# Recording and Monitoring Attendance:

An electronic solution using QR Codes where large numbers of students are present.



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**1.** Quick guide to setting up and taking the e-Register

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# Part 1: 1. Introduction and Background

The University policy on Recording and Monitoring Attendance states in point 2.2 that,

"The attendance of all taught students must be recorded by the registering School. Attendance points must be recorded <u>weekly, throughout each</u> <u>semester</u>." (TLSO, 2014)

At present, student attendances in the School are largely gathered using paperbased methods, using signing-in sheets, that students have to sign. Attendance data generated by this method takes time to process and make available to others. Collecting this information is a time-consuming task when you consider there are approximately 60 UG and PG course units running across the School per Semester. According to University policy, this has to be done on a regular basis, 'weekly' and where several 'trigger points' need to be recorded to check that students are complying with University code of conduct.

This paper considers an electronic solution to gathering and reporting of student attendances, especially with large groups of upwards of 350 students which are quite common in the School.

The current method for taking attendances in the School of MACE relies primarily on pre-prepared, printed-out lists that require a student to place their signature on the sheet alongside their name to record their attendance. For large groups of over 300 students, this is an onerous task, only compounded when students arrive late, through multiple entrances, who then forget to sign-in, sign in the wrong place, sign twice, sign for someone else etc.

The accuracy of paper-based registers that are passed around a room for students to complete has to be questionable. The completed list of assumed attendees then requires secondary processing by a Programme Administrator who then have to enter the attendance data into an spreadsheet before re-distribution to course team leaders.

In Semester two 2013-14, I was asked to help out with recording the attendance of a group of 326 students on Professor Andrew Gibson's Electrical Energy and Circuits first year unit, MACE10492. To record the names of attendees each week, three colour-coded lists were produced, one each for Aerospace (yellow), Mechanical (green) and Civil Engineering (blue) students. Three copies of each list were then copied and a clipboard provided making a total of nine clipboards (and pens) to be carried to each session.



**Figure 1:** The 1st Year MACE 10492 group and the clipboards set out at the back of the room. This was repeated for all twelve lectures that ran in Simon Building in Semester 2, 2013-14).

The lecture was scheduled to start at 3:00pm and I arrived at the lecture room 15-20 minutes before with the lecturer. For the first session, I handed out the clipboards to students, in the hope they would sign them and then pass them on. The majority of students signed but they had to search through three pages of the relevant list to find name. (Mech students had the longest search with over 180 names to look through) This method worked but took time for students to complete and the lists were still going round during the lecture. This 'distributed approach' led to one clipboard going missing. (It was returned to the tutor at the end of the session who later passed it on to me.) Some students also thought it fun to write amusing names and doodle on the sheets.

I altered my approach in week two and laid out the clipboards (as figure 1) and located them near the (single) entrance to the lecture room and stood by the entrance to greet students and ask them to sign in on arrival. This improved the process but caused bottlenecks when large numbers of around 20 students arrived together all wanting to sign in. Some students, despite politely asking them to sign in, ignored me and sat down without signing.

Gradually over the remaining weeks, students became more accustomed to the routine and most students signed in before taking their seats. I remained at the back of the room once the lecture had started at 3:00 and stayed for another 30 minutes to grab any latecomers arriving. At 3:30 I collected the clipboards and put them in a carrier bag. I then took the bag back to George Begg building and returned the clipboards to the three Undergraduate Programme Administrators. The Programme Administrators then entered the attendances onto a separate spreadsheet they each kept to record the attendance.

This whole approach was a time-consuming and labour-intensive process, that involved the efforts of a number of staff and took up several staff-hours each week to process just this one group. Scaled up across the School, the processing of attendance data using this manual approach must take many hours of staff time every week.

# **1.1 A Paperless Electronic System**

This paper considers an alternative approach.

Following my experience with the MACE 10492 group I drew up some features of what an alternative system would ideally require.

- A system that would support the University policy and its requirements for attendance monitoring and recording,
- a system that would be robust, portable and simple for staff to use,
- a system that would eliminate the need for paper-based lists and the reentering of attendance data from paper-lists to spreadsheets,
- a system where attendances could be quickly captured and recorded on entry,
- a system that would be flexible, scalable and used by either small groups or for large lecture classes,
- a system that would be reliable and accurately record those present or absent.

Over the summer (2014) I considered several approaches to the problem. I thought about using touch-screen tablets with spreadsheet lists of students, biometric systems such as the capture and measurement of student fingerprints that could be used with a portable fingerprint scanner. I looked at using wireless voting systems where the students could register their attendance from their own mobile phones using a wireless based voting system (mBclick).

I ruled many of these systems out as they either needed a good Wi-Fi service (mbClick) or required expensive hardware and installation costs (biometric analysis). An alternative system should avoid these.

# **1.2 Using Blackboard to record attendance**

A new system would need access to student data to create digital class registers. Although Campus Solutions has this data, I wanted a source that teaching staff have access to. Via the Grade Centre in Blackboard staff can access access student data such as; last name, first name, ID number, IT username and their University email address.

The first consideration was to create additional columns in the Blackboard Grade centre, export this to a spreadsheet app on an iPad, and then enter the weekly attendances against the student names before importing this updated information back into the Grade centre. This approach worked, but it took time to enter the data and the Grade centre soon began to look un-wieldy for large group sizes with over 300 rows.

# 1.3 Replacing Paper with an iPad

I considered replacing the clipboards with an iPad and an app which could hopefully import data from Blackboard's Grade Centre. I searched the iTunes App Store on 'Attendance' for apps that handled attendance which returned a number of options shown in figure 2.



Figure 2: iTunes returned a number of potential apps.

I downloaded the first four (free) apps in figure 2 but soon discounted these, though the Stearsoft app shown in figure 3, looked useful and had been developed for use in schools and further education colleges.

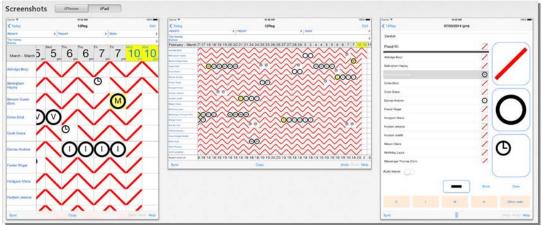


Figure 3: Stearsoft's attendance app.

