

# Student Perception of Learning and Teaching by VC

---

Simon Clarke, Shetland College, University of the Highlands and Islands,

Submitted 23<sup>th</sup> March 2015

## Biography

Simon Clarke is a senior lecturer in archaeology, based in Shetland College. He has been using videoconferencing to support distributed cohorts of students enrolled on networked degree programmes across the University of the Highlands and Islands partnership since 1998.

## Abstract

This paper explores the student experience of learning and teaching through the medium of videoconferencing (VC), on a range of HE programmes across all the partners of the University of the Highlands (UHI). The primary evidence used are the 190 responses to an online survey made available to any taught HE student at UHI that had taken modules where VC had played a significant role in delivery. Twenty nine, multiple choice, multiple answer and continuous response questions were asked, covering a wide range of subjects from students' circumstances of study, to how they rated difference aspects of the experience. The study suggests that not only can VC succeed as a mode of educational delivery when undertaken by pioneering staff with a strong interest in educational technology, but it continues to succeed when delivered by an institution's rank and file teachers, as a mature technology that has lost its novelty value. The much greater sample size of this study, compared to those that have been undertaken in the past, also provides a quantitative basis for identifying the approaches to teaching which succeed best, and for identifying the groups amongst whom VC is best received. Key factors for success were found to be appropriate allocation and configuration of VC suites, effective training in the use of VC, and teaching that placed a premium on interaction with students. However social circumstances appear to be as important as substantive quality factors in colouring perception. Students' rating of the technology as a mode of study seems to be heavily coloured by their access to educational alternatives. Students in remote locations appear more favourably disposed than those in larger campuses, mature students more than school leavers and women more than men. This has important implication for design and marketing of VC mediated degrees in the future.

## Key Words

videoconferencing, training, remote students, interaction, online survey

## 1 Introduction

Videoconferencing (VC) has now been used to support students at centres remote from their tutors for the better part of two decades. A flurry of studies were published in the late 1990s and early 2000s, setting out the problems and opportunities of the medium and looking at success and satisfaction rates compared to conventional teaching (c.f. Pitcher, et al 2000, Knipe and Lee 2002; Badenhorst and Axmann 2002). However, even more recent analysis has almost invariably been based on pilot studies and conducted on relatively small groups of students (c.f. Gillies 2008, which looked at data from just 15 students on one course and Hoyt *et al* 2013, which looked at two modules enrolling just thirteen students each). The University of the Highlands and Islands (UHI) is Europe's largest educational user of VC and has been routinely teaching using VC since 2000 (Clarke 2010, 6). In the later part of semester two of the 2013-14 academic year students on UHI programmes with a significant VC element were invited to take part in an online survey using multiple choice / multiple answers and continuous text responses (see [Appendix 1](#)). One hundred and ninety students, drawn from thirty-one programmes responded, providing an authentic student voice on what it is like to take VC led modules within UHI. By looking at associations between students' responses to different question it also provides a basis for reasoned analysis of why some approaches have led to a better student experience than others. Three broad findings will be detailed in this paper. Firstly that that VC teaching can be routinely used by remote students to access higher education comparable in quality to a face to face experience. Secondly teaching decisions by individual staff and at institutional level have a substantial impact on student satisfaction. Finally the study will demonstrate that significant differences exist in the perceived quality of the experience for different types of students (age, gender, level of study, circumstances of study), with important implications for how and when VC should be used to maximum advantage.

## 2 The Overall Experience

The central question of how students rated the overall experience of learning and teaching by VC was left to quite near the end of the survey so that respondents might first consider a whole raft of contributory factors. Students had a choice of five responses to the question how do you rate your experience. Just over 72% selected the top two classifications; "overwhelmingly positive" and "generally good occasionally falling short of its potential". Almost half the remainder, 13.16% selected the middle classification "good in parts but frequently falling short of its full potential". Only six students, 3.16% responded that the VC learning experience was "wholly inadequate ...". While six out of 190 is six too many this is a remarkably low figure, bearing comparison with more conventional modes of HE delivery. There is the potential for surveys using this sort of Likert scales to gain an inflationary 'positive' effect by listing the "strongly agree" or "overwhelmingly positive" response first (Nicholls et al 2006, Hartley and Betts 2010). However there is no evidence in this case that students ticked the first box they came to. The propensity for students in a

hurry to do this has been reduced by varying the style of questions and the nature of the responses throughout the survey.

How would you rate your experience of learning and teaching by VC with UHI?	Numbers	Percentage
Overwhelmingly positive.	29	15.26%
Generally good occasionally falling short of its potential	108	56.84%
Good in parts but frequently falling short of its full potential	25	13.16%
Adequate, but significantly inferior to face to face teaching in most instances.	22	11.58%
Wholly inadequate for the delivery and support of quality education.	6	3.16%
Total	190	

Table 1: Rating the overall learning and teaching experience

### 3 Factors Impacting on the Student Experience

#### 3.1 The Learning Spaces

The learning environment is much more than just the physical classroom and the learning technology it contains – but this does form the crucial foundation to that environment, particularly for networked teaching (Zandervliet and Fraser 2005). UHI uses a range of VC facilities, from large raked lecture theatres, down through various sizes of classrooms to units based in small offices.

