

# A degree for £2,000?

My College is a  
Microchip

Peter J A Noble

# A degree for £2,000? – Appendices Only

This document contains just the appendices of the book and is provided here for Kindle users because some of the graphs etc. are not viewable on the Kindle reader.

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## Definitions

For the purposes of this book and to stop having to refer repeatedly to the words “colleges and universities” the word college is used as a general term to mean either a college of further education or a university. Higher Education Institution (HEI) is used specifically for a provider of higher education i.e. universities.

AR – Augmented Reality

AVC – Associate Virtual College

BKD – Basic Knowledge Degree

CMA – Computer Marked Assessment

CPD – Continual Professional Development

CVC – Commercial Virtual College

eTMA – Electronically Submitted Tutor Marked Assessments

FEP – Further Education Provider

FTR – Fast Track Routeing

HEI – Higher Education Institute

IVC – Independent Virtual College

LEP – Local Enterprise Partnership

LVC – Local Virtual College

NUS – National Union of Students

SME – Small or Medium Enterprise (Those employing less than 250 employees)

RSPET – Role Specific Pre-Employment Training

VC – Virtual Campus or College

VE – Virtual Education

VR – Virtual Reality

VTMA – Virtual Tutor Marked Assessments

## Appendix A - Dream Glasses – 3RD Generation VR Technology

What will come after Oculus style goggles?

The next generation of VR technology will be more like large framed, wraparound sun glasses with the electronics and batteries in a band behind or over the head. Not dissimilar to that seen in many Science Fiction comics and series.

Technology wise, they are likely to use organic light-emitting diodes (OLEDs) unless there is some super new technology bubbling away in laboratory somewhere.

To avoid confusion, we possibly need to explain that there are two ways LEDs are used in visual displays / TVs.

1. The first is as low energy lights to illuminate the back of the liquid crystal display (LCD). The LCD display does not emit light by itself, it acts as a filter to block the light on a per pixel (dot on the screen) basis. The opacity of each pixel is controlled by applying an electric field to it. Modern TVs use LEDs to illuminate the LCD because they can be made very small and use very little power. A TV made this way is called LED TV.
2. The second form uses LEDs to create each pixel. This technology has been around since 1977<sup>A.1</sup> and is often used to make very large displays. A TV made using this technology is called an OLED TV.

It is the second, OLED, method that could provide us with compact light weight VR glasses. This type of technology is already used in the Oculus Rift, HTC Vive and others but the LEDs are on a solid substrate so the “screens” are not transparent. Imagine having a screen from a miniature phone or smart watch in front of each eye.

This technology would require building a lens with a screen made up of minute LEDs embedded in or etched on a clear plastic or glass lens. The LEDs would be connected up into a matrix using very fine wires. The components would have to be so small as to be invisible to the naked eye.

Surprisingly, elements of this nano technology already exist. Researchers into how the brain works have built neural probes that contain 12 LEDs and 32 electrodes and these probes are less than 100µm wide<sup>A.2</sup>. Looking at their graphics<sup>A.2</sup>, the LEDs appear to occupy 1/6 of the width so they are around 17µm wide. To give some idea of scale, human hairs are typically 50µm to 120µm wide.

We have the lights, what about the wires? This is where it gets even smaller; apparently the smallest wire was created in 2012 and was 4 atoms wide<sup>A.3</sup> and it appears that at 20 atoms wide wires behave well. *NB. 20 silicon atoms are 10nm or 0.01µm wide.*

Wiring up the LEDs with “invisible” wires therefore does not appear to be a problem. As OLED TVs already exist so does the electronics control them. It is just a question of tweaking and some serious miniaturisation, like they have done with smart watches. If someone could get those two

sets of scientists together with some experts in microelectronics and throw in some optical engineers and a pile of money they should be able to create the author's "Dream Glasses".

### **3D Augmented Reality on your Tablet or Smart Phone**

In June 2015 Samsung<sup>A.4</sup> and 13 other companies started developing super resolution displays of 2,250 pixels per inch (ppi). This is a 4 fold increase on the Samsung Galaxy S6, which is 577ppi. Why? Apparently, at that density you are able to show a 3D effect, they hope to be able to demonstrate it working in 2018. Will we be using tablets with 3D in the classroom 5 years after that?



## Appendix B - Student Finances – Examples of Loan Repayments

You can use the student loan repayment calculator @

<http://www.studentloanrepayment.co.uk/scheme/rep/repayment-calculator/sfe/>

to work out the repayments costs of a student loan.

*NB. In Scotland, different rules apply.*

For a detailed explanation of how repayments are calculated go to

[http://www.studentloanrepayment.co.uk/portal/page?\\_pageid=93,6678784&\\_dad=portal&\\_schema=PORTAL](http://www.studentloanrepayment.co.uk/portal/page?_pageid=93,6678784&_dad=portal&_schema=PORTAL)

**Reality Check** – the NUS<sup>B0.4</sup> estimated that the actual cost for a 39 week student year was £22,189. Taking away £9,000 fees and £7,500 maintenance costs grant still leaves a shortfall of £5,689 which either has to come from parents, savings or part time work. Where part time work is required and presuming working for 39 weeks, they will need to be taking home an average of £146 per week. Thankfully this is below the National Insurance threshold of £155 per week. As the jobs are likely to be minimum wage @ £7.20 per hour they will need to be working at least 20 hours per week on top of their studies.

### **Notes:**

1. The maintenance loan details used are those that are applicable from 1<sup>st</sup> August 2016<sup>B0.2</sup> - The maximum available is £8,200 for those with a household income of up to £25,000. Maintenance loans are means tested but will be repaid in the same way as a tuition fee loan.
2. The Office for National Statistics<sup>B0.3</sup> average household income for financial year 2015 of £25,600 has been used. This makes the maximum maintenance loan £7,612. For simplicity this has been reduced to £7,500 in our examples shown in Appendices B1 – B5.
3. From the Complete University Guide website<sup>B0.6</sup> it can be seen that the majority of HEIs are charging the full £9,000 p.a. for the year 2015-16 so that is the figure we have used for these calculations.
4. Appendices B1 – B5 contain example loan repayment schedules<sup>B0.1</sup> based on a teachers starting salary of £22,244<sup>B0.5</sup>.
5. If working from home living costs are likely to be in the order of £100 per week. If that has to be funded by part time work then a student will only need to work 14 hours a week.

**The results shown in Appendix B1 show why a conventional education is priced out of the reach of many families on or below the average household income.**

### **Part Time Jobs**

It cannot be presumed that everyone studying from home can take a part time job as they may be a carer, have medical issues or there just may not be any suitable work in their area. In these cases taking out a maintenance grant may be essential.

### **Sub Appendices B1 – B5**

B1 – Traditional HE Model – 2 and 3 year courses – £9,000 per year fees + £7,500 maintenance

- B1A – 3 Years of study
- B1B – 2 Years of study

B2 – Virtual Education Model – 3 Year course – £6,000 per year

- B2A – Maintenance £5,000 per year (based on £100 per week living costs)
- B2B – No maintenance loan as living costs covered by part time work

B3 – Commercial VC running fixed price 2 year FTR course - £15,000 for whole course

- B3A – Maintenance £5,000 per year (based on £100 per week living costs)
- B3A – No maintenance loan as living costs covered by part time work

B4 – Independent VC – 3 Year course – Fees of £5,000 p.a.

- B4A – Maintenance £5,000 per year (based on £100 per week living costs)
- B4B – No maintenance loan as living costs covered by part time work

B5 – Independent VC – 3 Year course – Fees of £3,000 p.a.

