

The impact of **course structure** on **eText use** in large-lecture introductory physics courses

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Abstract: Course structure - the types and frequency of learning activities - impacts how students interact with electronic textbooks. We analyze student-tracking logs generated by the LON-CAPA learning management system from nearly a decade of blended large-lecture introductory-physics courses at Michigan State University, as well as one on-campus course from MIT. Data mining provides estimates of the overall amount and temporal regularity of eText use, i.e., weekly reading versus review immediately before exams. For all courses studied, we compare student use of eTexts as it varies with course structure, e.g., from traditional (three or four exams, eText assigned as supplementary) to reformed (frequent exams, embedded assessment in the assigned eText). Traditionally formatted courses are accompanied by little eText use, while high reading levels persist throughout reformed courses.

Course structure categorization

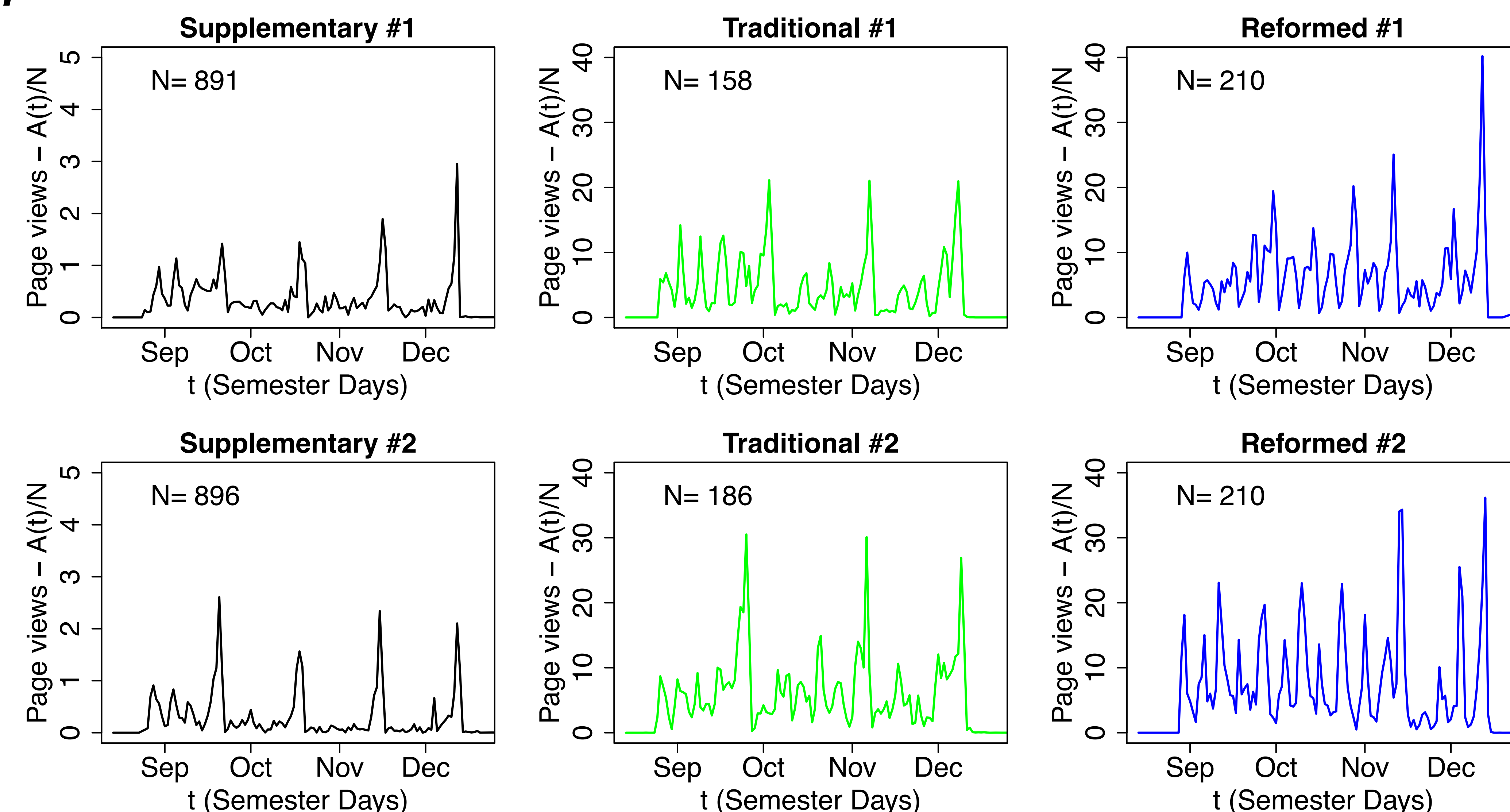
Course Type	N students each course	eText	Exams	Embedded Assessment
Supplementary 1	898	Secondary	4	No
Supplementary 2	911	Secondary	4	No
Supplementary 3	808	Secondary	3	No
Traditional 1	159	Primary	3	No
Traditional 2	190	Primary	3	No
Reformed 1	211	Primary	7	Yes
Reformed 2	209	Primary	7	Yes
Reformed 3	197	Primary	7	Yes
Reformed 4	254	Primary	7	Yes
MIT Reformed	38	Primary	13	Yes

* All MSU courses are large-lecture introductory physics.

