Parent-rated time spent online by children for study versus entertainment purposes (n = 100). Line plot comparing self-reported rates of study-related online time (blue dashed line) and off-task, entertainment-related online time (red dashed line) on a 1 (very low) to 5 (very high) scale.

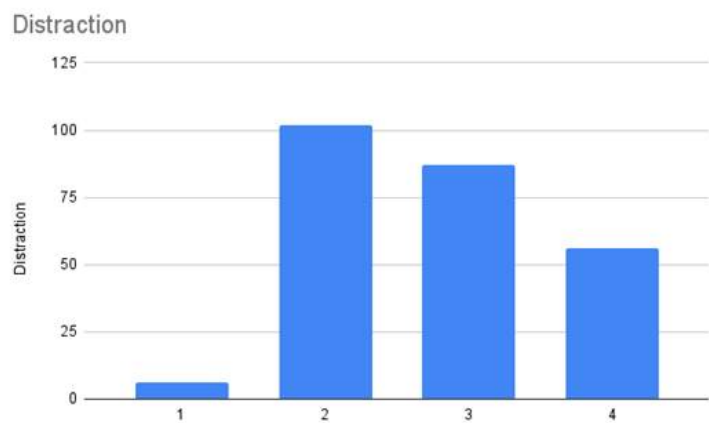


Figure 3. Student self-rated focus fluctuation during online classes (n = 100). Distribution of focus ratings on a 0 (lowest) to 5 (highest) scale, with the modal response at 2 and a substantial subset of students reporting ratings of 3–4, indicating frequent attentional lapses.

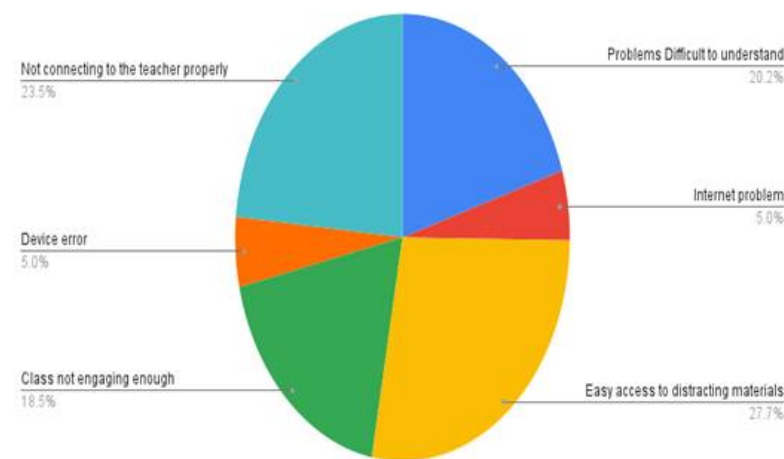


Figure 4. Student-reported causes of distraction during online classes (n = 100). Percentage breakdown of distraction sources identified by students, including accessible distracting content (27.7%), weak instructor connection (23.5%), material difficulty (20.2%), low lesson engagement (18.5%), internet issues (5%), and device issues (5%).

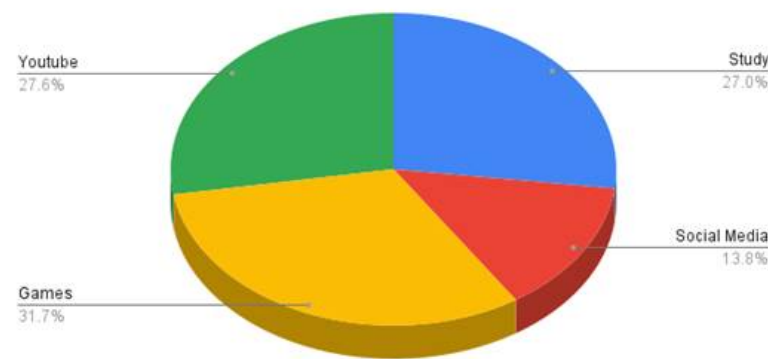


Figure 5. Teacher-reported distribution of students' online activities (n = 100). Estimated percentage of student time spent on online games (31.7%), YouTube (27.6%), study materials (27%), and social media (13.8%), as perceived by teachers.

Table 1: Comparison of Commonly Used Online Conferencing Platforms for Coding Instruction. Feature comparison across four widely used conferencing platforms (Zoom, Microsoft Teams, Google Meet, Cisco Webex) relevant to online coding instruction, including cost structure, screen-sharing capability, interactive functionality, encryption status, and mobile accessibility. Y = feature available; L = limited availability; O = optional/configurable; N = feature not available. Data adapted from a platform comparison reported by TechRepublic (2020). Note. Y = Yes, L = Limited, O = Optional, N = No. Data from TechRepublic (2020).