- B5 – Maintenance £5,000 per year (based on £100 per week living costs)
- B5B – No maintenance loan as living costs covered by part time work



## Appendix B1 - Traditional HE Model – 3 and 2 year courses

Comparing Typical Student Loan Repayments for Conventional 3 year and 2 year courses

*NB Please Read Appendix B0 First*

Loan Details

- Tuition fees £9,000 per year
- Maintenance £7,500 per year

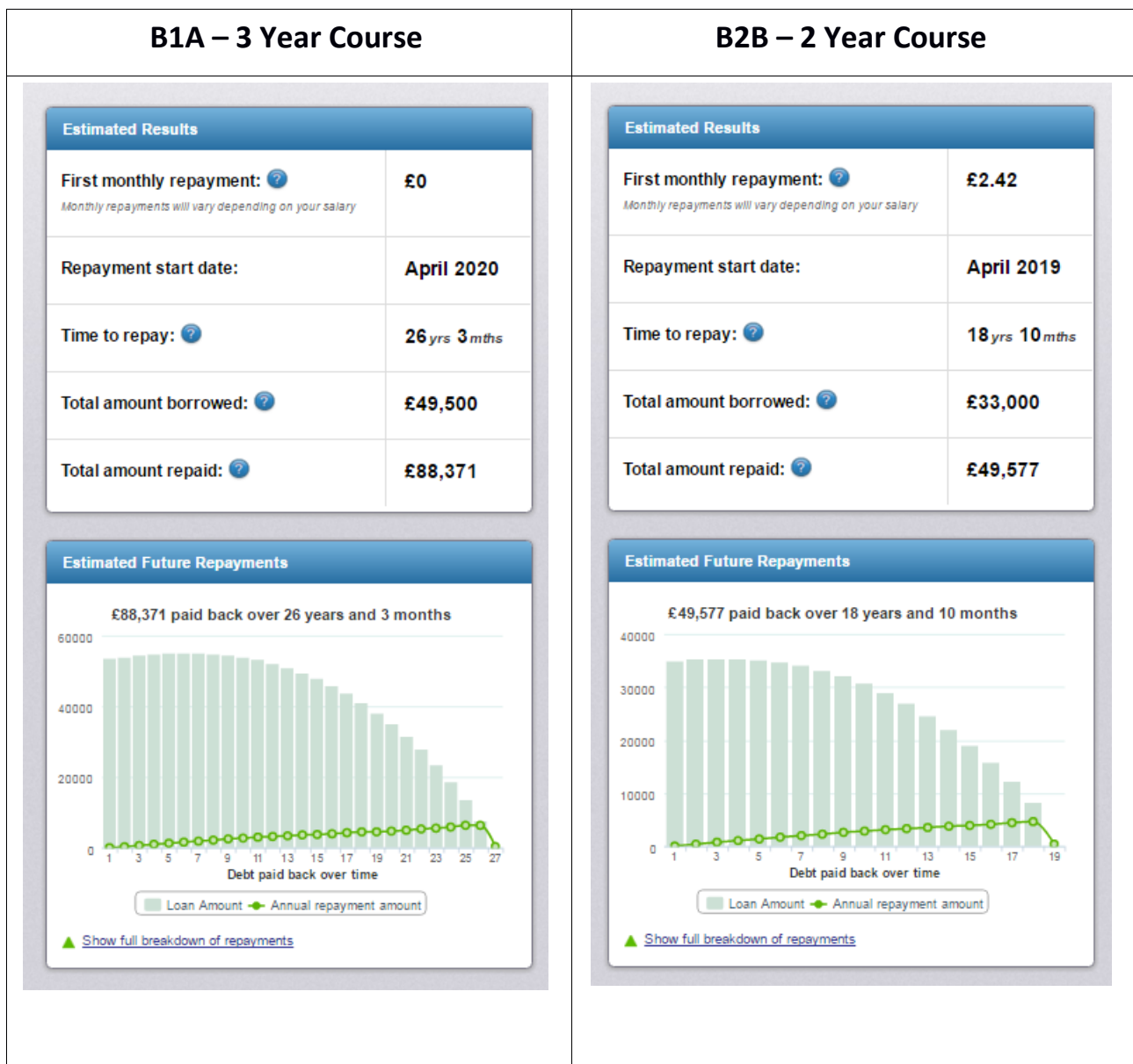


Figure B1.1

## Appendix B1 – (continued)

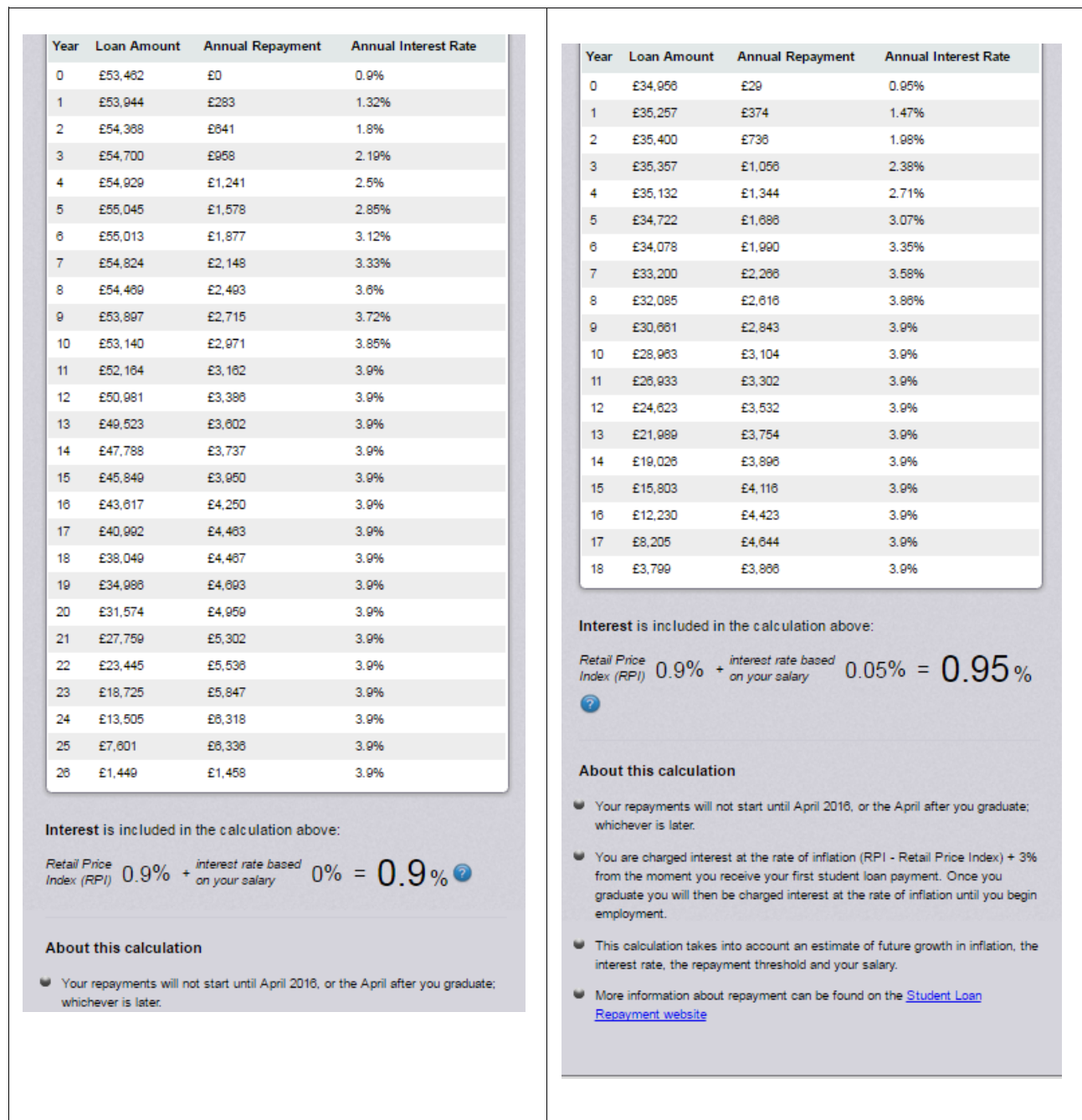


Figure B1.2

Note that choosing a 2 year course reduces the total cost by 45%; in this example that is a massive saving of £38,794.