**VC Auditoria** capable of seating up to 100 students are available to students at quite a few sites; Inverness College, West Highland College (Lochaber), Moray College, SAMS and NAFC. However, for reasons which will become apparent they are relatively little used and only a minority of students reported having used them (36 students, 18.95% of the sample). See [figure 1](#) for an example of this sort of VC space.

**VC with twin screen with fixed console** are quantitatively the most significant VC suits in UHI. There are about fifty of these units installed around the UHI partnership, and for most teaching purposes they are the VC space of choice, so are in service a high proportion of the time and tend to be located in bigger classrooms intended for use by larger groups. Consequently 130 students or 68.42% of the sample reported having used this type of space. See [figure 2](#) for an example of this sort of VC space.

**VC with single monitor and remote control handset** are more numerous, but are of a lower technical specification and tend to be in smaller classrooms so have consequently been used by a smaller, but still significant, proportion of students, 91 students or 47.89% of the respondents.

**Personal Computer (PC) based VC** rather than a dedicated VC suite is a relatively new phenomena in UHI, but has grown very rapidly, 91 students, 47.89% of the respondents reported having used it to access teaching. UHI is currently exclusively using Cisco's Jabber system (formerly called Movi), but until 2013 it also used

Cisco's (now defunct) Conference Me system. Relatively low specification PCs with a few peripherals and some downloaded software potentially allow access from a vastly expanded range of locations (UHI Learning and Information Services n.d.). The system is being used from UHI campuses, non-UHI public places (such as libraries and community centres) and from private homes (see figure 3).

Which of the following VC delivery spaces have you experienced for learning and teaching?	Numbers	Percentage of respondents
VC equipped lecture theatre / auditorium	36	18.95%
VC classroom with twin screen and control console	130	68.42%
VC classroom with remote control rather than fixed console.	91	47.89%
VC via Jabber / Movi / Conference me on a PC	91	47.89%
Total from 190 respondents	348	

Table 2: Experience of different types of VC suite

As the table below shows the type of hardware and its accommodation appear to have a relatively weak influence on students' perception of quality. (Note that students are commenting on all the types of space they have experience not just the type filtered for). As one student noted "when they are used properly, they work well".

How would you rate your experience ... Filtered by use of VC delivery spaces	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
VC Equipment Experienced					
VC equipped Lecture Theatre / Auditorium (36)	16.67%	47.22%	13.89%	16.67%	5.56%
VC classroom with twin screen and control console (130)	12.31%	60.00%	12.31%	13.08%	2.31%
VC classroom with remote control rather than fixed console. (91)	15.38%	58.24%	12.09%	10.99%	3.30%
VC via Jabber / Movi / Conference me on a PC (91)	17.58%	57.14%	14.29%	5.49%	5.49%

Table 3: Rating the student experience filtered by experience of different VC suites

Generally students were very positive about the VC spaces they used, even those that didn't like the study mode conceding that it was done as well as could be expected for the medium. However VCs were not always configured appropriately as

classrooms, and occasionally there was an issue with allocation of inappropriately size rooms for the local class size. One student complained of a space suitable for one student being used by three, and that there was “not enough desk space for taking notes”. Another issue was classes being too large to sit within the camera’s widest angle. At the other end of the spectrum students reported that their VC space was ridiculously oversized, and in one case a lone individual had been assigned to an auditorium VC. This type of space was singled out for specific criticism frequently relative to the small numbers of students that have used it. These largest spaces were the least effective due to the inability of microphones to pick up comments from the students and the tendency of students to spread out to maximize the distance between themselves and their neighbour like passengers in a railway carriage! This was recognised as inhibiting student interaction even locally. Above all, the use of such a big space is very rarely justified by the size of the class attending. Ironically these most expensive VC suites appear to be used as the VC space of last resort.

Over half of student returns included comments about the technical reliability of the live VC. Where detail was provided the most common complaint was getting connected to the VC session, with audio or image quality coming a close second. Bandwidth for off campus, and even smaller learning centres, is one significant factor beyond UHI’s control, but in quite a few of these “technical problems” are quite likely to be “pilot error” of some sort; administrative errors, incorrect equipment set up or use etc, rather than hardware failures. One student suggested that some sort of “confusion does occur in about 1 in 10 VCs”. Probably the most important lesson to draw from this is that an additional layer of complexity brings the likelihood of at least occasional, and potentially quite debilitating, technical and administrative failure, requiring development of a “Plan B”.

