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## Using VLEs and Mobile Technology to Aid in the Provision of an Upgraded Delivery Mechanism for the Basic Principles of Quantity Surveying

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***Using VLEs and mobile technology to aid in the provision of an upgraded delivery mechanism for the basic principles of quantity surveying?***

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Building measurement has its roots on the construction site not in the classroom. As a result of this it is a subject which is better taught in a practical manner, rather like an apprenticeship. Many students entering the course, whether as standard entry or as mature students, will have had little or no exposure to building measurement as carried out by the quantity surveyor unless they have had some experience of working with a quantity surveyor. As a result students may find the initial learning process very intense. The maths used are relatively simplistic. Building measurement is about analysing the construction of the structure in order to determine the key components, establishing the quantity of materials required for each component and then formatting this information in a way which is easily understood by all parties within the process. The main purpose of my project is to investigate whether the introduction of screen-cast tutorial videos as an extension of the existing virtual learning environment (VLE) will benefit the students. These videos will be produced with mobile technology in mind. It is envisaged that students will use smart phones, tablets and laptops etc. to access these resources at their own convenience. The objective is to produce a free learning aid specific to the subject which can be viewed by the students in their own time, repeatedly and in various locations as required.

**Keywords:** Building measurement, virtual learning environment, VLE, reusable learning object, RLO, mobile learning.

**Introduction**

Quantity surveying is an age old profession in the construction industry. The profession is found in many corners of the globe particularly those colonised by the British Empire. The initial role of the quantity surveyor was the measurement or counting of elements of work in order to verify the value of works completed. “*In Ireland, the earliest mention of surveying as a profession was in 1750*” (Hore et al. 2009). The Society of Chartered Surveyors Ireland defines a quantity surveyor as someone who “*advises on the cost of developing all types of buildings and infrastructure*” ([www.scsi.ie](http://www.scsi.ie), 2013). This shows that the profession has progressed but the taught fundamentals are still the same.

Building measurement has its roots on the construction site not in the classroom. As a result of this it is a subject which is better taught in a practical manner, rather like an apprenticeship. The basis of this paper is to investigate whether the introduction of screen-cast tutorial videos as an extension of the existing virtual learning environment (VLE) will benefit the students.

The objective is to produce a free learning aid specific to the subject which can be viewed by the students in their own time, repeatedly and in various locations as

required. This learning aid falls into the category of reusable learning objects as defined by Adams (2013)

## Literature Review

*“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it”*. (Mark Weiser, 1991).

Adaptive learning is based on the idea of adapting learning methodologies to students' learning styles. The concept is that individualised methods of teaching will help and encourage students to learn at a faster pace, more effectively, and with greater understanding. Some of the elements of adaptive learning include: monitoring student activity, interpreting the results, understanding students' requirements and preferences, and using the newly gained information to facilitate the learning process (Paramythis and Loidl-Reisinger, 2004). Valdez, Diaz et al (2004) confirm this whilst discussing the fact that “an educator can teach a class taking in consideration far more elements affecting the learning process than a computer”. The discussion goes further state that a teacher can determine with a glance if what has just been said was understood or not. Valdez, Diaz et al go further to note that a good teacher can explain the topic based on the background of the students and answers students questions in a personalised manner.

Barajas (2000) defines a VLE as “*any combination of distance and face-to-face interaction where some kind of time and space is present*”. So with this definition in mind it appears that many systems used in the various stages of education have been using a VLE in one form or another. However, some educators misuse VLEs as a way to store lecture content which was released on a weekly basis. Part of reason was to reduce the cost of photo copying while allowing the students to access content electronically. Seery (2010) refers to this as “*shovel-ware*”. It does not provide the student with a valuable resource as it does not direct the student in any way. It may actually lead to confusion due to a content overload.

