

2017-05

Impact of QR-based In-Class Assignments on Student Engagement and Retention

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Last name, FN. (2017). Title of Paper, University of Calgary Conference on Postsecondary Learning and Teaching: Creating a Learning Culture: Conversations that Matter, Calgary, May 2-3. Calgary, AB: University of Calgary.

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Impact of QR based in-class assignments on student engagement and retention

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Motivation

- Increase student engagement in large classes

"Student engagement has become problematic following the rise of mass and universal forms of higher education."
[P. Kahn, Brit. Educ. Res. J., 40 (6), 2014, 1005 – 1018]

- Create a formative assessment tool

The Importance of Student Engagement

"Students participate more in a classroom and also report a better understanding of course concepts when steps are taken to actively engage them."
[Joffe, Higher Educ. Res. Dev. 24, 2005, 1]

Students believe response systems help them in their learning and increase their engagement. Assessments show higher level of mastery of the content in classes where SRS were used.
[E. Blood & R. Neel, J. Technol. Teach Educ., 2008, 16 (3), 375-383]

"Involvement in educationally oriented activities positively contributes to a range of outcomes including persistence, satisfaction, achievement and academic success."
[K. Krause, James Cook Symposium 2005, Queensland]



Introduction

QR-Code Sheets



PHYSICS QR Code Generator

All fields are required

Added Course: Physics 1020

First Name: Ania

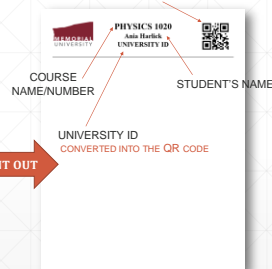
Last Name: Harlick

Student Number: UNIVERSITY ID

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PRINT OUT

READ AND DECRYPTED BY THE QR CODE READER



- Created using Creative Commons Library
- Hosted at the Departmental Website
- Information Securely Stored

The Pen is Mighty

"The encoding hypothesis suggests that the processing that occurs during the act of note taking improves learning and retention."

"To the extent: more notes, better performance, **but notes have to be taken discriminately.**"

P.A. Mueller, D. M. Oppenheimer, Psychol. Sci., 25, 6, 2014

For Generation Z the focus is shifting from content to process, from the information itself to the means of gathering, analyzing and applying it.

<http://generationz.com.au/education>

Reaching Generation Z

Multi-modal generation that demands engagement of multiple learning channels.

Literate forms of communication are not enough.

- Discussion & application are critical
 - Facilitator is required.
 - Engagement in classroom
 - Essential learning outside.



check notes
open e – text
consult
look
apply
try
draw
fill in
solve
write
follow up

formative assessment
review
compare
self – assessment

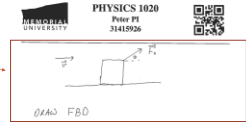
<http://generationz.com.au/learning-environment/>

<http://generationz.com.au/learning-styles/>

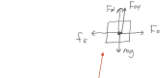
The Procedure

- Generate QR Sheet
- In-Class Question
- Photocopy the paper to generate a .pdf file (~2MB)
- Process using the QR code reader to generate .csv file for D2L

QUESTION



STUDENT'S SOLUTION



Procedure

Cumbersome and time consuming for large classes!

Problem 2: Returning work to students

Problem 1: Providing Feedback

Solution is posted on D2L or presented in class.

Participation marks are posted

Question is presented to students

Student fills the QR sheet with the answer

Sheets are handed in at specific time in class.

The sheets are scanned and the record of submissions is generated

The Interface

Anecdotally

"Even though they are not worth much, QR's make me come to class."

"I know right away whether I understand the concept behind the question."

Not enough feedback.

It be nice would be to get some kind of feedback, so you can see how you're doing.

"I pay more attention because you might ask a QR question."

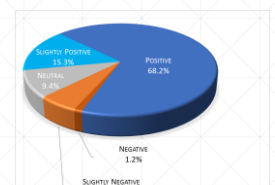
"Ownership of the written word, ie. I don't like to "Write down" something which shows that I know nothing."

Why should I have to come to class?

I wish we could get them back.

SUCCESS STORY: Fall 2016 Free Body Diagrams!

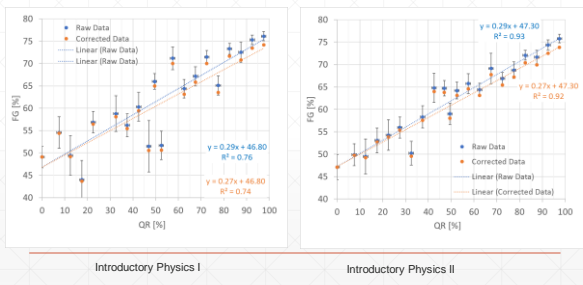
Statistically



Student assessment of the QR-code in-class assignments based on a student survey in Introductory Physics II course (April 2015)

Student assessment of the QR-code in-class assignments based on the survey administered among students taking Introductory Physics I and Introductory Physics II in years 2015-2017.

“There’s Lies, Damn Lies and Statistics”- Mark Twain



Opening the conversation

- Formative assessment tool has become a channel for conversation
 - gathering information about the progress
 - communicating expectations, standards and procedures
 - asking for students' input
- Development of the skills beyond course curriculum
- Conversation with themselves
- Detachment from the device

Opening the conversation

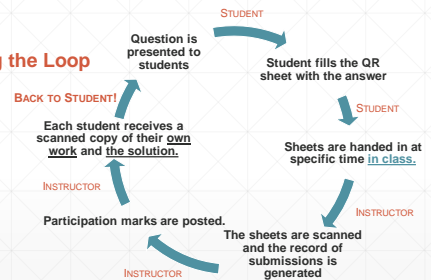
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Room for Improvement

IMPROVEMENT SUGGESTION	[%] OF RESPONSES
ACCESS TO CORRECT SOLUTION	83%
ABILITY TO SUBMIT FORMS ELECTRONICALLY	58%
SOLUTION PRESENTED IN CLASS	52%
ACCESS TO SUBMITTED FORMS	43%
ACCESS TO STATISTICS ON CORRECTNESS	40%
GRADING FOR CORRECTNESS	13%

Development of the QR Code Reader

Closing the Loop



Next Steps

GOAL: to create a better connection between assignments and tests.

STEP 1: "One Shots"

- An in-class question after each major topic which will be passed in and graded
- Enhancement so that students using Ipads etc can pass in sheet electronically

STEP 2: "Take Home QRs"

- Take-home one question assignments highlighting big concepts covered in class/related to the assigned readings.
- Submitted at the beginning of the class

- Formative assessment tool alternative to online student response systems
 - Opening an unused channel of communication
 - Not course-bound
 - Helps develop writing and communication skills
-
- Online submissions
 - Including coding of the graded work on the sheet

Summary

Future

Development of the QR code reader used to process data was done thanks to *Teaching and Learning Grant* from Memorial University.