### 3.2 Training for Learning and Teaching by VC

Any programme of learning and teaching through the medium of VC might reasonably be expected to include training in the use of the technology itself. In UHI this is available through a number of different routes. Most programmes provide students with an induction, and in many cases this included an introduction to the VC technology they would be using. This might be through local staff at the enrolling centre or through a VC supported introductory session. Some programmes also scheduled study skills sessions later in the academic year, including introductions to VC technology and VC etiquette. UHI also has online materials in PDF and video clip formats outlining specific aspects of the technology, such as use of the VC console and how to access VC recordings (c.f. UHI LIS nd, UHI Learning and Teaching 2012). However one of the findings of this survey has been that student uptake of these opportunities has been very variable, almost half accessing no training.

Were you provided with training in the use of the VC equipment? (tick all that apply)	Numbers	Percentage
---------------------------------------------------------------------------------------	---------	------------

I have received training locally from my enrolling partner staff	73	38.42%
I have received training through my programme organised across the VC network	13	6.84%
I accessed online training resources from the UHI website	29	15.26%
I have received no training in VC use beyond what I picked up in the modules for which I was enrolled	91	47.89%
(Total Respondents: 190)	206	

Table 4: Uptake of VC training

Where training was accessed only a couple stated that training was “not very effective”, “sink or swim”. The vast majority that expressed a view thought that it was “good enough”, “adequate”, “sufficient” or “satisfactory”, or at the more effusive end of the spectrum that it was “well done”, “very effective” and “straight to the point”. One explanation for uptake is that the “system is self-explanatory”, and it was “fairly easy to pick up on my own”. However while students might not have felt the need to access training, there was quite a strong correlation between uptake and their overall satisfaction with the VC experience. No one that had accessed training thought that VC was “wholly inadequate” and they were also about 15% more likely to place the experience in the top two satisfaction categories (see below).

How would you rate your experience ... Filtered by access to training	Overwhelmingly positive	Generally good occasionally falling short The Impact of Video Conferencing on Distance	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Training Provision					
Training (99)	14 14.14%	65 65.66%	11 11.11%	9 9.09%	0 0.00%
No training (91)	15 16.48%	43 47.25%	14 15.38%	13 14.29%	6 6.59%

Table 5: Rating of the VC experience filtered by whether training had been received

Although the majority of UHI’s VC equipment comes from a single supplier (Cisco / Tandberg) and are described by students as “quite intuitive as a system”, the diversity of units has resulted in a lack of consistency in the controls between different models. As a result one student reported “nobody is confident” on the equipment. Nobody is clearly an overstatement, but the lack of standardisation is generating anxiety amongst students (and staff) and places additional demands on training which are not always met.



### 3.3 Teaching Style and Learner Engagement

While technical failure is significant, at least as many students identified the key issue as “mainly how it is approached by the lecturer rather than the technology”, “some tutors seem more at home teaching on the VC than others”, and “the success or otherwise very much depends on the skills of the lecturer in grasping the possibilities and using it fully”. Good teaching in general and “tutors who really understand the medium” were named as a key factors in VC sessions success in twenty responses. Conversely staff’s lack of proficiency was identified as a problem in eleven responses. A significant number of students commented on difficulty with, or lack of interaction in their VC classes. Three specified discussion being dominated by just a few students, another three on lecturers exclusively focused on their own location to the exclusion of the remote sites. A further thirty commented on difficulty of interaction in VC sessions more generally. “Some lecturers just talk for the whole hour without asking for any student input, it’s quite hard to concentrate on a computer screen for that length of time”. Suggesting future improvements, five students stressed the importance of addressing remote students as well as those in the same location as the tutor. A further fifteen urged that classes should be more interactive generally.

Students’ behaviour in the VC environment is also highly significant and tutors and local support have an important role in shaping it. The tendency of some students, particularly those new to the medium, to approach VC classes with a passive television viewing mindset needs to be challenged (Calodine 2008, 242-3). One student noted that “students feel very intimidated and hold back quite a lot, where normally they would take part”. Tutors are therefore urged to help “make people feel comfortable about getting their point across”, “build in Q&A time to the lesson structure”, even to “expect students to take turns in leading the discussions”. Three students complained about discussion being hijacked by individuals or small groups, and a further three of disruptive chat or behaviours while the local centre was on mute. While a clear majority of students 62.11% felt able to participate actively in the learning process in most of their VC lessons, given the importance of interaction UHI should aspire to a much higher number. *Only* 12.11% rarely or never felt able to contribute, but one in eight students *that have responded to a survey* remaining disengaged from their actual learning is a major failing.