	Free	Screen-sharing	Interaction	Encryption	Mobile
Zoom	Y	Y	Y	N	Y
Teams	L	Y	Y	N	Y
Meet	Y	Y	Y	N	Y
Webex	Y	Y	Y	O	Y

reported no dedicated device (**Figures S8, S9**). Zoom was the dominant platform, ahead of Google Classroom and YouTube (**Figure S10**).

Self-rated focus clustered modally around 2 on a 0–5 scale, with a sizable subset reporting 3–4 (**Figure 3**) — suggesting that for a meaningful share of students, distraction was not occasional but close to routine. Self-reported time allocation placed gaming first (27%), narrowly ahead of YouTube (26%), with study-related use trailing at 23%, social media at 16%, and TikTok at 8% (**Figure S11**) — a distribution that, taken at face value, tips the balance of attention away from the classroom more often than toward it.

Asked what pulled focus away, students most often named accessible distraction (27.7%), followed by weak instructor connection (23.5%) and material difficulty (20.2%), with disengaging lessons (18.5%) and technical issues (5%) trailing (**Figure 4**) — a hierarchy that echoes, with modest reordering, what parents reported, and lends some cross-group support to Winter et al.'s (2010) account of how boundary-management failures manifest in practice.

Improvement preferences were more evenly distributed than in the parent sample: real-world relevance and general engagement each drew 15%, on-the-spot quizzes 13%, and browsing restrictions with teacher awareness 12%, with smaller shares favoring consolidated services, recording, forums, and notifications (**Figure S12**).

4.4 Teachers: Oversight and Simplicity as Two Sides of the Same Request

Among the 100 teachers surveyed, 95% taught online exclusively and 15% also retained some offline instruction (**Figure S13**); smartphones again led device use (41%), ahead of desktops (31%) and laptops (28%) (**Figure S14**). Teachers rated online instruction as carrying a consistently heavier challenge burden than offline delivery (**Figure S15**). Zoom led platform use (33%), followed by Google Classroom/Meet (30%) and YouTube (14%) (**Figure 22**); material delivery relied most on recorded sessions and Google Drive links (**Figure S16**), and assessment relied on a mix of handwritten testing, Google Forms, and LMS-based methods (**Figure S17**).

Teachers' perception of student time use — 31.7% gaming, 27.6% YouTube, 27% studying, 13.8% social media (**Figure 5**) — tracked closely with what students

reported about themselves, a convergence worth taking seriously: when two independently surveyed groups arrive at a near-identical distribution without coordinating, that agreement is itself a form of evidence that the underlying pattern is real rather than an artifact of how one group chose to answer.

Teachers' improvement priorities centered on consolidation — "one service for all necessary tasks," as several put it — paired closely with interest in monitoring student activity, suggesting teachers see oversight and administrative simplicity as connected rather than separate needs (**Figure S18**). An all-in-one service drew the most mentions ($n = 12$), followed by class-video storage, shared viewing, and remote parental monitoring ($n = 8$ each).

4.5 Cross-Group Synthesis

Read together, the three datasets converge on a smaller set of explanations than the volume of data might suggest: limited real-time oversight, a weakened instructor–student bond, and a mismatch between material and student readiness recur across all three vantage points, with only the relative weighting shifting by group. This convergence supports, and extends, Kedia and Mishra's (2023) finding that online learning effectiveness depends on interaction quality and support structures rather than on any single actor's behavior. It also lends some empirical weight to Aagaard's (2015) argument that off-task behavior is less a matter of individual weakness than of how digital environments are — or are not — designed to hold attention.

Table 1's comparison of conferencing platforms (Zoom, Teams, Meet, Webex) situates these findings practically: none of the platforms currently in wide use were designed with coding-specific oversight, annotation, or restriction features in mind (TechRepublic, 2020), which may partly explain why "consolidation" surfaced independently as a priority across both parent and teacher samples. Taken together, these findings motivated the integrated conferencing framework proposed in this study — combining monitoring, annotation, restricted-browsing quizzes, recording, and forums — though, as addressed in the Limitations, this framework remains a conceptual response rather than a tested one.

5. Conclusion

Distraction in online coding classes, this study suggests, is

rarely a single, isolated problem — it is several smaller ones, tangled together: a thinning connection between instructor and student, material that doesn't always land where intended, and the quiet convenience of a digital escape route sitting one tap away. Drawing on convergent evidence from parents, students, and teachers, the findings point toward an integrated response rather than a piecemeal one — a conferencing framework combining real-time monitoring, parental oversight, interactive annotation, restricted-browsing quizzes, automatic recording, and dedicated forums. This is not offered as a complete solution, nor should it be read as validated; it remains a conceptually grounded proposal awaiting empirical testing. If even part of it helps students remain a little more present and a little less elsewhere during instruction, that alone would justify the effort of testing it further.

Author Contributions

MABZ: conceptualization, methodology, data collection, formal analysis, writing – original draft. MSJ: data collection, data curation, writing – review & editing. KAM: supervision, conceptualization, writing – review & editing, project administration.

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Competing Financial Interests

The authors MABZ declare no competing financial interests.

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