The Stearsoft app was good but the free 'lite' version only allowed a test with up to 40 students. There were on-costs to consider for the full version so I went no further.

The next app on my list to evaluate was, *Attendance*.

The publicity information for *Attendance* said that the developer had built the app initially for use with **Blackboard** which sounded useful, so I paid **£2.99** for the app and downloaded it.

	Attendance (#) David M. Reed Software >		
E2.99 Buy Offers In- App Parchases This appoint of experimental This appoint of experimental Rating: 4- TOP IN-APP PURCHASES 1. Device Transfer ELA9 LINKS Developer Website © 2009-2013 David Reed	Screenshots Parallel (Series Consert C	CS161           CS170           CS160           CS160-1           CS160-2	C0101         C0101           Add reversed problems         0           Add reverse date         0           Station of the second se
		Device Transfer	Pri Har 12, 2010. 14         3           Hend Har 15, 2010. 15         3           How Star 26, 2010. 17         3           Pri Price 28, 2010. 19         3

Figure 4: The Attendance app, by David M Reed Software.

This app allows you to download and import a .CSV file of your student information from Blackboard. First, you set up the app by naming and adding a new class and session. As you can see in figure 4, (pane 1) once you have set this up, the registrar simply taps the iPad screen to change the student's status from **ABSENT** (the default) to **PRESENT**. You can also record students arriving **LATE** or those who were **EXCUSED**. The register taken, you can then export the register out of the iPad via Dropbox into your PC for viewing and processing in Excel.

The output CSV file generated by *Attendance* for the group of MACE10492 students appeared as shown in figure 5 when opened in Excel.

	A	В	C	D	E	F	G	Н	1	J	K	L	
1	MACE 10492 Electric	al Energy Supply and	Circuits										
2			Mon 29/09/2014 12:1	Mon 29/09/2014 12:34	Mon 29/09/2014 12:45	Mon 29/09/2014 12:49	Mon 29/09/2014 13:08	Tue 30/09/2014 12:15	Absent	Present	Excused	Late	
3	Iffah	Ab Latib		Present	Absent	Absent	Absent	Absent		4	1	0	0
4	Norman	Abadiano		Present	Absent	Absent	Absent	Absent		4	1	0	0
5	Mohd	Abd Rahim		Present	Absent	Absent	Absent	Absent		4	1	0	0
б	Abdul	Abd Rahman		Excused	Absent	Absent	Absent	Absent		4	0	1	0
7	Hussain Ali	Abid		Late	Absent	Absent	Absent	Absent		4	0	0	1
8	Syed	Abidi		Late	Absent	Absent	Absent	Absent		4	0	0	1
9	Gabriela	Adamczyk		Excused	Absent	Absent	Absent	Absent		4	0	1	0
10	William	Adams		Present	Absent	Absent	Absent	Absent		4	1	0	0
11	Nyamebekyere	Addae-Dapaah		Present	Absent	Absent	Absent	Absent		4	1	0	0
12	Indre	Adomaviciute		Absent	Absent	Absent	Absent	Absent		5	0	0	0
13	Alexander	Agboola - Dobso	on	Absent	Absent	Absent	Absent	Absent		5	0	0	0

Figure 5: The CSV file opened in Excel.

This solution seemed to have real potential, but a search over the weekend on the <u>David Reed website</u> (*Reed is a lecturer in computer science at Capital University in Columbus, Ohio who developed* **Attendance**) I found there was an upgrade available called, **Attendance2**.

(Note: a search on Attendance2 in iTunes didn't show in the search results)

### 1.4. Attendance2

**Attendance2** launched on the App Store in 2013. There are two new features with Attendance2. One allows you to add photographs of students, as shown in figure 6, pane 1 (and where a photo doesn't exist, you can take one with the iPad's camera.)

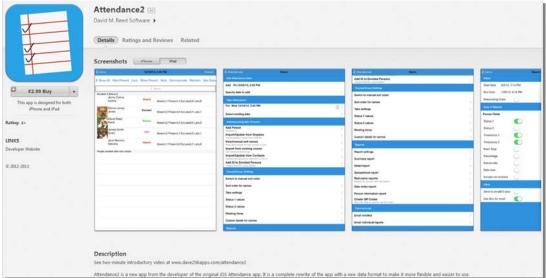


Figure 6: Attendance2, upgraded to include student photographs and QR code generation



The second useful addition in **Attendance2**, is the use of QR (Quick Response) codes, where the app itself generates a unique QR code for each student. To speed up registration, the student simply scans their code into a QR Reader on the iPad screen to register their attendance.

Figure 7: A typical QR code.

After uploading the CSV file for MACE 10492 into **Attendance2**, this generated a list of QR codes for the student group and saved them into Dropbox. These could, if needed, be given out on paper so students could paste them into their diary, or they could be printed on a card to put them in a wallet or purse. Ideally the QR code could be printed directly onto the UOM ID Card (hopefully next year.) Another method would be to email the QR code to the student so they have it stored on their mobile phone, (and used as small cash transactions are now carried out in cafe's etc.) which they can then scan on registration. (Alternatively, the student's name can still be taken by tapping ABSENT, PRESENT, LATE, EXCUSED etc on the main app screen.)



**Figure 8:** Showing a sample of four QR codes generated by *Attendance2* for the MACE 10492 student group out of the 300 for the whole class.

In Part 2, we will look at how to use the *Attendance2* app and how it works with Blackboard.

# Part 2:

### 2.1 Using Attendance2 to capture attendance.

This section looks at how use *Attendance2* to gather attendances.

Figure 9 shows the Blackboard course for the MACE 10492 undergraduate course which runs in the School of MACE. Like all Blackboard courses it has its own Grade Centre containing student names including surname, forenames, usernames and id numbers.

Course is unavailable	so students until Monday, 19 January 2019) - Course Content
ALCE 10492 Electrical Interpy Supply & Circuits 1914 15 2nd Semester	School of Mechanical, Aerospace and Civil Engineering
electorand	Course Content
Dourse Content Communication	Welcome to the Electrical Energy, Supply and Circuits Blackboard Course
Course Information	All the course documents and resources can be accessed from the folders below. Please use the menu on the left to access other resources such as assignments and online discussions.
ly Grades	The Course Team members are:
Learning Resources ILearning Dupport Istaf Details www.uncernent	
Control Panel	Co-ordinator: Ets/Anthen/Gilson
Content Collection Course Texts Distustion	Lecture sildes, Visualiser notes and Lecture Podcasts
irade Centre	Key Concepts - Audio Visual support

Figure 9: The MACE 10492 Blackboard unit for 2014-15.