Have you felt able to contribute actively in VC classes?	Numbers	Percentage
At all times	41	21.58%
In most sessions	77	40.53%
In some sessions	49	25.79%
Very rarely	20	10.53%
Never	3	1.58%
Total	190	

Table 6: Student interaction in VC classes

Filtering overall satisfaction with the VC experience by students' perceived ability to contribute revealed dramatic variability. Of those who always felt able to contribute 41.46% reported the experience as "overwhelmingly positive", none reported it "wholly inadequate". Where students reported "never" being able to contribute, none gave the top satisfaction rating and one third gave the bottom one. The numbers of students in this category was tiny (just three), but the picture it paints is entirely consistent with the overall pattern, with each successively worse category of interaction and inclusion reporting cumulative falls in overall satisfaction.

How would you rate your experience ... Filtered by ability to contribute	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
<i>Able to contribute</i>					
At all times (41)	41.46%	48.78%	4.88%	4.88%	0.00%
In most sessions (77)	11.69%	70.13%	10.39%	6.49%	1.30%
In some sessions (49)	4.08%	53.06%	22.45%	16.33%	4.08%
Very rarely (20)	5.00%	35.00%	15.00%	35.00%	10.00%
Never (3)	0.00%	33.33%	33.33%	0.00%	33.33%

Table 7: Rating of the VC experience filtered by whether students felt able to interact

One potentially quite interesting aspect of the VC learning experience is that there is not a conventional front and back to the class. Both students and staff participate through essentially the same devices and therefore are on a near equal footing. While some staff will undoubtedly be uneasy at this social levelling, arguably it is entirely appropriate in an adult educational context. Students can, and do, make presentations and lead discussions over the VC. Just over 46% of students reported having used the VC in this way. However VC satisfaction was only very slightly higher amongst students that had used the VC to make a presentation themselves, relative to those that had not. It needs to be remembered that long presentations by students are no more likely to be engaging for the rest of the class than those by the tutor.



How would you rate your experience ... Filtered by students own use of presentations in the VC	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Students making Presentations					
Yes (88)	15.91%	62.50%	10.23%	9.09%	2.27%
No (102)	14.71%	51.96%	15.69%	13.73%	3.92%

Table 8: Rating of the VC experience filtered by whether students have made a presentation

### 3.4 Support for Learning Beyond the VC

Typically a UHI 20 credit module (notionally 200 hours of learning) will be supported by just two hours per week of VC teaching for twelve weeks of the semester (the last weeks being reserved for final examination). Clearly therefore VC is, or should be, only one part of the learning and teaching package. No specific questions were asked about use of VLE in support of VC teaching in this survey, but elsewhere the author has argued that no VC led module should be attempted without such a resource (Clarke 2009). One reason is that any technologically dependent mode of delivery needs to have a Plan B to fall back on in the event of a failure (Winslow *et al* 1998, 130). The other is that as has been shown above a key feature for success in VC teaching is interaction. Though the term “flipping the classroom” was coined for the conventional face to face environment (c.f. Sams and Bergmann 2013), delivering the content element of teaching elsewhere is a highly effective tactic for VC. It is therefore highly significant that ten students reported that notes and other online materials were sometimes inadequate or posted very late. One student commented “staff seemed not to understand how to use the Blackboard system (and email), and all use it differently - no consistency ... the forums are used poorly by [module] leaders”. Two other students complained of poor communication by email, while three commented that it was difficult to get access to, or get to know, the tutors based at remote sites; for example “it’s hard to get to know your lecturer well enough to ask them for a reference”.

Are module tutors at remote sites available to you by phone and email outside the VC sessions?	Numbers	Percentage
In all cases	110	57.89%
In most cases	70	36.84%
In some cases	9	4.74%
Very rarely	0	0.00%
Never	1	0.53%

Total	190	
-------	-----	--

Table 9: Students' perception of access to VC tutors

On the face of it the availability of VC tutors by email and over the telephone appears very positive. Over half (57.89%) reported them accessible "in all cases". Most of the rest (36.84%) reported their tutors available in most cases. Less than five percent (ten students) reported staff only available "in some cases" or "never". It would be dangerous to assume there is a causal link, but there is a clear statistical association between better perceived access to the tutor and better student satisfaction ratings (see table below). Of students reporting access to their tutors "in all cases", 21.82% rated the VC experience "overwhelmingly positive", just 1.82% rated it "wholly inadequate". Of students reporting access to their tutors "in most cases", 7.14% rated the VC experience "overwhelmingly positive", just 2.86% rated it "wholly inadequate". Amongst the ten students claiming that they had "never" or in only "in some cases" had access to tutors the pattern was even more extreme with none reporting the top satisfaction rating and 20% of the sample rating it "wholly inadequate".