Dillenbourg et al, 2002 discuss VLEs under different headings and try to dispel many myths as to what does or does not constitute a VLE. The main misconception is that VLEs are used to facilitate distance learning. The discussion goes further to discuss the use of the VLE to “*support presential learning*”. McGarr (2009) investigates and discusses the many possibilities available to lecturers to enhance their lectures by the use of technologies such as podcasting. McGarr's research and literature review shows a great deal of acceptance for the use of podcasting as a tool in the virtual classroom but is it the only one? McGarr's article confirms that podcasting might only be suitable for certain subjects due to its audio only format.

McGreal (2004) states that “*learning objects (LOs) enable and support the use of education content online*”. These objects have international appeal as they can be reused and the software applications used to create them are interoperable with most

platforms. McKimm, Jollie and Cantillon (2003) confirm that the web is used more regularly as a “*learning tool to support formal programmes*”. The question is also raised as to how educators can use the web to support both their learning and that of their students.

The point of a subject being more suited to being taught as an apprenticeship was raised by Marchmann (2001) in relation to “*teaching science v the apprentice model*” for medical students. Whilst the students need to understand the mechanism they also need to be able to address the situation in an experienced practical manner. Clifton and Mann (2011) used YouTube to create tutorial videos for nursing students as both an aid in the classroom and for delivering module content. Following on from their research they now advocate the use of this resource in all nursing courses. If it can be used in nursing can it not be used in any profession?

The other issue raised by Clifton and Mann is that students are “*native of a rapidly changing digital world*”. This is a belief shared by many educators who witness students apparently surgically attached to smart phones, tablets and laptops in the world of Facebook, MySpace and Twitter but to name a few. A study carried out by Kennedy et al (2008) revealed that whilst an incoming group of first year students had exposure to technology it was of a very diverse nature. The same could be said as to how the technology was used by the students. One question posed by Kennedy was whether or not the students were open to the use of their everyday technologies in their studies. This was an interesting point as it raises the question of whether mobile technology is an extension of a person and if we impose into that technology are we trespassing in their lives? Student exposure to mobile technology was also noted by Thornton and Houser (2004) who studied a group of Japanese students. Whilst all the students polled in their first study had mobile phones the level of competency in all the features was diverse.

## **Research Methodology**

The objective of this research project was to investigate VLEs and to determine if the use of VLEs and RLOs could aid in the delivery of module content in a diverse learning environment.

In order to commence the research it was first necessary to determine the various software packages available to use in the production of online resources. This included looking at hardware requirements, availability and ease of use. The initial research in this manner had already been completed and was available in Seery’s (2010) paper. This paper was a great resource for evaluating and shortlisting various software packages based on their function. However, in order to evaluate each package it was necessary to field test the shortlisted packages. The main criteria for the final assessment were:

1. Availability of package – Was there an initial cost involved?
2. Was there a free usage period?
3. Would this be a subscription service?
4. Did the package require a lot of storage space or was the package / application cloud based?

5. Hardware requirements for the user – Would using this package necessitate upgrading to existing hardware.
6. How easy was the software to use and would it integrate with existing delivery methods?

The reason for this line of questioning was simply that additional costs could not be incurred for budget reasons. Free usage systems would lead to the need to work on an alternative system at a later date and so negate the work carried out to date. Large storage requirements would mean that streaming would be an issue. Playback could be slow and fragmented. Cloud based repositories allow for faster and better streaming as the system is less congested. Hardware requirements were addressed from the lecturer's perspective as more demanding packages would require investment in new hardware. As noted before the research was carried out under strict budget constraints. The ease of use of the software was critical. Time is limited for this type of research during the preparation of weekly lectures. As a result if the software is difficult to understand or use it will further limit time. This may cause the research to be delayed or abandoned due to other pressures.

The issue of delivery was also raised during the research. Would the RLOs be delivered via a new VLE or would it be best to use an existing one. It was decided to utilise the existing one used by the students. In this case Webcourses, which operates on the Blackboard platform and allows content to be added as required. All students involved in the study had access to the module in question.