## Appendix B2 – Virtual Education Model – 3 Year course – £6,000 per year

*NB Please Read Appendix B0 First*

### Loan Details

- Tuition fees £6,000 per year
- B2A Maintenance £5,000 per year (based on £100 per week living costs)
- B2B No maintenance loan as living costs covered by part time work

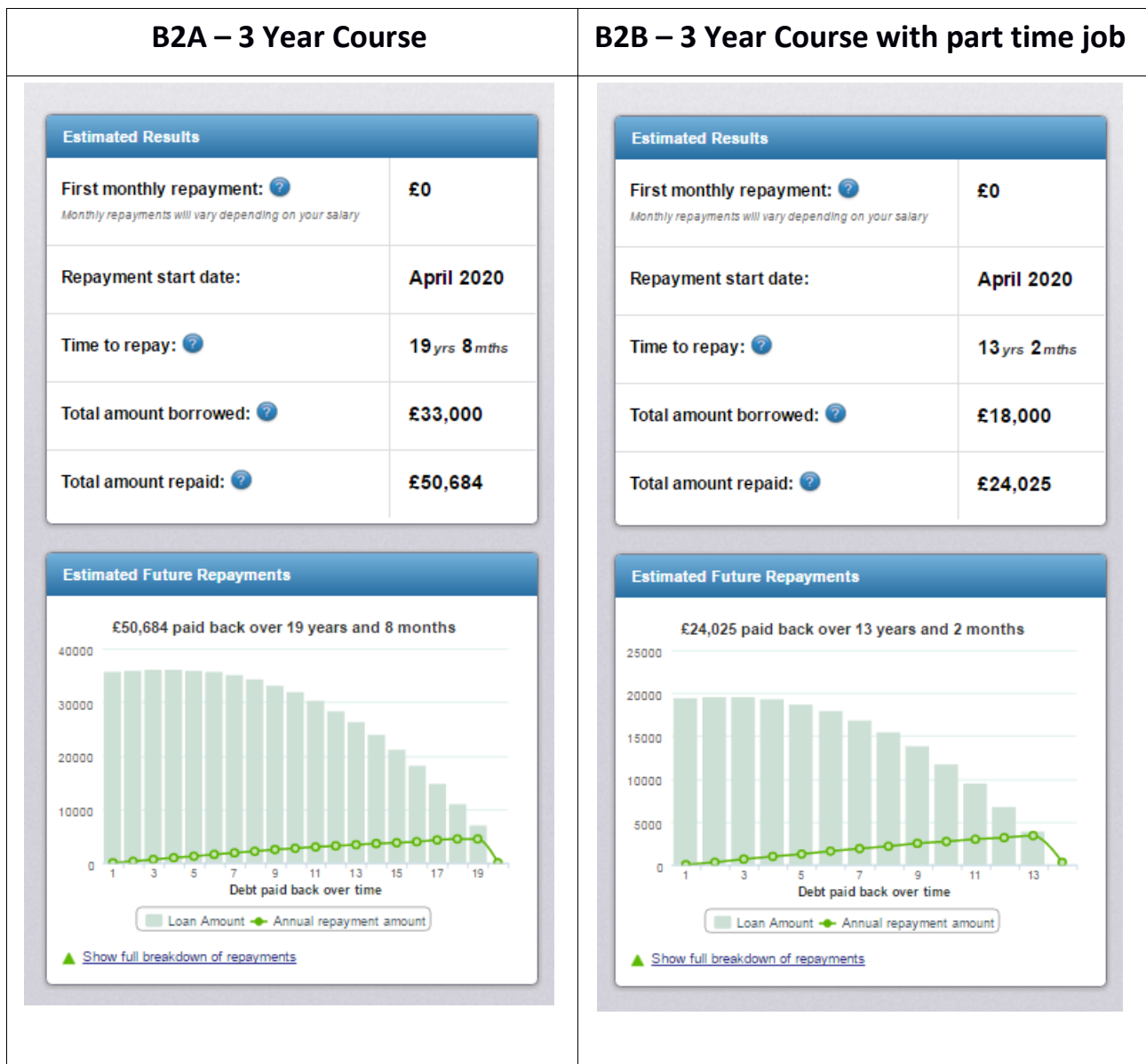


Figure B2.1

## Appendix B2 – (continued)

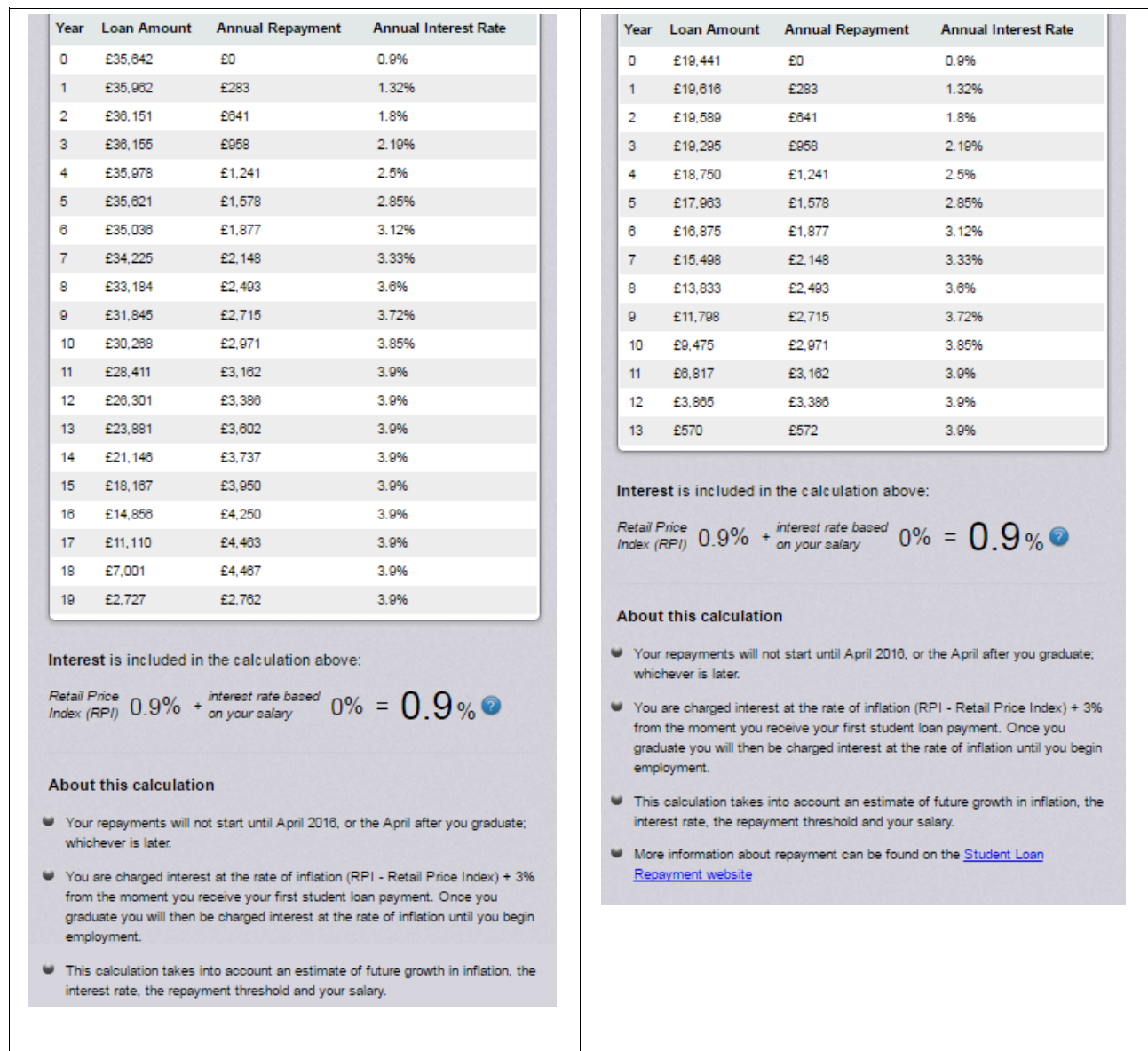


Figure B2.1

## Appendix B3 – Commercial VC Running fixed price 2 year FTR course

NB Please Read Appendix B0 First