How would you rate your experience ... Filtered by access to VC tutors	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Access to tutors outside the VC					
In all cases (110)	21.82%	55.45%	12.73%	8.18%	1.82%
In most cases (70)	7.14%	62.86%	11.43%	15.71%	2.86%
Never, or in only in some cases (10)	0.00%	30.00%	30.00%	20.00%	20.00%

Table 10: Rating of the VC experience filtered by students' perception of access to VC tutors

Streamed recording of VC classes is another facility that has (like PC based VC) been introduced relatively recently to UHI, replacing recordings on DVD or videotape and distributed by post. The VC service at UHI has the capacity to record up to fifteen high definition VC sessions simultaneously, and has the storage capacity for recorded lessons to remain available online for the whole semester. These can be made available to students via a hypertext link distributed either by email or from within a module VLE space (UHI LIS 2012). Many students commented on the usefulness of these recordings, twenty-seven mentioning mitigation in the case of missed classes, one specifically a case of technical failure. Three students also mentioned the reassurance it gave them even, when it was not needed. The resource was also reportedly used for purposes of review and revision by 22

students. One student reported that it helped them manage their dyslexia, as accurate note taking was difficult for them with the live sessions alone.

Though generally refuted in the wider literature, persistent fears remain amongst staff that recordings undermine student attendance (The Learning Institute 2012). Similar fears, also dismissed, exist in relation to making notes and slides available ahead of lectures (Babb and Ross 2009). In spite of the ease of use, over 62% of students have never or only very occasionally used this service. In most cases this is despite of the fact they have taken multiple VC modules. Engstrand and Hall (2011) looking at use of the facility in UHI in 2010-11 found that 39% of recordings were never accessed at all. A very high proportion of Higher Education VC lessons are now recorded, so both statistics rather beg the question whether this is appropriate use of resources?

How much do you use the Streaming of Recorded VC classes?	Numbers	Percentage
I have never used it	37	19.47%
I have used it once or twice	82	43.16%
I use it quite often	36	18.95%
I use it regularly	22	11.58%
It is the main mode of delivery for a module that I usually cannot attend live.	13	6.84%
Total	190	

Table 11: Students' use of streamed recordings

Alarming for different reasons are thirteen students (6.84% of respondents) who use the streamed recording as their main mode of delivery. Students themselves noted the recording is not as useful as being present at the live lecture, because there is not the opportunity to interact. If interactivity is important to the educational success of the VC sessions, then a diet of one way broadcasts cannot be a healthy option. Is VC recording at UHI facilitating a dangerously passive student experience?

How would you rate your experience ... Filtered by use VC Streaming	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Use VC Streaming					
Never (37)	10.81%	54.05%	18.92%	8.11%	8.11%
I have used it once or twice (82)	8.54%	59.76%	12.20%	17.07%	2.44%
I use it quite often (36)	22.22%	55.56%	11.11%	8.33%	2.78%

I use it regularly (22)	22.73%	59.09%	13.64%	4.55%	0.00%
It is the main mode of delivery for a module that I usually cannot attend live. (13)	38.46%	46.15%	7.69%	7.69%	0.00%

Table 12: Rating of the VC experience filtered by students' use of streamed recordings

While learner centred teaching should not be simply catering to students desires (Anderson 2008, 47), an emphatic answer to the issue of resource allocation appears to be provided by the satisfaction rates of students when filtered by their use of the streamed recordings. Looking at overall satisfaction filtered by the use of streamed recordings there is a very strong association between use of the recordings and the most positive responses. Amongst those that had never used the service (thirty-seven students in total), 10.81% reported the VC experience “overwhelmingly positive”, 8.11% “wholly inadequate”. Amongst the twenty-two students using it “regularly” 22.73% reported the highest and none the lowest satisfaction rating. Amongst the thirteen students using recordings as a substitute for attending live sessions the satisfaction rate was even higher, 38.46% reporting the experience as “overwhelmingly positive”, with a further 46.15% reporting that it was “mainly good”, the second highest rating. Satisfaction rates' relationship to use of recordings is also somewhat counter intuitive if active learning is the key to successful pedagogy. One possibility is that uptake of streamed recording is incidental to the real factors for success. Students can only access recordings if they have been made available by tutors, for example by placing them on a well signposted area within the module VLE. Is it actually good management of the VLE more generally that is crucial? Alternatively it may be the character of the students that is the key factor for a happy outcome; showing initiative and using every opportunity available to them.

#### 4 The Experience of Different Groups

The majority of programmes accessible to students through the medium of VC are available throughout the UHI partnership. However the importance of VC delivery to the different partners varies considerably. Inverness College, the largest partner predictably had the largest number of respondents (33 students), but Orkney College came second (27 students) knocking the much larger Perth (23 students) and Moray (22 students) colleges into third and fourth places respectively. Two other island colleges, Lews Castle (20 students) and Shetland (18 students) were not far behind in terms of students responding. It is evident that some of the smaller colleges have made much greater use of this technology than their larger partners, which generally have a wider range of conventional face to face programmes available.