When do students read?

Daily eText Activity

- **Large spike indicate activity before examinations.** In many “traditional” courses, eText is used as a review tool. Reformed courses have weekly activity.
- **Dip in activity after the first midterm in Supplementary and Traditional A.** Indicates an alternative connection between book use and examinations.
- **Reformed courses have “weekly” periodicity.** If eText use was only correlated with examinations, periodicity would be every two weeks. Instead, students interact weekly with the eText.

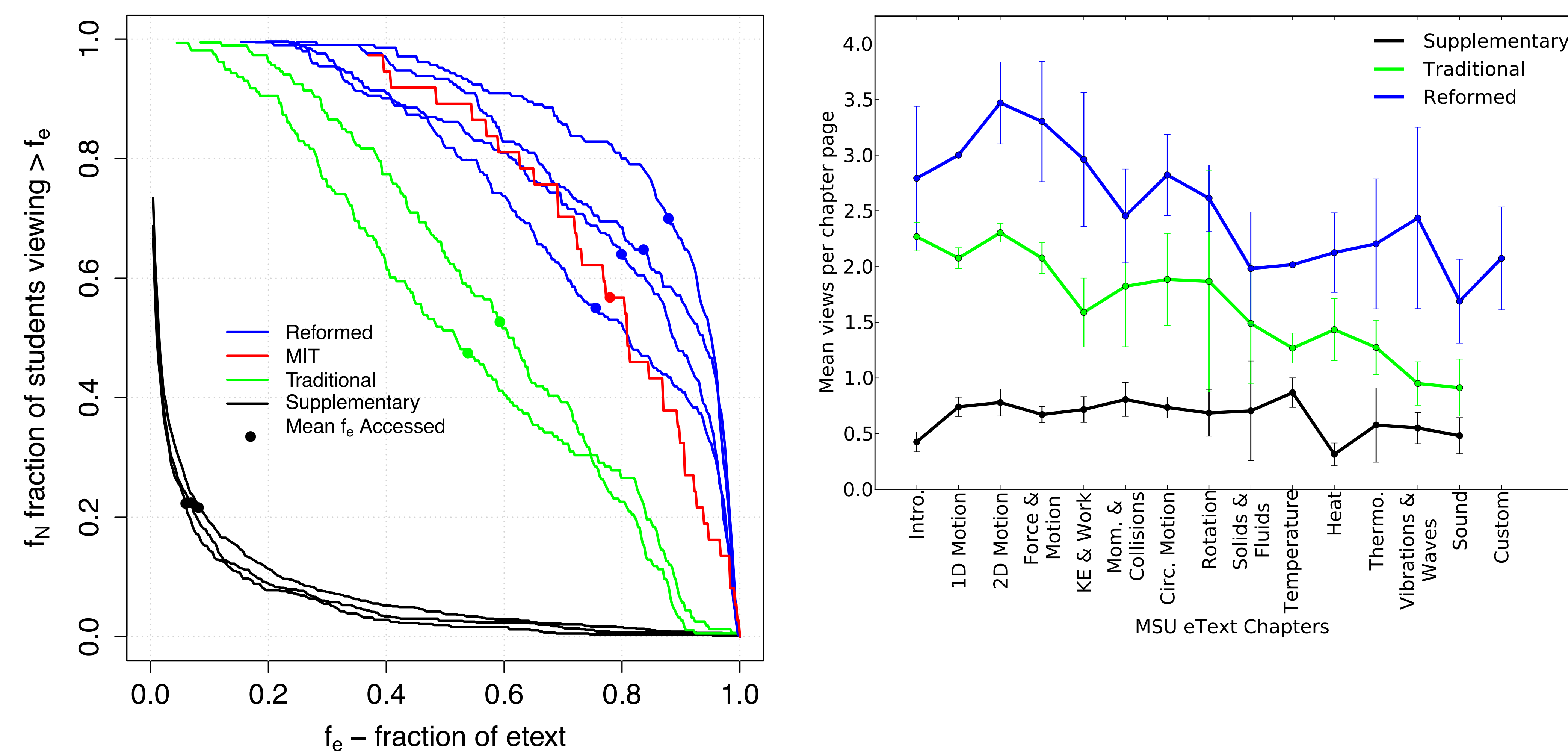


Plots depicting daily page-view activity $A(t)/N$ for two courses from all course categories: Supplementary, Traditional, and Reformed.

How much do students read?

Course structure impacts usage

- **Average fraction read increases from Supplementary, to Traditional, to Reformed.**
- **Points on curves indicate the average fraction read in each course.** Shape of distribution is also important, but the core message is increased eText use with increased course structure.
- **Mean views per chapter** show additional differences in amount read for our course categorization.



(Left) Complimentary cumulative distributions of student eText use for three categories of course structure: **Supplementary**, **Traditional**, and **Reformed**. **MIT Reformed** is also plotted. (Right) Mean views per chapter page for the MSU eText; error bars are standard deviations.

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