### Loan Details

- Tuition fees £15,000 for whole course
- No Maintenance – Part Time Working

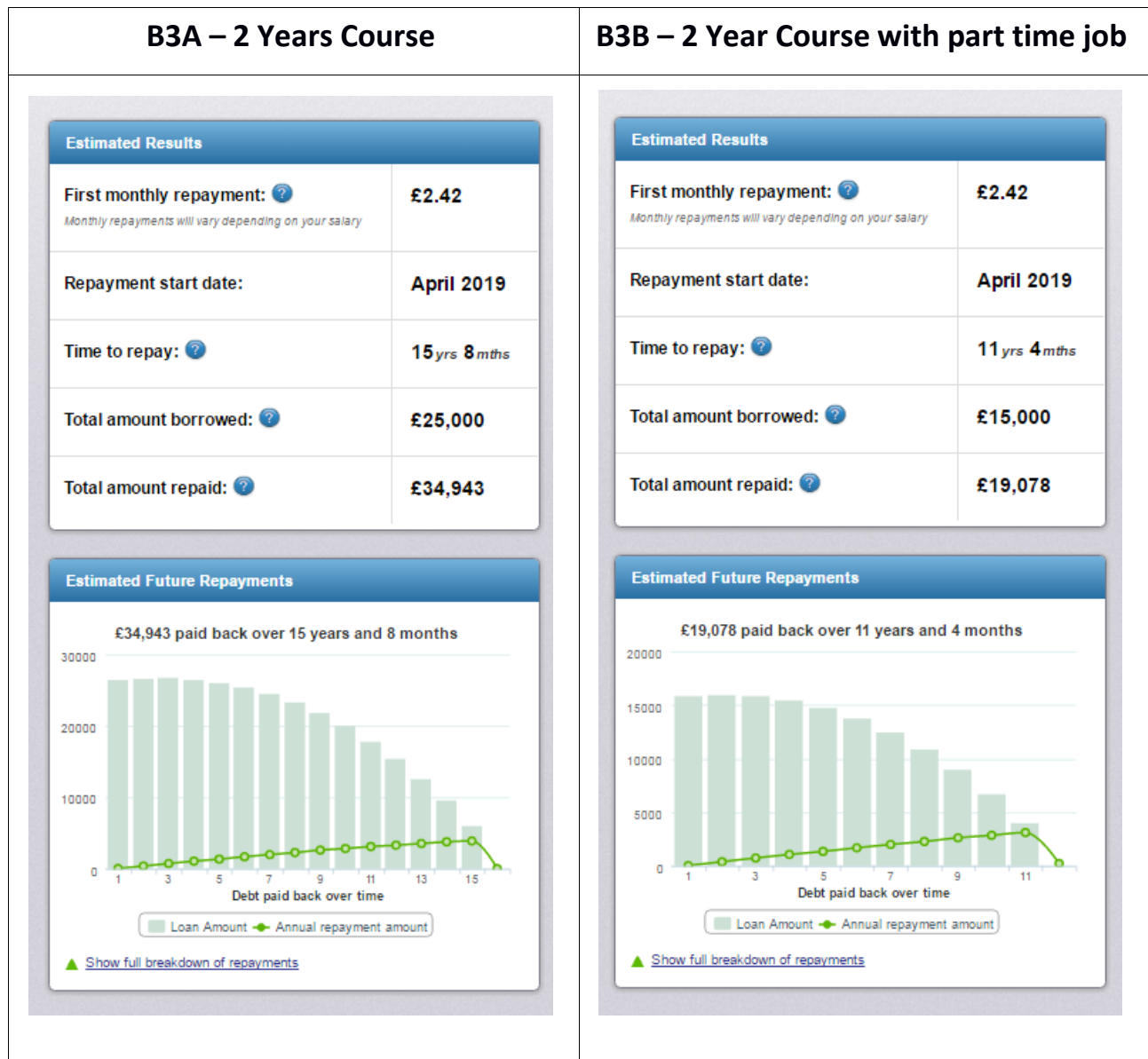


Figure B3.1

## Appendix B3 – (continued)

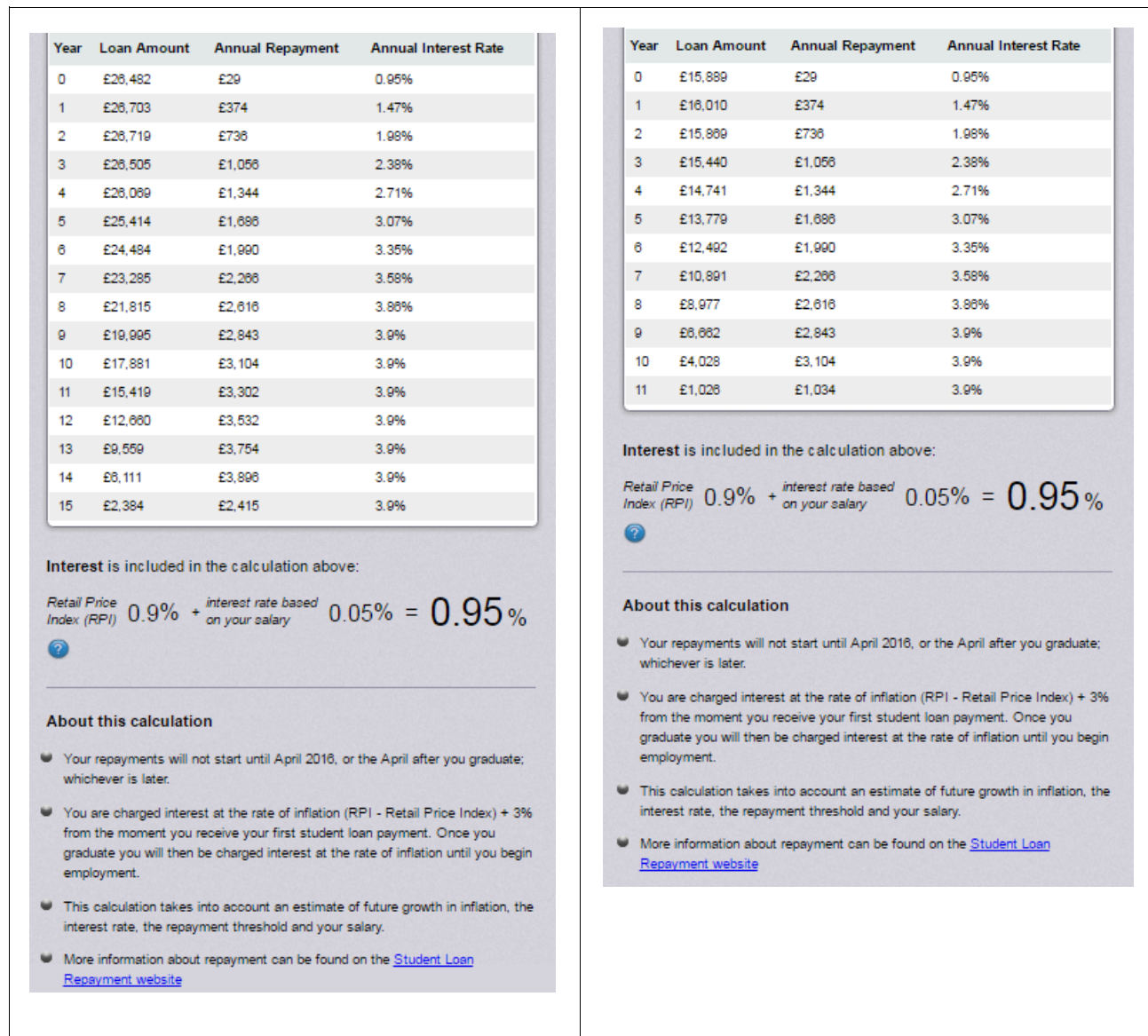


Figure B3.2



## Appendix B4 – Independent VC – 3 Year course – Fees of £5,000 p.a.

NB Please Read Appendix B0 First

### Loan Details

- B4A Maintenance £5,000 per year (based on £100 per week living costs)
- B4B No maintenance loan as living costs covered by part time work