The first task is to export part of the Grade Centre information into a spreadsheet for some minor editing. With Blackboard's Edit Mode switch **'ON,'** Click on Grade Centre > **Full Grade Centre.** Figure 10 shows the **Work Offline** button on the right. Click On, **Work Offline > Download**.

						1000.000	100				
eute Column	Create Calculat	rd Column 🗸	llanage 🗸	Reports +							Film Work Offline 🗸
Move To Top	Enal (										Upload Work Of SonColumns By Layout Position Download
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Abd Rahman	Abdul	mogm4ase	9488991		Available	** :	++		- ++ T	+	
Abid	Hussam Alt	mogm4ha3	9475905		Available				-		
Abid	Syed	mogm2sa7	8997250		Available			**		-	
Adamopk	Gabriela	mbgm4ga2	9478429		Available	-	54 C	**	ш.	-	
Adams	William	mbgm2ws3	9047489		Available	(a)		**	(m)	-	
Addae-Dapash	Namebelgere	mbgm2na3	9134828		Acalable	**	**	÷	te a	ie.	
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Figure 10: Blackboard Grade Centre and the 'Work Offline' download option.

Figure 11 shows Blackboard's, Download Grades screen. Under the DATA section select, 'User Information Only.' This will only export the basic student data rather than the complete Grade Centre and all its columns. Under OPTIONS, select, 'COMMA' and for the Hidden information, 'No'. Lastly, under SAVE LOCATION, select My Computer.

Finally click-on the **Submit** button.

Download Grade	
	nloaded from the Grade Centre and saved to your computer or a Content Collection folder. Once downloaded, grades can be changed and added offline and later uploaded to the Grade Centre. In addition, you can edit comments mmmt feature or the Manually Override tab on the Grade Details page. <u>More Help</u>
	Cancel Submit
DATA	
Select Data to Download	© Tuti Grade Centre
	💿 Seleded Column 🗰 wegeted toai 🔹 📄 Indude Comments for this Column
	User Information Only
OPTIONS	
Choose either the tab-delim	ted (XLS) or comma delimited (CSV) delimiter type to open the file directly in Microsoft Excel. Select comma-delimited for importing to third-party applications that do not support Excel.
Delimiter Type	Comma      Tab
Include Hidden Information	Yes   No  Notices offurms and users that have been hidden tiom view
SAVE LOCATION	
Select where to save the file.	
Download Location	My Computer     Contract Collection     Browse

Figure 11: Download Grades screen.

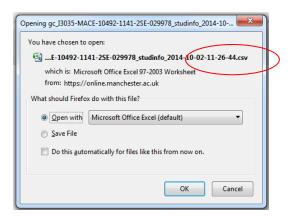
Blackboard will then respond with a confirmation message (Figure 12).

Download	d Grades	
	saved to a file. To download the file and work offline, click Download to Open the file.	
DOWNLOAD		

Figure 12: Download Grades confirmation button.

After clicking on the Download button, the MS-Office prompt appears asking if you want to Open or Save the file.

Choose the **Open** option as shown in Figure 13 and click on **'OK'**. (You can choose Save if you prefer, and save the file to your Desktop – though you can do this later if you Open the file now.)



**Figure 13**: The file you download is identified by its long course ID number and the date and time you downloaded it.

It should have a .csv extension.

The .csv file should open and look something like Figure 14. The only data we need are the student surname, first name and the username. as a secondary check (or you could use the student ID but only one column is needed to generate the QR Code per student) so we can delete the other columns. Click on Columns, D, E and F, right-click your mouse and delete them.

	А	В	С	D	E	F
1	Last Name	First Name	Username	Student ID	Last Access	Availability
2	Ab Latib	Iffah	mbgm4ia5	9481006		Yes
3	Abadiano	Norman	mbgm4na2	9447244		Yes
4	Abd Rahim	Mohd	mbgm4ma9	9473301		Yes
5	Abd Rahman	Abdul	mbgm4aae	9488991		Yes
6	Abid	Hussain Ali	mbgm4ha3	9475905		Yes
7	Abidi	Syed	mbgm2sa7	8997200		Yes
8	Adamczyk	Gabriela	mbgm4ga2	9478429		Yes
9	Adams	William	mbgm2wa3	9047489		Yes
10	Addae-Dapaah	Nyamebekyere	mbgm2na3	9134828		Yes
11	Adomaviciute	Indre	mbgm4ia4	9497578		Yes
12	Agboola - Dobso	Alexander	mbgm2aap	9074273		Yes
13	Ahmed	Ahmed	mbgm2ao3	9288804		Yes
14	Ahmed	Gais	mbgm2ga2	8263398		Yes

Figure 14: The Excel spreadsheet you need to edit.

There are only a further few small changes to make. The column headings need to be changed to the format that **Attendance2** identifies.

Last Name needs to become, lastName First Name needs to become, firstName and Username needs to become identifier

# (The field names used are case-sensitive.)

**Note:** You will only need to do this once for each class. You can add / delete individual students using the app if you need to.

	А	В	С	D	E
1	lastName	firstName	identifier		
2	Ab Latib	Iffah	mbgm4ia5		
3	Abadiano	Norman	mbgm4na2		
4	Abd Rahim	Mohd	mbgm4ma9		
5	Abd Rahman	Abdul	mbgm4aae		
6	Abid	Hussain Ali	mbgm4ha3		
7	Abidi	Syed	mbgm2sa7		
8	Adamczyk	Gabriela	mbgm4ga2		
9	Adams	William	mbgm2wa3		
10	Addae-Dapaah	Nyamebekyere	mbgm2na3		
11	Adomaviciute	Indre	mbgm4ia4		
12	Agboola - Dobson	Alexander	mbgm2aap		
13	Ahmed	Ahmed	mbgm2ao3		
14	Ahmed	Gais	mbgm2ga2		
15	Ahmed	Waheed	mbgm3wa2		

Your spreadsheet should now look like the example in Figure 15.

Figure 15: showing the new field names

OK, that's the student data file created.

Click on **Save As** to save the changes you have made to the spreadsheet and rename it. I have called my new file **MACE 10492 Electrical Circuits 2014-15**.

