Qlicker: An open source in-class response system for and by students

R. Martin
Dept. of Physics
CTL Showcase
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• Motivation for developing Qlicker
• Overview of Qlicker and features
• Results of pilot test in PHYS 104/106
• Roadmap towards wider adoption
Motivation for developing Qlicker

• Active learning techniques used widely on campus and benefit from in-class response systems

• Most in-class response systems are not free to students (Learning catalytics, Top Hat, iClicker)

• Personal experience with Learning Catalytics:
  – Interface is impractical
  – Cannot drag and drop pictures
  – Not very pedagogical for students
History of Qlicker

• F16W17: 3 students developed a prototype as a project for CISC 498
• Summer 2017: further development by student supported by Physics (part time)
• Summer 2017: Obtained CTL Teaching and Learning enhancement grant and department matching
• F17W18: Supported student to maintain Qlicker for a pilot test in PHYS 104/106 (~200 students)
• F17W18: Implemented many updates during the year to improve the interface
Qlicker overview and features

• Web application: any web-connected device can be used
• Clean and easy to use interface with Latex integration for mathematical expressions
• Multiple question types:
  – MC, MS, T/F, Long answer (including upload a picture)
• An easy to search library of questions
• Ability for students to contribute questions to a course (and for TAs to review and approve those questions)
• Ability for students to review and practice questions
• Ability to handle “at home” quizzes (similar to onQ quizzes), including ability to grade manually (e.g. long answers).
• Grade book, students can review grades, prof can export grades as CSV
- List of clickable students with pictures
- List of sessions (e.g. in class or at home quizzes)
- Manage course membership
- Students can be grouped
- Create/copy/delete sessions
• Search question by tag, by author, by content
• Edit, copy, make public
• Drag and drop images (both into the question and into the options)
• Math is pretty (Latex through MathJax)
• View public questions, questions submitted by students
Various ways for prof to run a session:
- Use split screen
- Use mobile device
- Show interface directly

During a session:
- Can have multiple attempts
- Can show students statistics
- Can show students correct answer
How I used Qlicker in PHYS 104/106

• Class with ~200 students
• Flipped classroom, students complete a reading assignment every week:
  – Answer an MC question quiz (currently on onQ)
  – Submit an original question through Qlicker that tests the material
    (students were not allowed to create True/False questions) → many of
    the MC questions on exams were from students!
• Lectures each have ~5-10 Qlicker questions to answer, including some
  “long answer” questions to be completed as a group.
  – 5% participation grade, full grades for one lecture if at least 50% of
    questions answered
  – No control/penalty to avoid people answering from home, etc, (if they
    answer the questions from home during the lecture, they’re at least
    following the lecture a little!)
Student survey (W18)

Qlicker is easy to use

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I would rather pay to use a classroom response system and use a more "polished" product

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Submitting questions to Qlicker as part of the reading assignments helps me to think about the material

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Student survey (W18)

I have used the library of public questions on Qlicker to help me study

- Yes: 28.8%
- No: 13.5%
- I didn't know that I could: 57.6%

Which classroom response system did you use?

- Learning Catalytics: 16 (36.4%)
- Top Hat: 3 (6.8%)
- iClicker: 36 (81.8%)
- Reex: 19 (43.2%)
- Turning Point: 2 (4.5%)
- Kahoot: 22 (50%)

I have used other classroom response systems (e.g. learning catalytics, tophat, iclicker, etc.)

- Yes: 25.4%
- No: 74.6%

I prefer Qlicker over the other classroom response system(s).

- Yes: 20 (65.9%)
- No: 7 (23.2%)
- Neutral: 4 (9.1%)
- Other: 0 (0%)
- Don't know: 1 (2.3%)

59 responses for each question.
Roadmap for this summer and wider adoption

• Student supported full time over the summer to:
  – Implement some additional functionality (e.g. cleanup at home quizzes, additional question types, etc)
  – Develop plan to scale up deployment in the cloud, develop costing estimate for adopting University wide
  – Investigate integration with Queen’s SSO and/or onQ
  – Investigate hosting and management through eCampus Ontario
Technical details

• Application is written in MeteorJS, data are stored in MongoDB

• Pilot test deployed using Docker (containers for app, db, and reverse nginx proxy), should scale easily

• Was deployed on a single dedicated server (i7-7700k, 4 core 8 threads), preliminary tests showed it could handle 800 concurrent students when the database was mostly empty – main load is querying the database (CPU)
Feedback from students

Qlicker was a much better alternative to the iClicker that many other first year classes used. Being able to go back into previous Qlicker sessions after the fact is also great for studying, and we can see where we went wrong on questions if we were incorrect, which we can’t do with the iClicker. Also, it being free is a lot better for students than a paid program, especially considering Qlicker worked better than the alternatives most of the time.

Qlicker is by far the best response system and it's free as well. I think Qlicker is an excellent alternative to iClicker and is much more useful in terms of learning and studying.

I think Qlicker is an easy and accessible learning tool for active learning during lectures. It's hassle free and also I can see how I'm doing in terms of my class and what concepts I need review. It also encourages me to pay more attention to the lecture material. I've had other difficulties in Learning Catalytics such as problems logging in, joining sessions, and reviewing my own sessions. It's also very expensive for my financial standing. Qlicker is also so much prettier and a happier blue.

(...) Really do think letting us come up with a question each week helped a lot though. It's ridiculous that other courses require you to buy a remote for this kind of thing when literally everyone in the lecture hall has a tiny computer on them at all times.

I do not see why other courses would not use qlicker- it is accessible, very easy to use, and really helps with my studying to determine areas of weakness.