How would you rate your experience ... Filtered by Host College	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Partner College					
Argyll College (7)	28.57%	57.14%	14.29%	0.00%	0.00%
Highland Theological College (12)	25.00%	66.67%	0.00%	8.33%	0.00%
Inverness College (33)	15.15%	48.48%	18.18%	18.18%	0.00%
Lews Castle College (20)	25.00%	50.00%	10.00%	10.00%	5.00%
Moray College (22)	18.18%	63.64%	13.64%	4.55%	0.00%
North Highland College (13)	15.38%	53.85%	23.08%	0.00%	7.69%
Orkney College (27)	18.52%	74.07%	3.70%	3.70%	0.00%
Perth College (23)	4.35%	52.17%	13.04%	26.09%	4.35%
Sabhal Mòr Ostaig (8)	12.50%	37.50%	12.50%	12.50%	25.00%
Shetland College (18)	5.56%	72.22%	16.67%	5.56%	0.00%
West Highland College (7)	0.00%	14.29%	28.57%	42.86%	14.29%

Table 13: Rating of the VC experience filtered by enrolling college

When the survey was filtered by UHI partner a startling disparity in satisfaction rates emerges. Some colleges (cf. Argyll College, Highland Theological College and Orkney College) have high proportions of students selecting “overwhelmingly positive” or “generally good”, with few or none responding with only “adequate” or “wholly inadequate”. In contrast other partners (c.f. Perth, SMO and WHC) have small proportions of students selecting the most positive responses, much higher rate of dissatisfaction. The significance of the results should not be overstated given that the sample sizes at individual colleges are in some cases small. For example the 25% reporting the VC experience as “inadequate” at the Gaelic language College SMO is actually only two students. However in the larger groups such as Perth and Orkney Colleges it is difficult to believe that there is not some profound root cause for the difference. Given that students throughout UHI are using networked modules, by and large universal to the partnership, it is likely that these differences reflect either the suitability of recruits selected for enrolment, or the quality of support provided for them locally.

Students were also asked to specify their main mode of attendance. Did they attend VCs in their colleges’ main campus (63.68%), from a minor learning centre (7.37%), or from outside the UHI network through PC based videoconferencing (28.95%)? The latter might include access from non-UHI affiliated community centres, but in most cases meant through home broadband. The difference between the perceived quality of experience in this instance is somewhat counter intuitive. Though the

sample is small learning centre students rate their experience as far superior to that of their peers at the main campuses. The much larger group taking VCs from outside the UHI network using PC based VC was somewhat polarised in its opinion. PC based CV from outside UHI had a small but significant minority with a dreadful experience, reporting “wholly inadequate” in a higher proportion of responses than the other categories of user. For the majority however the experience was better than average. PC based VC users were less satisfied than learning centre students, but in most cases reported a better experience than that in the technically far superior VC suites at the main centres. One factor is probably that the most remote students are more forgiving of technical and pedagogical shortcomings than those with access to a wider range of educational alternatives. Another possibility is that the convenience of study from home and the autonomy of controlling personal VC facilities (in particular the microphone mute) outweigh the disadvantages of simpler equipment and restricted bandwidth.

How would you rate your experience ... Filtered by mode of VC attendance.	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Mode of VC attendance					
At the main campus (121)	11.57%	57.85%	13.22%	15.70%	1.65%
At a learning centre (14)	28.57%	57.14%	14.29%	0.00%	0.00%
From a non-UHI site, via PC based videoconferencing (55)	20.00%	54.55%	12.73%	5.45%	7.27%

Table 14: Rating of the VC experience filtered by mode of VC attendance

The survey was directed exclusively towards HE students on taught programmes and achieved good coverage at all five levels, from first year undergraduate to taught post-graduate. In contrast to many established universities, UHI has a highly flexible approach to certification. Most undergraduate programmes have interim certificated exit points prior to achievement of full honours degree, and students avail themselves of this facility fairly frequently. While some students do re-join programmes having taken a break from education, and advanced entry from outside UHI is also possible, this has inevitably resulted in a wedge shaped level profile with smaller numbers in each successive cohort. That this is reflected in the respondents to the survey is entirely in line with expectations.

Your current level of study through the	Numbers	Percentage
-----------------------------------------	---------	------------



medium of VC?		
SCQF 7, HNC / first year degree	63	33.16%
SCQF 8, HND / second year degree	41	21.58%
SCQF 9, Third year / ordinary degree level	51	26.84%
SCQF 10, Fourth year / honours level	21	11.05%
SCQF 11, Masters level	14	7.37%
Total	190	