**The next important thing to do** is to make sure the file is saved as a **.csv** as shown in figure 16.

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Organize 👻 New fol	der					10 ·	0	
12 I I I I I I I I I I I I I I I I I I I	Name	Date modified	Туре	Size			~	
😭 Favorites	📕msigeplugin61	02/07/2014 14:36	File folder				-	
E Desktop	4F07D428-C1A3-4C06-9036-A3E2BD6E32		File folder					
bownloads 👔	668462A3C-FD11-42D8-9E8F-4286F3AE12	02/07/2014 07:51	File folder					
Stopbox =	49C410D6-553E-4709-8621-51EA38DBAF	27/08/2014 07:49	File folder					
Recent Places	(88FC5F5A-34BA-474C-8199-936B3C0BE7	03/09/2014 07:52	File folder					
1000 C	(92A0F958-139A-4D38-8E76-6474BF15C9	28/01/2014 10:05	File folder					
libraries	3 (440E4AF0-F35D-454D-9977-4F7077D954	25/06/2014 07:51	File folder					
Documents	3 (80443AD9-ED25-47D0-867F-83D2615908	16/06/2014 08:05	File folder					
J Music	🔉 (AC8F7636-ACC0-4873-9EF9-14BE8CA29	18/06/2014 07:47	File folder					
Pictures	3 (B2D1454E-3C36-44C5-8473-B6371A5AD	19/08/2014 07:53	File folder					
Videos	(83991C16-E60A-4BC7-AD4F-C57CF4185	09/07/2014 07:48	File folder					1
· Commuter	(CE15D1B6-19B6-4D4D-8F43-CF5D2C335	28/01/2014 10:30	File folder					
	197-2003 Workbook Data le File Web Page							
Sing Web Exce Exce Exce	Page I Template I Macro-Enabled Template 197-2003 Template							
Sing Exce Exce Exce Test Unic XML Micr	Page I Template I Macro-Enabled Template							 CSV

Figure 16: Saving the student data file as a CSV file.

Make sure the student data file is somewhere handy on your PC's desktop as you are going to move it to Dropbox.



**Dropbox** is a free file hosting service operated by Dropbox, Inc. You need to have a Dropbox account so you can move the **.csv** file from your PC into your iPad.

If you don't have a Dropbox account you need to set one up on your PC. You will be able to transfer your PC files from your PC into the Dropbox and link your iPad to it so you can import and export your files, make files available from other computers mobile devices, smartphones etc.

If you have set up Dropbox on your PC, you need to set up a folder structure so the data files will be stored in the right place.

In Dropbox create a new folder and call it **Apps** Inside that folder create another folder called **Attendance2** 

🔆 🖉 🖉 🕨 mwwssms5 🕨 Dropbox 🕨 Apps 🕨			-	
Organize ▼ Include in library ▼ Share with ▼ I	Burn New folder			
🔆 Favorites	Name	Date modified	Туре	Size
🧮 Desktop	Attendance2	02/10/2014 11:23	File folder	
〕 Downloads				
😌 Dropbox				
📃 Recent Places				

Figure 17: Dropbox with the Attendance2 folder you created.

Next drag and drop (or copy) the student data .csv file into the Attendance2 folder you created in Dropbox.



**Figure 18:** You need to place a copy of your student data file in the Attendance2 folder in Dropbox.

That's all you need to do for now on your PC.

# 2.2 Setting up your iPad

For the next stage, you need to use your iPad. If you have only just started using your iPad, you will first need to set up an Apple iTunes account. If you already have an iTunes account, then you are ready to download **two iPad Apps.** 

The first app you need to download via the App Store is the **Dropbox** app so you can access the **.csv** student data file you created earlier.

App Store > Productivity > Dropbox				
	Dropbox #			
	Dropbox >			
	Details Ratings and Reviews Related			
	Screenshots Phone Plant			
	Rute 0 0 0	Drigbon 111	6 a	8
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Offers In-App Purchases This app is designed for both iPhone and iPad		Much Statut and Statut and Statut	YOU don't know about me without you have read a book by the name of The Adventures of Tion Surveyer, but that with no matter. That book was made by Mt. Mark Youan, and he told the trath, mainly. There was things which he	
★★★☆☆ (35)		Potes	and ne node the trate, manage reserve was bunge where ne stretched, but mainly be hidd the trath. That is nothing, 1 never seen amploady but lied one time or another, without it was Aust Polls, or the widner, or maybe Mars, Aust Pol-	
Rating: 4+ TOP IN-APP PURCHASES		C Pale	by Tiom's Aust Polly, she is and Mary, and the Widow Douglas is all tail about in that book, which is mostly a true	
1. Pro-1Year (69.99		Petiere	book, with some stretchers, as I said before. Now the way that the book winds up is this: Tons and	
2. Pro - 3 Months £17.99		Dreading Int	me found the money that the robbers had in the cars, and it made us rich. We got six thousand dollars apiece — all gold. It was an asoful sight of money when it was piled up. Well,	
		Delta Maria del Carlos	Judge Thatcher he took it and put it out at interest, and it fetched us a dollar a day apiece all the year round — more	
LINKS			than a body could tell what to do with. The Widow Dong- las she took me for her son, and allowed she would sie me, but it was rough living in the boase all the time.	q
Privacy Policy Developer Website	far Pere' lans br.y.	The max farin stro		
	Description			
© 2014 Dropbox	Dropbox lets you bring all your photos, docs, and videos anywhere and share the have your important memories and work with you.	em easily. Access any file you	save to your Dropbox from all your computer	s, iPhone, iPad, and the web. With Dropbox you'll always
	Features: • Access all your photos, docs, and videos from any device			

Figure 19: Dropbox in the App Store.

Download and install the Dropbox app.

Once you have done that you can log into Dropbox (on the iPad) using the same username and password that you set up/use for/on Dropbox on your PC.

So long as your local Wi-Fi connection is working, the Dropbox account on your PC will now synchronise with the Dropbox on your iPad, so both Dropboxes will contain the same set of files and folders. (You should see Dropbox's small, blue progress wheel turning when synchronising is taking place.)

Next, check the Dropbox on your iPad to make sure the **.csv** file appears in there.

# 2.3 The Attendance2 app

V	r		
	V	 _	
1	1	 	
Ĥ	4		

The second App you need to download is **Attendance2.** The app is available on the iTunes Store and costs £2.99. The iTunes page shown below in Figure 20 will tell you more about what the Attendance app can do and how it integrates with Blackboard etc.