Part of the assessment of the software also necessitated research into the type of mobile devices and technology which the students within the group use. This was to be carried out by an on-line poll using a free mobile application called Socrates. Due to a technical error I had to resort to carrying out an in-class poll in order to determine the range of mobile devices carried by students and their main function / use. This was possible due to the relatively small class involved. Student numbers have fallen in this discipline since the recession but prior to this numbers would never have risen to higher than sixty students in any one year. The number surveyed was seventeen. The class itself only contains 19. The poll was to determine what mobile technology the students have, their use of service provider data packages and/or wifi and what were their primary uses of their mobile devices.

Nr.	Question	Yes	No	Comment
1	Do you have a smart phone, blackberry (phone with web capabilities)?	14	3	
2	Do you have a tablet?	3	14	
3	Do you use a laptop?	3	14	In College
4	How many smart phone users are Bill pay Customers?	10	4	
5	Do you have all you can eat data on your smart phone?	1	13	
6	Do you have a data bundle not exceeding 2GB?	9	5	
7	Do you have a data bundle on your smart-phone?	10	4	
8	Do you avail of free wifi services?	17	0	
9	Do you use your mobile devices for internet searching, social media and email?	17	0	

Initial questions posed to students group (source: Author, 2013)

This was an interesting exercise as it highlighted the use the range of devices available within the group. The results as to the number of students who have smart phones but do not have data packages are not surprising. Smart phones can be seen as status symbols.

This short questionnaire provided the author with an understanding of what mobile devices were available to the group and to gather a general understanding of how they were used. With this information to hand choosing a relevant software package was simplified. The revised criteria had to be broad enough to allow the whole group to be included.

Following on from this research the author choose to use Screenr ([www.screenr.com](http://www.screenr.com)) to produce online tutorial videos. This software was chosen for the following reasons:

1. It is a free online resource with no subscription. A more professional versin is available for a fee if required.
2. There is no need to download any software.
3. It requires minimum operating systems.
4. The author had seen it used previously and found the software to be easily navigated and intuitive.
5. All videos are stored on the cloud and not on the server.
6. Resources are searchable via the website similar to YouTube and other free share programmes.
7. Software allows for variations of the presentation style

Once the videos were in operation it was decided to use online multiple choice quizzes as a revision tool to monitor progress.

### Preview Survey: Quick Quiz 1

#### Instructions

- |                   |  |
|-------------------|--|
| Description       | This quizz covers content form weeks 1-4 of semester 1.  |
| Timed Test        | This survey has the time limit of 20 minutes.You will be notified when time expires, and you may continue or submit.<br>Warnings appear when half the time, 5 minutes, 1 minute, and 30 seconds remain.[The timer does not appear when previewing this Survey] |
| Multiple Attempts | This Survey allows multiple attempts.  |

∨Question Completion Status:

1 2 3 4 5 6 7 8 9 10

Save and Submit

#### Question 1

True / False: The net sum of the internal angles on an irregular shape is always 4.

True

False  
Question 2

Bills of quantities are tender documents produced by a quantity surveyor which contain general information on a construction project with quantities measured from drawings in accordance with a measurement code (standard method of measurement).

What are the main functions of a bill of quantities?

- 1. Tender document for pricing.
- 2. Assisting in valuing estimates and variations.
- 3. Preparing interim valuations and final accounts.
- 4. All of the above.

Question 3

What is the primary function of building measurement?

- 1. Quantify the volume of materials in order to allow for better purchasing.
- 2. Enable estimates for construction cost to be prepared prior to commencing construction.

Question 4

When working from internal dimensions to find the centreline of the foundation trench do we add or subtract the value of the centreline formula?

- 1. Subtract from the internal perimeter.
- 2. Add to the internal perimeter.

Question 5

The formula for the centreline adjustment is  $4/2/0.5/W$ .

Which of the following statements describes correctly how the formula is derived?