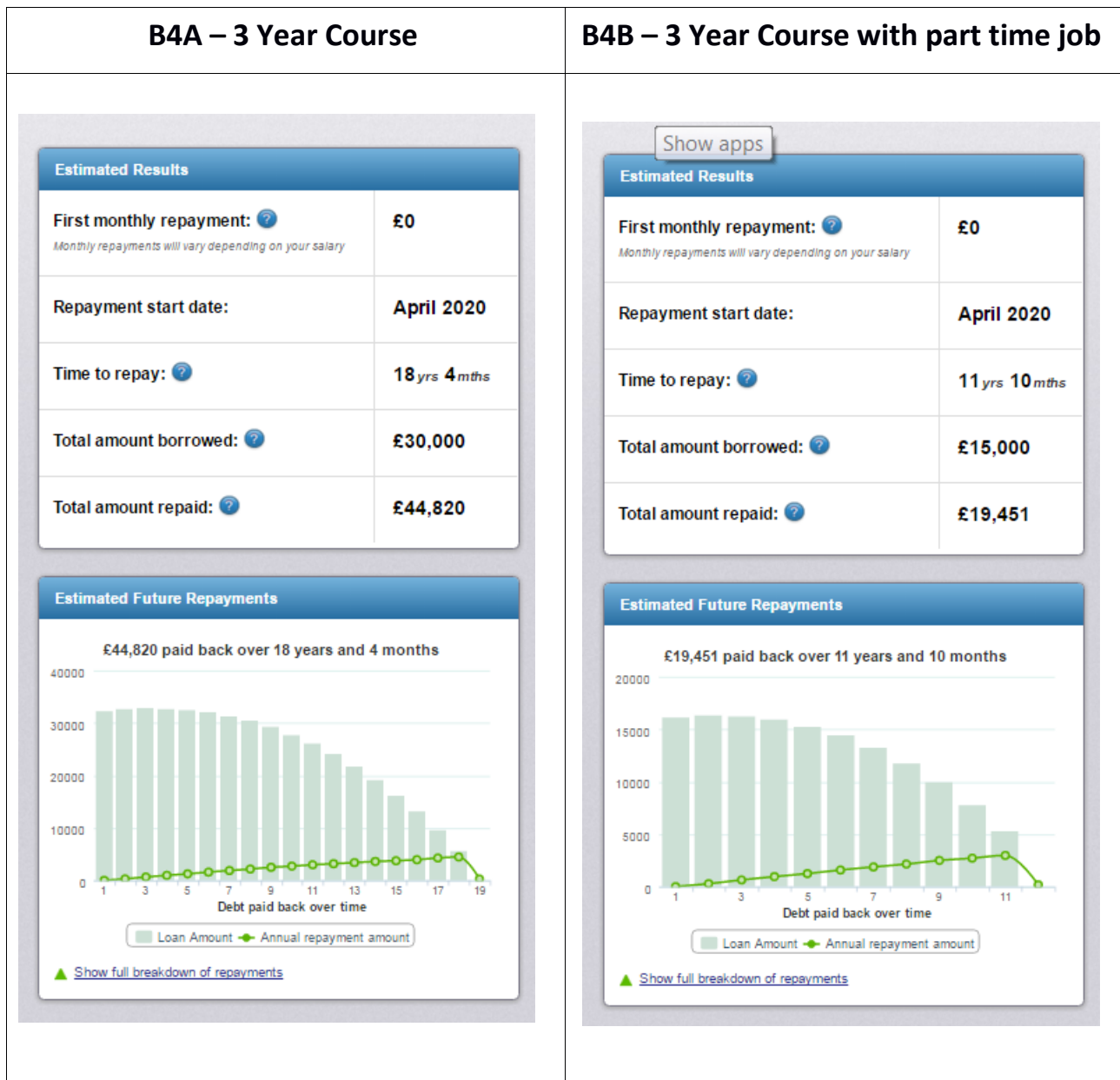


Figure B4.1



## Appendix B4 – (continued)

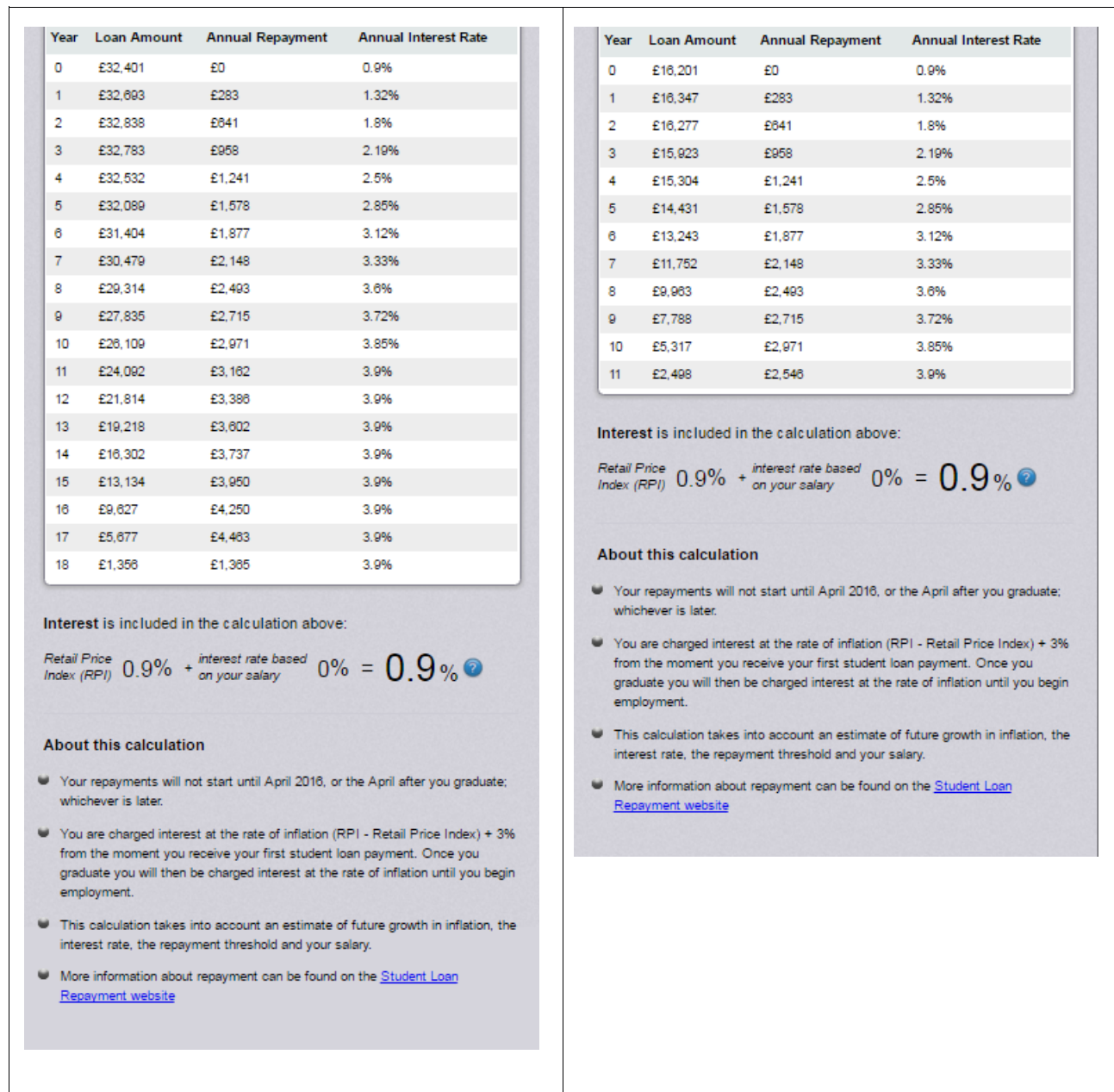


Figure B4.2

## Appendix B5 – Independent VC – 3 Year course – Fees of £3,000 p.a.

NB Please Read Appendix B0 First

### Loan Details

- B5A Maintenance £5,000 per year (based on £100 per week living costs)
- B5B No maintenance loan as living costs covered by part time work