Go into iTunes store now and download the **Attendance2** app to your iPad.

#### What can Attendance2 do?

Attendance2 is a powerful relational database that allows you to input data in the form of weekly attendance, student photographs, and output reports and QR codes.

	Attendance2 (#) David M. Reed Software >			
5	Details Ratings and Reviews Related			
	Screenshots there in a ment	Constant New	Considerer Name	(
	3 Dow All Hide Present Lock Shoe Present Note Communicate Random Obe State	Chief Attendent Com	Add D to Errobed Persons	Channel .
D £2.99 Buy .	Unit 1	400 fe 100013, 245 PM	Connectional Section	Gran Dava 9(0112, 2115 #44
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This app is designed for both	Collys Alexen(1 Present) Electand 2 Land	Tana amangana	Bort order for names	Descending Dieter
iPhone and iPad	Second Jores Research Present Property Social Column	Per Web 12/10/13, 2:45 PM	Take settings	Marca in Pageone
	Abard Present Excertion	Relact exciting-data	Bata Costore	Paraos Fadda
ating: 4+	Tend Read Read Assert() Present Licoured Lated	Anthropologies Factors	Blatest 2 solices	Date 1
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	Antaria Prisaria Calculate Calculate	Import/Update Rom Droptess	Coston labels for names	Templano 1
INKS	Jana Davane Stevens Assant 1 Present 2 Excured 1 Land	Venilitation and names from Ed bottom prove and and	April	Texemeno 2
leveloper Website	Page coded also be also	Imput how existing course	Record authors	Paint Insi
		Import/Update from Contacts	Summary report	Pecentage C
0 2012-2013		Add ID to Enrolled Persona	Detail report	Elana valo
0.0016-0013		Forme lines faiture	Spreather must	Dato rote
		Buildh fo manual and older	Pad name reports	Inclusion not enrolled
		Sion ontier for names	Date robes report	000
		Take settings	Person information labor	Send to email/U alter
		Ratio Custom	Create OR Codes	Use fice for entail
		Status 2 values	Martine field a cost for the 2P cost	
		Musting times	Contraction .	4
		Guatom labels for numus	Enal-sected	
			Email individual reports	

Figure 20 from the iTunes App Store takes you though the basics of what it can offer.

Figure 20: 'Attendance2' detailed in the App Store.

# 2.4 Setting up a New Register for a Class

The first thing you need to do is how to set up a new register for your class. Using my MACE 10492 as an example, follow these steps.

Open the **Attendance2** app.

The Attendance2 opening screen on your iPad should look like figure 21,

	14.05	
+	Attendance2	
Courses/Groups		
MACE 10492 Electrical Energy Supply and Circu	lits	() >
Staff Dev1 2014		① >
stafftestgroup		( <b>)</b> >
Backup/Restore		
Back up to Dropbox		>
Back up Photos to Dropbox		>
Restore from Dropbox		>
Restore Photos from Dropbox		>
Link with Dropbox		>
Unlink with Dropbox		>
Back up via Email		>
Help/Version		
Help		>
Version/What's new		>

Figure 21: Attendance2's home screen.

Click on the to add a new course title. I have three courses set up here already.

Add Course Named: will appear. In the empty box enter the name of your course in full.

Tap the **Add** link under the box.

After adding your course title, the Course screen shown in figure 22 appears.

	1616	
Attendance2	MACE 10492 Electrical Energy Supply and Circuits	Course title
Add Attendance Date		
Add Fri 03/10/2014 14:15		
Specify date to add		1
Take Attendance		and the second
For Tue 30/09/2014 15:30		C
Select existing date		
Add/Import/Update People		
Add Person Enrolled: 350		
Import/Update from Dropbox		
View/manual sort names Press Edit button on next screen to sort		
Import from existing course Get names and settings		
Import/Update from Contacts Names from groups or selected contacts		
Add ID to Enrolled Persons Unique Identifier value added		
Course/Group Settings		
Pullish In and I and I		

Figure 22: The Course screen with the name of your course appears.

Next is to import the student data .csv file.

Tap the Import/Update from Dropbox link.

That will open another screen that shows the csv files available to import. Find the file you transferred to your Dropbox on the iPad.

It will have a **forward-slash** symbol before it and look something like,

# /MACE 10492 Electrical Circuits 2014-15.csv

Tap the .csv filename and you should see your student data file imported as shown in figure 23. You should see the three columns and your student names and username.

< Back			
		Press button to view specified line and match fields for importing.	of
First Line			Second Line
lastName	firstName	identifier	
Ab Latib	Iffah	mbgm4ia5	
Abadiano	Norman	mbgm4na2	
Abd Rahim	Mohd	mbgm4ma9	
Abd Rahman	Abdul	mbgm4aae	
Vbid	Hussain Ali	mbgm4ha3	
Abidi	Syed	mbgm2sa7	
damczyk	Gabriela	mbgm4ga2	
dams	William	mbgm2wa3	
ddae-Dapaah	Nyamebekyere	mbgm2na3	
domaviciute	Indre	mbgm4ia4	
gboola - Dobson	Alexander	mbgm2aap	

Figure 23: Your student data imported to Attendance2.

# Tap the **First Line** link.

You should see on your screen the names of the fields as shown below,

lastName lastName firstName identifier identifier

Tap the **Import** link (it is top right on your iPad screen.) *Attendance2* then displays a message for you to import the first line.

Import first line?
Press Import First Line if the first line contains data for a person or press Skip First Line if the first line is headers.
Skip First Line
Import First Line

Figure 24: The Import message box.

Tap the **Skip First Line** option shown. This will put another message on your screen as shown in figure 25.



**Figure 25**: The Import Finished confirmation showing how many names were imported. In my case **352**.

Tap the **Save** option.

Next we need to add the sessions the class meets. This can be done on an on-going basis or pre-set if you know when the group meet.

The next step is to add the date(s) of your classes. You do this by adding a specific date.

# Tap, Specify date to add

KAttendance2	19:16 MACE 10492 Electrical Energy Supply and Circuits	考 73% 🔳
Add Attendance Dat	le	
Add Sat 04/10/201	4 19:15	
Specify date to add		

#### Figure 26: Specify date to add.

Attendance2 returns with the date and time of the session you want to record.