- 1. 4 adjustments at 2 corners multiplied by half the width of the wall (W).
- 2. Four times the sum of two corners multiplied by the width of half of the foundation (W)
- 3. 4 corners, each with 2 adjustments multiplied by half the width of the item (w)

Question 6

Working from left to right on standard dimension paper the names of the columns are.....

Question 7

It is good practice to enter dimensions in a particular order. In what order should dimensions for a trench excavation (cubic meters) be entered?

- 1. Breadth / width, then length, then vertical height / depth.



- 2. Length, then breadth /width, then vertical height / depth.

Question 8

Who can the quantity surveyor work for?

- 1. The Client.
- 2. The contractor.
- 3. Any party in the construction involved in the construction process.

Question 9

When dealing with re-entrant in a centreline calculation do you add in the value of the re-entrant adjustment to the girth before or after making the centreline adjustment?

- 1. After
- 2. Before

Question 10

What type of device did you use to view and answer this quiz?  
(E.g: Tablet, smart phone, PC / Laptop)

Sample student feedback quiz (Source: Author. 2013)

The quiz would not form any part of the students' formative assessment as it was designed to be a learning aid which would allow students to self-assess so as to encourage self-directed learning. This conforms to the discussions of Walker, De and Keeffe (2010) in their case study of blended learning design. It must be noted that in line with DIT ethics policies that all students were given the option to part-take in the research.

## Findings

The initial research into the software packages available showed that there are many software packages available, both free and paid, dependant on your requirements. The limitation of using the selected software, Screenr, was that the video could be no longer than five minutes and did not allow for editing in the free version. Also, it recorded what was on the screen along with audio.

The intention was to produce at least one tutorial video per week in semester one followed by a short online quiz every two to three weeks. It was found that initial screen cast, which just less than five minutes long took, nearly seven hours to complete. This included scripting the whole production, preparing a power point presentation and updated graphics to show the topic in detail. Students were notified as to the uploading of new videos by announcements via Webcourses.

The quizzes did not work in the manner hoped as only 4 students regularly undertook to take the quizzes. This resulted in needing find another way to collect data. It was decided to operate focus groups during the tutorial sessions of the module. Here, students and lecturers were able to discuss the video content and practicality. Students were also encouraged to use the resource during the tutorial as a learning aid.



As a result of the focus groups it became apparent that approximately 65% of the class had looked at one or more of the suite of videos at some stage or other. Of this number at least 50% had viewed the videos on multiple occasions.

It emerged early on in the study that those students using android devices were not able to see the video but could hear the audio using the Screenr site. This was overcome simply by converting the Screenr file to an MP4 format and posting on YouTube. The Screenr site shows how this can be completed simply using its own conversion function. Youtube videos can also be added directly to Webcourses and so the RLOs became more accessible. Another of the benefits of this is that the video tutorials have gained some international following. Unexpected international feedback has been received which includes requests for further topics to be explored.

Whilst it is possible to track the number of views on both sites this can lead to confusion regarding the statistics. Some students use both sites to view the videos and both sites are public and as a result views from third parties are counted.

The study to date shows that there is room for the use of this expansion of the VLE in this module. It is also believed that students will use such resources throughout their studies and maybe beyond. The main area to be reviewed is the mechanism for encouraging participants to complete all aspects of the study.

### **Conclusions**

The literature review highlights that the use of RLOs as part of a VLE to compliment the work carried out in the physical classroom is greatly under-rated by the majority of academic staff.

The study outlines that whilst many institutions promote the concept of VLEs they do not realise the full extent of the input and drive required producing and keeping current the content. At stages during this research the author struggled to find ways to summarise tutorial exercise into concise and meaningful RLOs.

Whilst students using the resources have noted benefits of the use of such RLO's, the overall uptake was less than anticipated. This confirms comments by Kenndey et al (2008) which question if students wish to use their personal equipment for structured study purposes. Comments received from students outside of the study seem to be more accepting. These comments highlight that the use of RLOs in an open repository may be the best method of dissemination.

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