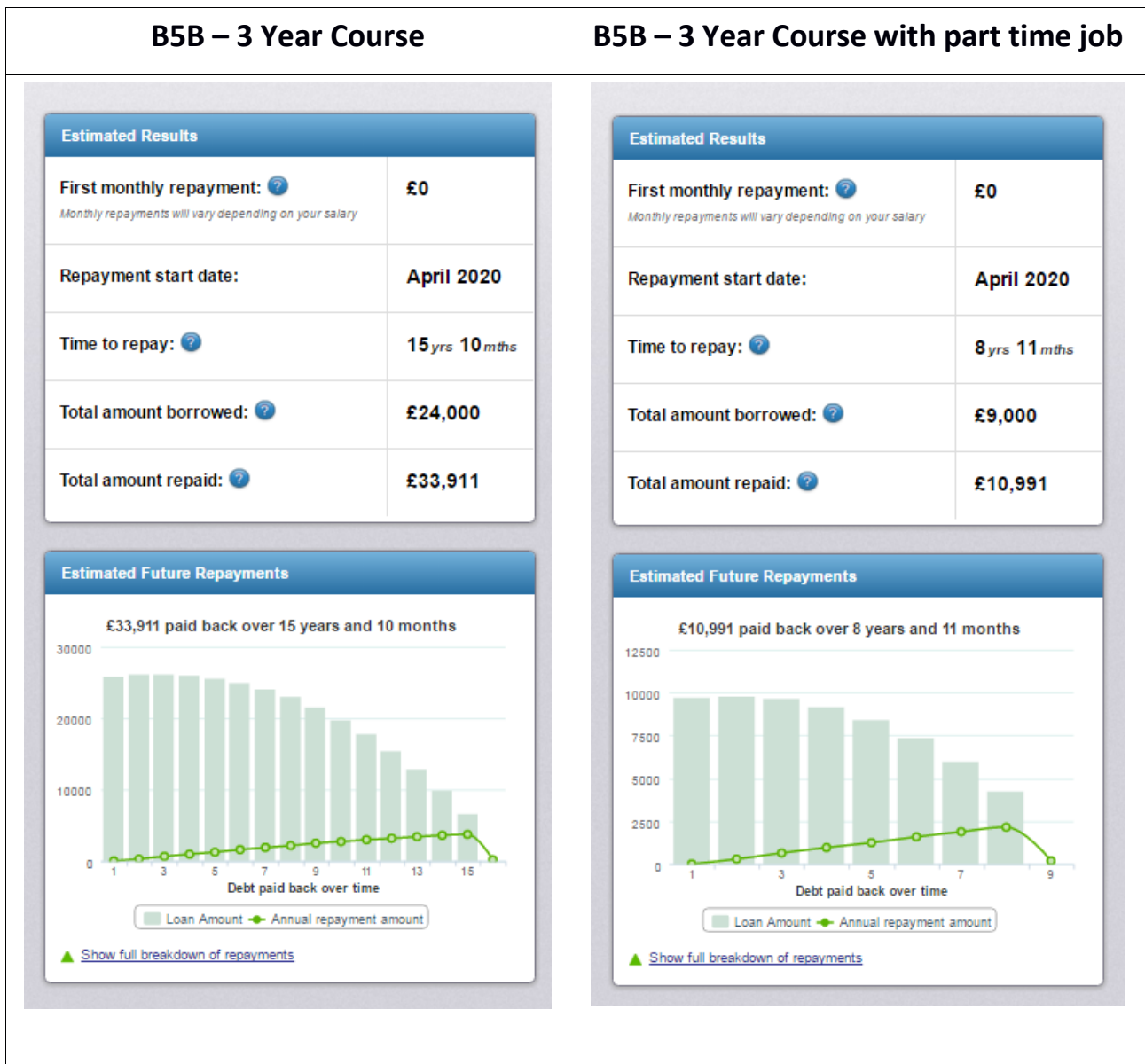


Figure B5.1

## Appendix B5 – (continued)

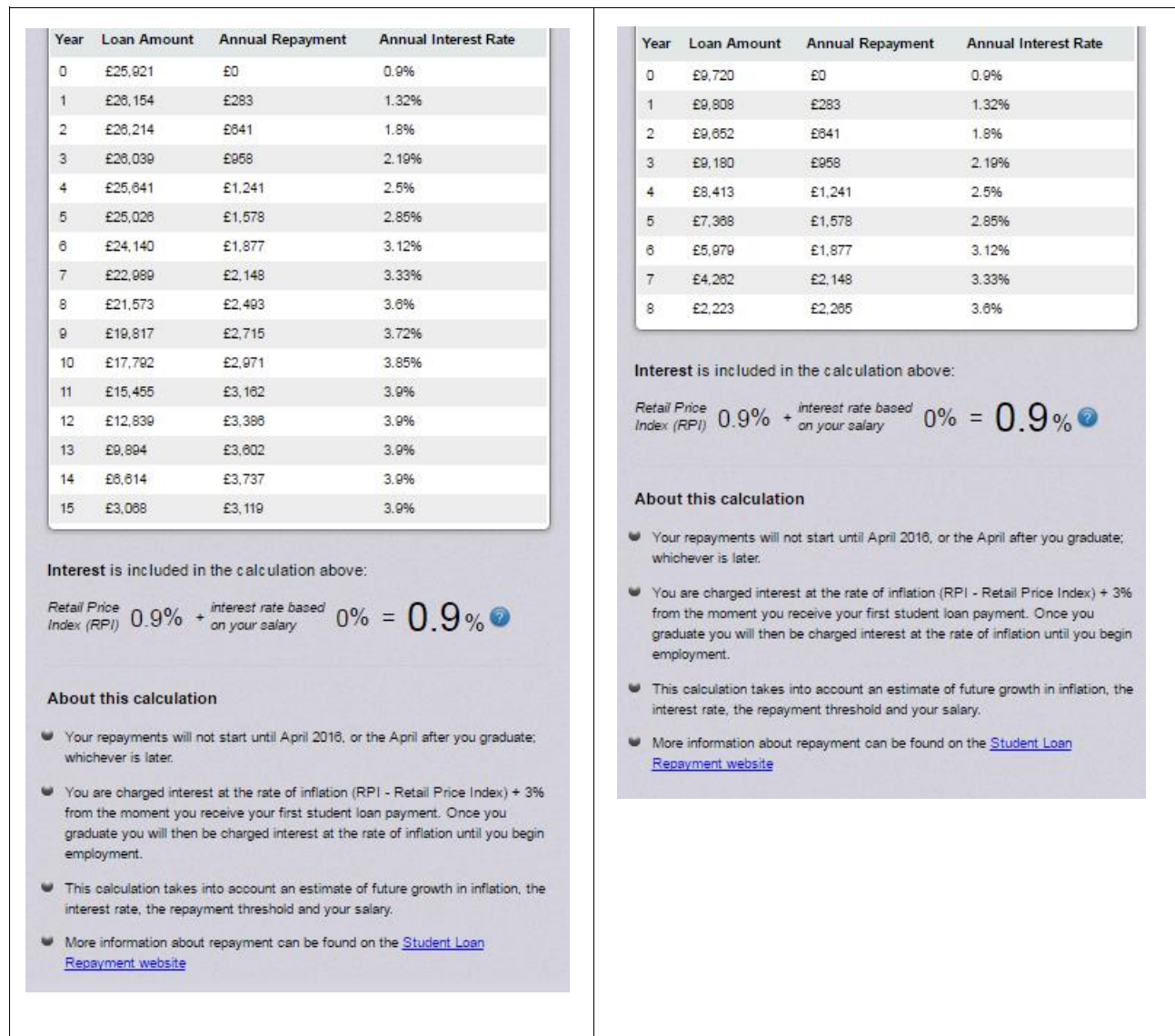


Figure B5.2

## **Appendix C - Technology Required For Maximum Student Productivity**

Students will use a range of different technologies to access AR & VR and the choice of the moment will depend on:

The “mode” they are in:

- A) Knowledge gathering / lecturers
- B) Peer discussion / tutorials
- C) Research
- D) Assimilating knowledge – Writing essays
- E) Where mixing social activities with study activities

There will also be physical factors such as comfort, accessibility and facilities available at their location. Peer pressure may also be an issue with some students, especially where there are recent changes in technology or product upgrades. This peer pressure is likely to be more of an issue with younger students i.e. those under eighteen.

For purely knowledge based subjects or modules, students may only need AR. VR will offer additional experiences especially where there is a physical element, i.e. 3 dimensional objects, laboratory settings, field trips etc. VR will, for most students, improve their efficiency in retaining knowledge as VR technology removes extraneous distractions when listening to lectures or participating in tutorials.

### **Minimal Student AR Workstation**

- Computer with a single visual display unit (VDU) that is suitable for use 7+ hours a day without physical discomfort
- Comfortable to use keyboard
- High Speed Internet connection

The key element of a minimal configuration is the VDU, which means the majority of tablets would not be suitable as a student’s primary workstation.

### **Optimum Student Workstation**

From experience the greatest productivity will be with a configuration with 3 VDUs connected to a single processor with a single keyboard and mouse plus an A4 printer. Although it would be great if all 3 VDUs were touch sensitive, having at least one touch sensitive screen would be a distinct advantage.

Although 3 would be ideal it is likely that most students will compromise by having just 2. This would still make them more productive than if they had just a single screen. 2 would obviously take up less desk space and it is usually a relatively simple task to add a second monitor to most PCs. Adding a third will usually require adding another video card and some expert assistance to

configure it correctly.

### **Why Touch Sensitive Screens**

A key objective of VE is to improve quality of output and increase efficiency. Computer marked assignments are likely to be multiple choice; with the answer being selected by touching the screen. Correctly designed software would ensure that the process is quicker and more accurate than using a mouse. The problem with using a mouse is that the brain is no longer focusing on the question; rather the eye is focusing on the cursor, the brain on moving the mouse.

The brain is flipping backwards and forwards between the subject of the test and the physical control of the mouse. You can test this for yourself. Load up a web page with plenty of text, read the text, when you read the word “and” touch the screen. Do that for the first 4 occurrences of the word “and”. Now repeat clicking on the word with your mouse. You will sense your brain thinking about moving the mouse whereas when you touched the screen with your finger there was no conscious effort, we are so used to using our fingers we do so without conscious thought.

### **A4 Printer**

This may appear a bit of a luxury but it always pays to print out the final draft of an assignment and then sit down and quietly read it, or better still, get someone else to also read it. You will be amazed how many more errors you will find when checking a hard copy version. For some reason our brain gets very lazy when looking at a computer screen and seems to ignore some errors. It is probably that when we read printed material we expect it to be perfect so our brain shouts louder when it spots something which is not right.

### **VR Kit**

Most technology goes through a series of stages

- Proof of concept
- Produce a version that geeks can buy and try
- Measure sales to identify strength and persistence in demand

NB. This may involve a gradual drop in retail price, large price drop indicates poor sales

The current level of technology is changing and initially it will be more a matter of which VR equipment that you find comfortable and can afford. One thing you never see on TV is someone lying down whilst wearing VR “goggles”. Why not lie down when studying? It will might be far more comfortable.