Cancel		S	ave
Add Date			
Fri Oct 3 Today	11	57	
Sun Oct 5	1	59	AM
Mon Oct 6	2	00	PM
Tue Oct 7	3	01	

Figure 26: Setting the date and time of the session.

Rotate the dials for the date and time you want and then tap, **Save.** 

If you wish, you can set all the dates and times for the sessions you want at this stage. Repeat the previous step adding all the dates you want, clicking on Save each time.

ad 🗣	19-42	£ 71%
< Back	Dates	
Tue 04/11/2014 10:00 : 0		
Tue 28/10/2014 10:00 : 0		
Tue 21/10/2014 10:00 : 0		() >
Tue 14/10/2014 10:00 : 0		
Tue 07/10/2014 10:00 : 0		

If you added a number of sessions, tap on, Select existing date.

Figure 27: Dates you have set for the sessions you need.

You can delete the dates if you wish by tapping the date and **Edit.** You will then see the **Delete** option appear.

# 2.5 Taking the Register Manually

With your sessions now set up, you can take the register for the current session and record the attendances. For small tutorial groups, if you wished, you could take the register manually following these next steps. For much larger groups, that's where the QR codes come into their own and we will look at this in part 2.7.

Tap the **Select existing date** and the **date** for the group you want to register.

Attendance2 Add Attendance Date	MACE 10492 Electrical Energy Supply and Circuit	e man
Add Sat 04/10/201		
Specify date to add		
Take Attendance		>
For Tue 07/10/2014	10:00	
Select existing date		(i) >

Figure 28: Select existing date

Your register will appear with the date at the top and the names down the left.

< Dates		07/10/20	14 10:00			Present
Show A	All Hide Present Lock	Show Prese	nt Note	Communicate	Random	Use Stat
		Q Se	arch			
	352 (Status1) Iffah Ab Latib	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
	Norman Abadiano	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
Ð	Mohd Abd Rahim	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
	Abdul Abd Rahman	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	1
1	Hussain Ali Abid	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	1
	Syed Abidi	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	1
(	Gabriela Adamczyk	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	1
1	William Adams	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
P	Nyamebekyere Addae-Dapaah	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	1
I	ndre Adomaviciute	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
1	Nexander Agboola - Dobson	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	
,	Ahmed Ahmed	Absent	Absent,5	Present,0 Excus	ed,0 Late,0	

Figure 29 shows the register for the 7<sup>th</sup> October session I set up.

The default status is set as **Absent**. You can change this to **Present**, **Late** or **Excused**.

#### Figure 29: A typical Attendance2 register

Once you have taken the register, tap the **LOCk** link at the top of the register page. You can always **Unlock** it later if you want to change anything but it will prevent any changes taking place.

# 2.6 Report Generation

If you want to email a report on the session you have just registered, go back to the Course screen shown in figure 30.

	MACE INSIDE EXcellence Browige General and County.
Add Mon 06/10/2014 10:15	
Specify date to add	
Take Attendance	
For Mon 06/10/2014 10:15	
Select existing date	
Add/Import/Update People	
Add Person	
Import/Update from Dropbox	
View/manual sort names	
import from existing course	
import/Update from Contacts	
Add ID to Enrolled Persons	
Course/Group Settings	

Figure 30: The Course screen for my example course.

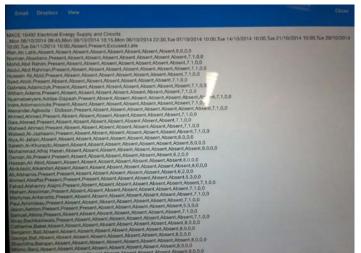
	MACE 10492 Electrical Energy Supply and Circuits
Status 2 values	
Meeting times	
Custom labels for names	
Report settings	
Summary report	
Detail report	
Spreadsheet report	
Red name reports Reports for people with red names	
Date notes report	
Person information report	
Create QR Codes	

Scroll down the page and you will see the Report section.

Figure 31: The Report section of the Course screen.

#### Tap the **Spreadsheet report** link.

You should see a screen like the one in figure 32.



**Figure 32**: The register for the Course. Note that my example shows a number of sessions.

To export the register as a spreadsheet, tap the Dropbox link (in between the Email and View links).

Tapping the Dropbox link will return a screen with your course name and a

#### -report.csv extension.

Tap the Save link. The report file will be saved in Dropbox on your iPad. If your Wi-Fi connection is working, the spreadsheet will be uploaded to your Dropbox on your PC. (If not it will the next time you have a Wi-Fi connection.)

Find your report file in Dropbox (it should the in the Apps/Attendance2 folder) Open the file and you should see your register along with any other dates you have set similar to my example shown below.

	A	B	C	D	E	F	G	н	1	1	к	L	M	N
1 MACE 10492 Electrical Energy Supply and Circuits														
2			Mon 06/10/2014 09:45	Mon 06/10/2014 10:15	Mon 06/10/2014 22:30	Tue 07/10/2014 10:00	Tue 14/10/2014 10:00	Tue 21/10/2014 10:00	Tue 28/10/201 4 10:00	Tue 04/11/2014 10:00	Absent	Present	Excused	Late
3	Iffah	Ab Latib	Absent	Absent	8	0	0	0						
4	Norman	Abadiano	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
5	Mohd	Abd Rahim	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
6	Abdul	Abd Rahman	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
7	Hussain Ali	Abid	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
8	Syed	Abidi	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
9	Gabriela	Adamczyk	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
10	William	Adams	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
11	Nyamebekyere	Addae-Dapaah	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
12	Indre	Adomaviciute	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
13	Alexander	Agboola - Dobson	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
14	Ahmed	Ahmed	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
15	Gais	Ahmed	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
16	Waheed	Ahmed	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
17	Waleed	Al-Jashaami	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	7	1	0	0
18	Alya	Al-Jefairi	Absent	Absent	8	0	0	0						
19	Salekh	Al-Khuraybi	Absent	Absent	8	0	0	0						

**Figure 33**: A typical spreadsheet with the attendance data for the group for all the sessions you have set up.

# 2.7 Taking the Register with QR Codes

Taking the register with QR codes speeds up the capture of attendances, especially with large groups. QR Codes (Quick Response) codes are a kind of two-dimensional bar-code that hold alpha-numeric data. In data terms, we can use the student's computer username as these are unique to create the QR code. We could have chosen to use their ID number to generate the QR code, or something which is unique to the student. QR Codes need to be scanned by a camera, and for our application, we will be using the front camera on the iPad.