Table 15: Level of study

Satisfaction varied considerably between the different levels of study. The percentage reporting an “overwhelmingly positive” experience varied between 26.83% for second year undergraduate and 0% for final honours year. The percentage reporting a “wholly inadequate” experience varied between 9.52% for final honours year and 0% for both second year undergraduate and taught post graduates. There is no simple, easily explained trend here. It might have been expected that the smaller groups and more experienced students of higher undergraduate levels would have resulted in more effective support for more confident learners. It would also be natural for students that had struggled or disliked the VC-led experience at lower levels to have dropped out disproportionately. However neither of these expectations is borne out by the trend within the undergraduate students. It seems likely that something about the character of higher level undergraduate modules is not as appealing to students. Rather different expectations are placed on students in terms of self-direction, reflection and critical capability at the higher levels. It may be that students are uncomfortable with this and / or that tutors are less adept at facilitating it. A rather less palatable possibility is that lower student numbers at higher levels result in poorer levels of preparation and online support by UHI staff. However if that were the case we might expect the worsening trend to extend into the masters level taught course, which tend to have even smaller student cohorts. In fact they have the best satisfaction rates of all, an astonishing 100% of students rating their experience in the top two categories. As with all statistics we need to beware the assumption that association implies a causal link. It is worth noting that other factors may have affected this small postgraduate group. Most masters level respondents are enrolled with Orkney College (one of the happiest partners in terms of VC experience), they have a different age profile to other programmes (more mature students, who also tend to be more satisfied with the VC experience, see below) and they have a high proportion of participants via Jabber from outside the UHI network.

How would you rate your experience ... Filtered by Study Level	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Level					
SCQF 7, HNC / first year degree (63)	17.46%	55.56%	15.87%	9.52%	1.59%
SCQF 8, HND / second year degree (41)	26.83%	36.59%	29.27%	7.32%	0.00%
SCQF 9, Third year / ordinary degree (51)	13.73%	47.06%	13.73%	19.61%	5.88%
SCQF 10, Fourth year / honours (21)	0.00%	71.43%	19.05%	0.00%	9.52%
SCQF 11, Masters level (14)	21.43%	78.57%	0.00%	0.00%	0.00%

Table 16: Rating of the VC experience filtered by level of study

The age profile of students taking modules through the VC medium is also notably atypical of HE students in the UK generally. Only 30% of the respondents come from the traditional mainstay, the 17 to 21 year olds straight from secondary school. The largest group are the over forties. This group made up only 2.1% of the UK's undergraduate entrants in 1997 (Thomas 2001: 59). The gender profile is less extraordinary, women now outnumber men in many institutions and in UK HE generally by about 1.2 to 1 (Reay *et al* 2005). The disparity at UHI of 55.79% female to 44.21% male to is therefore unexceptional.

To which age /gender group do you belong?	Numbers	Percentage
17-21,	57	30.00%
22-25,	23	12.11%
26-40,	43	22.63%
41+	67	35.26%
Male	84	44.21%
Female	106	55.79%
Total	190	

Table 17: Age and gender group

How would you rate your experience ... Filtered by Age and Gender Group	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Age / Gender Group					
17-21, (57)	8.77%	54.39%	21.05%	14.04%	1.75%
22-25, (23)	8.70%	69.57%	8.70%	13.04%	0.00%
26-40, (43)	18.60%	53.49%	11.63%	16.28%	0.00%
41+ (67)	20.90%	56.72%	8.96%	5.97%	7.46%
Male (84)	10.71%	55.95%	11.90%	16.67%	4.76%
Female (106)	18.87%	57.55%	14.15%	7.55%	1.89%

Table 18: Rating of the VC experience filtered by age and gender

Satisfaction varies considerably between different social groups. Women are more likely to rate their experience highly than men; about 10% more selecting the top two categories and about 12% less selecting the bottom two categories. It is difficult to speculate on why this should be without resorting to stereotypes. Are women better communicators? The answer seems more likely to lie in social circumstances than biological difference. Women remain society's principal carers, and are also more likely to be tied to an area by a partners' career. Their expression of satisfaction therefore needs to be seen in the context of more limited educational alternatives. The pattern of satisfaction with age is even more divergent than that for gender. The oldest students rate their satisfaction in the top two categories almost 14.5% more frequently than the youngest students. Conversely they select the lowest two categories about 3.4% less frequently. It is easier to believe that genuine motivational and skill differences have influenced the differences in satisfaction for the different age groups. However, again social context is likely to be at least as important. It is much easier for young people to go away to university as they have, on average, fewer social and financial commitments.

Less than ten percent of students in the survey reported taking only one or two modules by VC. The largest group have taken 3 to 6 (56.32%), with those taking seven or more making up the rest (34.21%). As might have been anticipated those with the least VC experience were the least satisfied, with the largest proportion of students reporting a "wholly inadequate" and the smallest an "overwhelmingly positive" experience. Possibly the skills to thrive in and enjoy the VC environment are steadily acquired as students spend more time in VC sessions. However this isn't borne out in the comparison between students with experience of 3 to 6 and those with 7 plus modules, where if anything the more experienced students are less

happy. Two alternative explanations seem more plausible for low satisfaction amongst the students with only one or two modules in the VC environment. The first is that those that have a really bad experience are likely to drop out or at least avoid that mode of study in the future. The other is that this group probably disproportionately includes students taking a VC module as an elective from a programme primarily supported by face-to-face teaching. Very likely their induction and support in the use of VC is inferior to those where VC is central to the delivery strategy of the programme as a whole.