## Appendix D - Become a US Citizen – They get \$150 billion in student aid

The US believes very strongly in education and the US government provides a considerable amount of financial support to their students, there is also financial support available from third parties.

US students can apply for<sup>D.1</sup>

- Federal Grant Aid (from the government) - \$150 billion fund
- State Aid – Funds vary between states
- Scholarships – There are thousands of them, from all kinds of organisation and for all sorts of reasons, including:
  - Sport
  - Being a good student
  - Church membership
  - Parents work for a particular company

The table below shows how much grant and scholarships the average US student received in 2013-2014<sup>8.5</sup> even high income families can get financial support<sup>D.1</sup>.

		Grants & Scholarships Received by US Students 2013-2014	
Family Income Level	£	US\$	% Of Annual Funding
Low < US\$ 35k	6,076	8,733	45%
Middle	4,233	6,084	31%
High US\$ 100k+	3,028	4,352	16%
Average	4,541	6,527	31%

Figure D1

The key fact is that low income families receive nearly half the gross cost of going to college in the form of non-repayable aid.

The £104 billion the US government give annually in aid equates to £322 for every man woman and child in the US. Translating that to the UK's population of 64 million would be £21 billion or around 75% of the gross cost of Higher Education in the UK or a reduction of fees from £9,000 to £2,250 a year.

How US students fund their studying at college? An interesting point is that costs for low-income

and middle-income students are about the same whereas high-income students spend typically around 30% a year more. Also the cost of being a student in the US is lower than in the UK, this is primarily to lower rents<sup>D.2</sup> typically £350 per room per month. Overall, taking the average UK student debt as £37,500, US students leave college with average debts of £8,200 (22% of UK).

**UK students have debts typically 4.5 times higher than their American cousins and their cousins get 4 years of college education against 3 in the UK.**

How US Families Pay For College 2013-2014 <sup>8.5</sup> Based on \$1.43 = £1 exchange rate on 1 <sup>st</sup> April 2016			
	Low Income Families	Middle Income	High Income
	£ (Sterling)	£ (Sterling)	£ (Sterling)
Student Borrowing	1,881	2,502	1,767
Parental Borrowing	444	1,134	1,755
Parental Income & Savings	2,675	3,410	9,469
Student Income & Savings	2,091	1,668	1,656
Relatives & Friends	414	648	881
Grants & Scholarships	6,107	4,255	3,043
	13,612	13,616	18,570
Total Accumulated Debt for Typical 4 Year College Education			
Student Debt	7,524	10,008	7,069
Parental Debt	1,779	4,534	7,021
Total Debt	9,303	14,542	14,090
Average Student Debt	£8,200		

Figure D2



How American Families Pay For College Data Is Included Here as Original <sup>8.5</sup> In US\$			
	Low	Middle	High
Student Borrowing	2,690	3,578	2,527
Parental Borrowing	636	1,621	2,510
Parental Income & Savings	3,826	4,877	13,540
Student Income & Savings	2,990	2,385	2,368
Relatives & Friends	592	927	1,260
Grants & Scholarships	8,733	6,084	4,352
Total	19,466	19,471	26,556
Total Accumulated Debt for Typical 4 Year College Education			
Student Debt	10,760	14,312	10,108
Parental Debt	2,544	6,484	10,040
Total Debt	13,304	20,796	20,148

Figure D3

As well as receiving grants and scholarships students are eligible for fixed interest rate student loans from the US government. The interest rate on these loans is currently slightly higher than the UK but it is at a fixed rate which makes it easier to budget for long term.

## **Appendix E0 - Cost of Adding a Virtual Campus to an Existing College**

This Appendix contains sample costings for adding a virtual campus to an existing college.

### **Administration**

This Includes, administration, support and help desk staff, processing computer marked assessments (CMAs) etc.

### **Lecture Production Costing**

The time taken to produce a lecture has been based on the following

- 7 hours to write lecture notes and recording of lecture
- 3.5 hours editing by professional editor
- 1.5 hours answering questions whilst lecture is being transmitted (10 mins pre lecture preparation + 60 mins for the lecture + 20 mins follow to cover any outstanding questions that could not be answered during the lecture)

This is a base cost; some may be more expensive to produce because of adding additional lectures, using professional voice actors etc. However, others are likely to be much cheaper, especially where a lecturer is working from a tried and tested set of lecture notes.

### **Technology Platform – Start Up**

A guesstimate of the capital start-up costs for the technology would probably be in the order of £500,000 - £700,000. It would be easy to spend millions on the technology; buyers have to learn to be wary of sales people driving expensive cars.

### **Technology Platform – Running Costs**

The equipment should not be expensive to maintain and a team of 4 should be able to keep it all running and provide technical assistance to the editorial team.

- Production Controller / Service Manager

Role: To ensure all media is transmitted at the correct time and check quality of transmission. Manage all technical aspects of the service

- Assistant Production Controllers

Role: Assist and deputise for production controller, monitor each lecture

One person required for every 40 hours of broadcast material per week

- Senior Technician / Server Engineer

Role: Responsible for ensuring the technology platform is performing correctly

- Technical Support

Role: Assist with the servicing and support of the technology platform

NB. The labour element of editing the lectures is included in the lecture production costs.

*If you wish to experiment with your own numbers then there is a useful calculator on the author's*

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website [www.peternoblett.com](http://www.peternoblett.com)

### Summary – Virtual Campus

Appendix	No of Students	Marking Method	1 Year	2 Years	3 Years
E1	2,000	eTMA	2,289	4,578	6,857
E2	2,000	VTMA	1,449	2,898	4,347
E3	10,000	eTMA	1,767	3,534	5,301
E4	10,000	VTMA	927	1,854	2,781

Figure E0

### VTMAs

With these the cost of marking will be zero but there is likely to be more support queries so the number of hours support required per student has been increased from 5 to 7.

## Appendix E1 - Adding 2,000 Student Virtual Campus with eTMAs

E1 – 2,000 (4 Courses x 500 students per course)		
Running Costs	Calculation	Amount
Administration	5 hours per year per student * 2000 students @ £30 per hour	£300,000
Creating 40 lectures per week	Preparation time 12 hours per lecture * 4 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£1,248,000
Electronically submitted tutor marked assessments (eTMAs)	15 minutes per paper * 1.5 eTMAs per week per student @ £60	£1,800,000
Tutorials – 20 students per tutorial	100 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£480,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£200,000
Technology platform running costs	See Appendix E0	£550,000
Guestimate of costs		£4,578,000
Cost per student		£2,289
<b>Surplus @ fee of £3,000 pa</b>		<b>£711</b>
<b>Gross surplus @ £3,000</b>		<b>£1,422,000</b>
<b>Surplus as % of revenue</b>		<b>24%</b>
<b>Surplus @ fee of £5,000 pa</b>		<b>£2,711</b>
<b>Gross surplus @ £5,000 pa</b>		<b>£5,422,000</b>
<b>Surplus as % of revenue</b>		<b>54%</b>

Figure E1

## Appendix E2 - Adding 2,000 Student Virtual Campus with VTMA's

This costing is based on assessments being marked by a Virtual Tutor (Tutor Bot).

E1 – 2,000 (4 Courses x 500 students per course)		
Running Costs	Calculation	Amount
Administration.	7 hours per year per student * 2000 students @ £30 per hour	£420,000
Creating 40 lectures per week	Preparation time 12 hours per lecture * 4 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£1,248,000
Virtual Tutor Marked Assessments	1.5 VTMA's per week per student	£0
Tutorials – 20 students per tutorial	100 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£480,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£200,000
Technology platform running costs	See Appendix E0	£550,000
Guestimate of costs		£4,578,000
Cost per student		£1,449
<b>Surplus @ fee of £3,000 pa</b>		<b>£1,551</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£3,102,000</b>
<b>Surplus as % of revenue</b>		<b>52%</b>
<b>Surplus @ fee of £5,000 pa</b>		<b>£3,551</b>
<b>Gross surplus @ £5,000 pa</b>		<b>£7,102,000</b>
<b>Surplus as % of revenue</b>		<b>71%</b>

Figure E2

### Appendix E3 - Adding 10,000 Student Virtual Campus with eTMAs

E3 – 10,000 (10 Courses x 1,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	5 hours per year per student * 10,000 students @ £30 per hour	£1,500,000
Creating 100 lectures per week	Preparation time 12 hours per lecture * 10 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£3,120,000
Electronically submitted tutor marked assessments (eTMAs)	15 minutes per paper * 1.5 eTMAs per week per student @ £60 per hour	£9,000,000
Tutorials – 20 students per tutorial	100 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£2,400,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£1,000,000
Technology platform running costs	See Appendix E0	£650,000
Guestimate of costs		£17,670,000
Cost per student		£1,767
<b>Surplus @ fee of £3,000 per year</b>		<b>£1,233</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£12,330,000</b>
<b>Surplus as % of revenue</b>		<b>41%</b>
<b>Surplus @ £5,000 pa</b>		<b>£3,233</b>
<b>Gross surplus @ £5,000 pa</b>		<b>£32,330,000</b>
<b>Surplus as % of revenue</b>		<b>65%</b>

Figure E3

## Appendix E4 - Adding 10,000 Student Virtual Campus with VTMAs

This costing is based on assessments being marked by a Virtual Tutor (Tutor Bot).