You can create the QR codes for the class as soon as you have imported your student .csv file and set up the register.

	MACE 10492 Electrical Energy Supply and Circuits	
Status 2 values		
Meeting times		
Custom labels for names		
Reports		
Report settings		
Summary report		
Detail report		
Spreadsheet report		
Red name reports Reports for people with red names		
Date notes report		
Person information report		
Create QR Codes Identifier field is used for the QR code		
Communicate		
Email enrolled		100

On your Course page in the Reports section, you can see Create QR Codes.

Figure 34: Create QR code

In my example, my MACE10492 student data is already in my iPad. All you need to do if you have your student data uploaded is to tap the **Create QR Codes** link. What happens next is one of the clever parts of the Attendance2 app. The app generates a unique QR code for each student in a matter of seconds.



Jason Ashton mmapzja4

Figure 35: A typical QR code generated for a student via *Attendance2*.

Copies of the QR codes are sent to your Dropbox in a folder for your group which look like the ones for my example group in figure 36.



Figure 36: QR Codes for your student group.

The codes are held in a database in your iPad so that when you take the register using the codes, the camera reads the code, compares it with the code held in the database and updates the register with 'Present.' There is no need to scroll through the register to find the students name and mark them present.

# 2.8 Testing the QR Codes

I printed off a set of QR codes generated by the app and copied them into Word to print them off 16 per side. I laminated a few sheets and cut them up using a portable guillotine. I enlarged some QR Codes and also reduced some in scale to check if the size of the images mattered. I also ran off some dummy QR codes I printed from a number of Google sites to see how **Attendance2** would react.

The card bench trial worked without any error. The smaller QR codes took slightly longer to capture until they were moved closer to the reader screen. This size of codes tested, (approximately 15mm – 20mm square) worked fine and this size would fit onto the students ID card. The codes generated by the app worked without a problem as did the enlarged codes.

The **false QR Codes** from Google were ignored by **Attendance2**. What happened was the website they were taken from appeared as a broken hyperlink at the top of the capture screen with ERROR alongside.

# 2.9 Working with QR Code reader

To use the QR codes to record attendances, you need to have your register open on the screen as shown in figure 37.

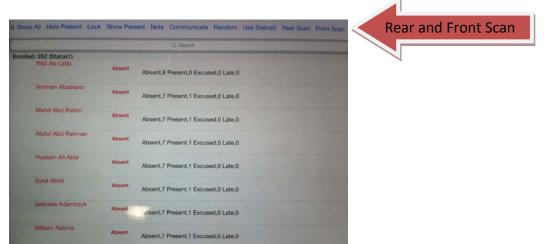


Figure 37: The register screen with the toolbar showing.

Along to the top of the screen are the **Rear Screen** and **Front Screen** links.

You can use either the **Rear screen** camera or the **Front facing** camera option on your iPad. Tap on either link. You should see a screen like the one in figure 38.

The camera is now ready to scan any QR codes from your students. All you need to do is hold up a QR code card, about 6-10 inches from the small window on the screen and the image will be recorded. The iPad should bleep when a scan has been successful and the screen go temporarily dim. QR codes that were slightly off square worked OK also.

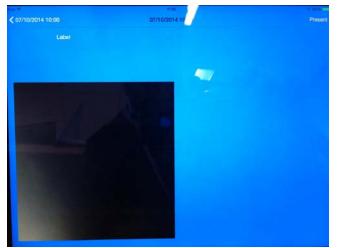


Figure 38: The Front screen QR capture / iPad camera screen

Students simply scan their codes against the camera window and their presence will be recorded by Attendance2.

Once you have finished scanning, tap the **date** (07/10/2014 in figure 38) link top-left of the screen and you will go back to your class register. Open the register and check that the students have been recorded as present.

The 'Presents' should all be coloured green.

**Lock the register** and you can now export the register by going back to the Course screen and tapping on Spreadsheet Report and selecting Dropbox.

That will upload a copy of the .csv file to your spreadsheet as you did with the manual registration on the previous step.

# 2.10 Mobile Phone QR code test

I checked that the QR codes worked from a mobile phone by importing seven codes to my phone as an email attachment. All seven codes were read. I used the same seven codes directly from the "Photos" app on my iPhone. Again, all seven codes were read when the photos displayed the full screen.

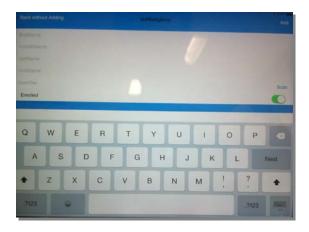
# 2.11 Adding a new student record.

It is straightforward to add a new student and take their photograph in-situ with Attendance2. On the Course screen you will see **Add Person**.



Figure 39: Add Person link

On the Add Person screen you can add anyone who wasn't imported from your .CSV file. You can also search your Dropbox and add their photograph, or if you don't have it you can take one with the iPad's camera.



**Figure 40:** The Add person screen – scrolling down you will see Photo and the arrow link on the right will let you import or take a photo.

That completes the basic steps you need to use the basics of Attendance2 with your iPad, using Dropbox and .csv files.

Having bench tested the system, I needed to test it with a group of real students. A report and a video of the trial with the MSc Management of Projects group is covered in the next section.

# Part 3

#### 3.1 The Live Trial with Students

In October 2014 I obtained permission to run a trial of *Attendance2* with the **MSc Management of Projects** post graduate group of approximately **260** students.

As I didn't have access to the Blackboard course unit, I asked the Post Graduate Programme Administrator if I could have a copy of the student names and ID's from Grade Centre.

I edited the csv file and imported it into Attendance2 to generate the QR Codes. I imported the QR Codes to Microsoft Word, and re-aligned them (three across a page) so I could make the cards about credit-card size. (I managed to fit 9 cards per A4 sheet) I then laminated the sheets (only to make them a bit more durable) and then cut them into separate cards roughly of the same (credit-card) size with a guillotine. All the QR codes were kept at the same size. (I had previously tested different QR code sizes in Part 2)

I first checked that all the laminated QR code cards worked by passing them through the front scanner on the iPad. All the cards registered a '**Present**' with no failures. The cards all scanned correctly at an optimum distance of approximately eight inches or 20 cm from the iPad window. Any further away and the QR code wouldn't register.

I also emailed a copy of the QR Codes to each students university email address, along with a message informing them of the trial.



On the 23<sup>rd</sup> October, before the 9:00am lecture, I took all the QR cards over to Renold Building and set out the cards in alphabetical order outside Lecture Theatre C16 at 9:00am for the students to collect.

Figure 41

I had assistance in issuing the cards from Samantha Winkler and Jack Cursham who filmed the proceedings. To see a 13 minute film of the trial log into the University Streaming Server at this address...

#### https://stream.manchester.ac.uk/Play.aspx?VideoId=22788

Following the briefing session, the live trial use of the system took place the following week on the 30<sup>th</sup> October at the same venue.

#### Live Trial - 30<sup>th</sup> October 2014

The MSc students began arriving for the morning lecture from 08:30 onwards. This was the first time the students had used the system so some familiarisation would reduce the future scanning-in time.

The *Attendance2* app and laminated cards worked well throughout the trial with the Management Of Projects group. There were some issues regarding;

#### Laminated cards

- Students obstructing part of the code with their fingers / thumbs.
- There were some delays in scanning-in due to the hand-eye co-ordination of some students who found it difficult to place the QR code in the iPad read window.

#### Mobile Phone users

- The PNG images sent to students via an email attachment worked fine, so long as there was white-space around the image.
- Any menus or navigation arrows covering the QR Code did not work. Once students removed the menus the codes did work.

#### Mobile Phone failures

- **Two students** had mobile devices with cracks in the glass screen which didn't work.
- Four students had re-photographed their laminated card and then stored it in their photos folder on their phone. This had allowed light onto the QR Code damaging the image which couldn't be read.

By 08:45, the number of students starting to arrive started to increase and a queue formed. There were a few students who had not collected their cards from the previous week and other delays which you can see on the film.

# **Trial Findings**

One iPad was not enough to get all the students present (220) through before the start of the lecture. There were delays though this was only the first time of operation. Two iPads working in tandem would have eliminated the queue that formed from around 08:50am. The spreadsheet data from two iPads could have been merged later.

By 9:10 however the queue had gone and the students (220) were all seated in the lecture theatre. I spoke to the students and thanked them all for their help and their patience with the trial.

The trial showed that QR Codes can work for attendance monitoring of large groups. As a consequence smaller class sizes could also benefit.

**The big advantage in using the system** was the reporting facility of the *Attendance2* app. At 09:45, shortly after I had returned to the office, I sent the spreadsheet report of the session to the course leader and teaching staff.

	A	В	С	D	E	F	G	Н
1	MOP trial 2014	-15						
2			Thu 30/10/2014 09:00	Arrived	Absent	Present	Excused	Late
3	Arina	Abdul Rahim	Absent		1	0	0	0
4	Nadeera	Abdul Razak	Present	08:40	0	1	0	0
5	Christopher	Agbaje	Absent		1	0	0	0
6	Emmanuel	Ahabwe	Present	08:45	0	1	0	0
7	Idris	Akanbi	Absent		1	0	0	0
8	Ali	Al Jaradah	Absent		1	0	0	0
9	Mohamad	Al Taki	Present	09:05	0	1	0	0
10	Vikaash	Alampalayam Sadhasivam	Present	09:08	0	1	0	0
11	Borislav	Aleksandrov	Present	08:42	0	1	0	0
12	Qi	An	Present	08:48	0	1	0	0
13	Danish	Ansari	Absent		1	0	0	0
14	firstname	Anu	Present	08:49	0	1	0	0
15	Muhammad Fa	Bin Mohamed Azim	Present	09:12	0	1	0	0
16	Jung Hwan	Byun	Present	08:40	0	1	0	0

Figure 42 The register for the trial session showing time of arrival and those present/absent

It was interesting that students opted to use the laminated card given to them rather than their phone. (It was optional which medium they chose3) The ratio was approximately 5:1 in favour of using cards.

One course tutor asked if email addresses could be included in the report so he could contact absent students. They can be but only if they are brought in with the .CSV file in the first place and in our trial only the student names and usernames were imported.

# Part 4: 4.1 Costs and implementation

To implement this system, staff would need to purchase;

- Apple iPad(s) ( iPad Mini start from £249 )
- Apple iPad(s) Smartcase (approx £35 each)
- Apple iTunes card (£15 each) for the purchase of the *Attendance2* app (£2.99) Other apps required such as Dropbox, are free.
- If you have a PC, you need to be able to access Blackboard and a spreadsheet programme like Microsoft Excel to edit the .csv files.
- Some form of iPad holder is needed if the reader is to be desk mounted (I used an old painting easel).

Staff Training is needed and for staff familiar with iPads and Dropbox, the training to use *Attendance2* could be carried out in a 2-3 hour session. (Perhaps a full day for those with no iPad & Dropbox experience.)

#### Other costs

There would be a small cost for printing the QR Codes onto small laminated or plastic cards.

A good idea would be to print the QR Code directly onto the student ID card next to their photo (there is a 20mm x 20mm available space next to the photograph)

or an additional card printed and issued by the School specifically for attendance use. For undergraduates, once the card was produced it would last for the duration of their course.



**Figure 43** The current student card showing a QR Code added and the mock-up of a separate QR Code card for attendance use.

It would be fairly straightforward to generate a QR card for all students in the School and distribute them as email attachments. Preparation time in advance of the first session is quite high, making cards, sending emails, but once cards and emails have been distributed and the electronic registers set up in Attendance2, the on-going workload per week is minimal.

# **4.2 Cost Benefits**

- The main cost-benefit of implementing an electronic system like this one will be the saving of the programme administrators staff time in preparing lists and processing the attendance data. The system removes the need to prepare and create of paper-lists, clipboards and the secondary inputting of student attendances into spreadsheets.
- Using QR codes should eliminate false name recording where students are left to 'sign' on paper to register their attendance. Signing in twice would also be eliminated as Attendance2 will only register a positive once.
- With improvements in the speed of reporting, students who miss lectures will be identified and contacted much more quickly. In some cases, attendance reports with the current paper-based system are not made until the end of Semester.
- Attendance data can be distributed to a number of staff much quicker and easier by emailing the attendance spreadsheets straight from *Attendance2*.
- There would be no need for piece(s) of paper for staff to create, move process, or for students to sign, pass-round, doodle-on, or sign as someone else.



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# Setting up and taking the e-Register (Quick Guide)