E4 – 10,000 students (10 Courses x 1,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	7 hours per year per student * 10,000 students @ £30 per hour	£2,100,000
Creating 100 lectures per week	Preparation time 12 hours per lecture * 10 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£3,120,000
Virtual Tutor Marked Assessments	1.5 VTMA's per week per student	£0
Tutorials – 20 students per tutorial	500 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£2,400,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£1,000,000
Technology platform running costs	See Appendix E0	£650,000
Guestimate of costs		£9,270,000
Cost per student		£927
<b>Surplus @ £3,000 pa fee</b>		<b>£2,073</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£20,730,000</b>
<b>Surplus as % of revenue</b>		<b>31%</b>
<b>Surplus @ fee of £5,000 pa</b>		<b>£4,073</b>
<b>Gross surplus @ £5,000 pa</b>		<b>£40,730,000</b>
<b>Surplus as % of revenue</b>		<b>81%</b>

Figure E4



## Appendix F0 - Production Costs for a Virtual College

This Appendix contains sample production costs and gross potential gross margin / profits for a virtual college. Fixed costs have been excluded as they will vary with location, building type etc.

As can be seen from the gross margin figures virtual colleges could become exceedingly profitable businesses, even if there is a substantial drop in fees.

### **Lecture Production Costing**

See Appendix E0

### **Technology Platform – Start Up**

See Appendix E0

### **Technology Platform – Running Costs**

See Appendix E0

*If you wish to experiment with your own numbers then there is a useful calculator on the author's website*

### **Summary – Virtual College**

Appendix	No of Students	Marking Method	TMA's / VTMA's per Week	1 Year	2 Years	3 Years
F1	20,000	eTMA	1.5	1,799	3,598	5,397
F2	20,000	eTMA	1.0	1,439	2,878	4,317
Not Shown*	20,000	eTMA	0.5	1,139	2,278	3,417
F3	20,000	VTMA	Any Number	899	1,798	2,697
F4	50,000	VTMA	Any Number	689	1,378	2,067
<b>F5</b>	<b>100,000</b>	<b>VTMA</b>	<b>Any Number</b>	<b>622</b>	<b>1,244</b>	<b>1,866</b>

\* To see this costing use calculator on

Figure F0

From figure F0 it can be seen that the cost of marking assessments is a substantial element so the incentive to automate this process is very high. Once they have been automated students can be assessed whenever the tutors feel it is appropriate.

## Appendix F1 – 20,000 Student Virtual College 1.5 eTMAs per week

F1 – 20,000 students (20 Courses x 1,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	5 hours per year per student * 20,000 students @ £30 per hour	£4,200,000
Creating 200 lectures per week	Preparation time 12 hours per lecture * 20 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£6,240,000
Electronically submitted tutor marked assessments (eTMAs)	15 minutes per paper * 1.5 eTMAs per week per student @ £60 per hour	£18,000,000
Tutorials – 20 students per tutorial	500 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£4,800,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£2,000,000
Technology platform	The equipment should not be expensive to maintain and a team of 4 should be able to keep it running and provide technical assistance to the lectures.	£750,000
Guestimate of costs		£35,990,000
Cost per student		£1,799
<b>Surplus @ fee of £3,000 pa</b>		<b>£1,201</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£24,010,000</b>
<b>Surplus as % of revenue</b>		<b>40%</b>

Figure F1

## Appendix F2 – 20,000 Student Virtual College 1 eTMAs per week

F2 – 20,000 students (20 Courses x 1,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	5 hours per year per student * 20,000 students @ £30 per hour	£4,200,000
Creating 200 lectures per week	Preparation time 12 hours per lecture * 20 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£6,240,000
Electronically submitted tutor marked assessments (eTMAs)	15 mins per paper * 1 eTMAs per week per student @ £60 per hour	£12,000,000
Tutorials – 20 students per tutorial	500 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£4,800,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£2,000,000
Technology platform	The equipment should not be expensive to maintain and a team of 4 should be able to keep it running and provide technical assistance to the lectures.	£750,000
Guestimate of costs		£28,790,000
Cost per student		£1,439
<b>Surplus @ fee of £3,000 pa</b>		<b>£1,561</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£31,210,000</b>
<b>Surplus as % of revenue</b>		<b>52%</b>

Figure F2

### Appendix F3 – 20,000 Student Virtual College with VTMA's

This costing is based on assessments being marked by a Virtual Tutor (Tutor Bot). The cost of marking will be zero but there is likely to be more support queries so the number of hours support required per student has been increased from 5 to 7.

F3 – 20,000 students (20 Courses x 1,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	7 hours per year per student * 20,000 students @ £30 per hour	£4,200,000
Creating 200 lectures per week	Preparation time 12 hours per lecture * 20 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£6,240,000
Virtual Tutor Marked Assessments	1.5 VTMA's per week per student	£0
Tutorials – 20 students per tutorial	500 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£4,800,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£2,000,000
Technology platform	The equipment should not be expensive to maintain and a team of 4 should be able to keep it running and provide technical assistance to the lectures.	£750,000
Guestimate of costs		£17,990,000
Cost per student		£899
<b>Surplus @ fee of £3,000 pa</b>		<b>£2,101</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£42,010,000</b>
<b>Surplus as % of revenue</b>		<b>70%</b>

Figure F3

## Appendix F4 – 50,000 Student Virtual College with VTMAs

This costing is based on assessments being marked by a Virtual Tutor (Tutor Bot). The cost of marking will be zero but there is likely to be more support queries so the number of hours support required per student has been increased from 5 to 7.

F4 – 50,000 students (20 Courses x 2,500 students per course)		
Running Costs	Calculation	Amount
Administration cost	7 hours per year per student * 20,000 students @ £30 per hour	£10,500,000
Creating 200 lectures per week	Preparation time 12 hours per lecture * 20 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£6,240,000
Virtual Tutor Marked Assessments	1.5 VTMA's per week per student	£0
Tutorials – 20 students per tutorial	2,500 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£12,000,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£5,000,000
Technology platform	The equipment should not be expensive to maintain and a team of 4 should be able to keep it running and provide technical assistance to the lectures.	£850,000
Guestimate of costs		£34,590,000
Cost per student		£691
<b>Surplus @ fee of £3,000 pa</b>		<b>£2,309</b>
<b>Gross surplus @ £3,000 pa</b>		<b>£42,010,000</b>
<b>Surplus as % of revenue</b>		<b>70%</b>

Figure F4

## Appendix F5 – 100,000 Student Virtual College with VTMA's

This costing is based on assessments being marked by a Virtual Tutor (Tutor Bot). The cost of marking will be zero but there is likely to be more support queries so the number of hours support required per student has been increased from 5 to 7.

F5 – 100,000 students (20 Courses x 5,000 students per course)		
Running Costs	Calculation	Amount
Administration costs	7 hours per year per student * 100,000 students @ £30 per hour	£21,000,000
Creating 200 lectures per week	Preparation time 12 hours per lecture * 20 courses * 10 lectures per course per week averaging 60 minutes * 40 weeks @ £60 per hour	£6,240,000
Virtual Tutor Marked Assessments	1.5 VTMA's per week per student	£0
Tutorials – 20 students per tutorial	5,000 * 60 minutes per tutorial * average of 2 per week * 40 weeks @ £60 per hour	£24,000,000
Annualised contribution to final exams	Cost of final exam £240 plus local assessment centre fee of £60	£10,000,000
Technology platform	The equipment should not be expensive to maintain and a team of 4 should be able to keep it running and provide technical assistance to the lectures.	£1,000,000
Guestimate of costs		£62,240,000
Cost per student		£622

Figure F5