How would you rate your experience ... Filtered by number of modules	Overwhelmingly positive	Generally good occasionally falling short of its potential	Good in parts but frequently falling short of its full potential	Adequate, but significantly inferior to face to face teaching in most instances.	Wholly inadequate for the delivery and support of quality education.
Number of modules					
1 or 2 (18)	11.11%	50.00%	22.22%	5.56%	11.11%
3 – 6 (107)	16.82%	59.81%	11.21%	10.28%	1.87%
7 plus, (65)	13.85%	53.85%	13.85%	15.38%	3.08%

Table 19: Rating of the VC experience filtered by number of VC module undertaken

To the question “what most impressed you about modules’ delivery by VC?” the most common response (46 students) was simply that it made access to education possible, either to a remote area or because it allowed delivery directly into their homes. One student was full of praise for remote access “because I had an operation and couldn't return to college for two weeks. I had installed Jabber [at home] and could access even unscheduled classes through VC .... this was so helpful so I wouldn't miss any classes and have to catch up when I returned”. Many of these were glowing endorsements of the VC experience, but clearly students’ attitude was significantly coloured by the availability (or not) of alternative educational opportunity.

## 5 Conclusions

For those using videoconferencing to teach this survey of 190 students, from across the spectrum of UHI’s taught HE programmes, provides some reassurance that a good learning experience can be routinely delivered. Clues as to how that experience might be improved are provided by the very substantial differences which exist between satisfaction ratings for different reported behaviours and groups of students.

The effectiveness of VC teaching is very strongly influenced by how the VC is managed, and the wider educational supports put in place. While previous commentators on VC have often emphasized its role in presenting carefully choreographed lectures (c.f. Gill et al 2005), the medium is actually most effective when used for two way communication, more of a tutorial or seminar, with active student participation (Calodine 2008, 239). VC should never be a stand-alone mode of delivery. The bulk of module content should be displaced to other media, particularly the VLE which is far more reliable and convenient for students to access (Clarke 2009). “Flipping the classroom” as it is sometimes termed (Sams and Bergmann 2013), frees up time within the VC session for students to be active participants in their own learning, also providing the tutor with crucial information on student engagement and comprehension. Ensuring that everything vital is available within the VLE is also a contingency against technical failure which is a racing certainty if VC is used extensively and for long enough.

If students are going to participate effectively, everyone needs to see and be seen, hear and be heard (see figure 4 illustrating the “continuous presence” facility allowing multiple remote sites to be seen). The arrangement of both the hardware and the participants within the VC space are crucial. Because of the importance of eye contact (c.f. Bondareva *et al* 2006) tutors should think very carefully before attempting to lead a VC class with students alongside them. It is very hard to address the camera and be inclusive of remote students where there is a large local cohort in pole position to seize their tutor’s attention. If students are to be present locally, classrooms need to be ordered so the tutor can address both the remote and local students equitably. Nothing could be more calculated to alienate and exclude remote students than to appear focused exclusively on the local class.

An effective VC session requires that all the participants know what they are doing technically and are clear on the etiquette for taking part. Both staff and students need to know the technical basics and where and how to get more advanced help if things go wrong. This study suggests that students who have accessed training, though they may not recognise the association, are far more likely to rate the VC learning experience a success. Students that don’t access training are also a menace to the rest of the VC cohort, joining sessions late, forgetting to use their mute and generally behaving inappropriately. Instruction documents, pod casts and live training sessions currently used by UHI could undoubtedly be improved, but even lower hanging fruit is student uptake, running at just over 52% in this survey. Teaching staff also need training in a mode of delivery which is superficially similar to but actually rather different than face to face teaching (Frindt 2014, 158). They cannot expect to gain their class’s respect and confidence if they themselves would fail the technical and presentational standards the university expects of its undergraduates! Staff therefore need to be familiar with their equipment, be very organised in the structure of their teaching and start on time, even if some elements of their virtual class are absent for whatever reason.

Looking at societal groups, mature students are generally more satisfied with their learning experience than younger students, women are more satisfied than men, and participants from very remote places are generally more satisfied than those attending larger campuses. The view that the younger generation are “digital natives” naturally imbued with technical skills and learning preferences is now generally discredited (c.f. Bennet et al 2008). That men and women possess innate intellectual or social abilities affecting the effectiveness of the VC learning environment seems similarly improbable. Rather than reflecting differences in ability, variability in satisfaction is almost certainly substantially the result of student expectation. Students with fewer alternative options in education would appear from this survey to be more forgiving of the shortcomings of the VC technology, more likely to see the glass as half full rather than half empty. This should have implications for UHI’s marketing strategy – we do best when we reach students not well served by traditional HE providers. Given that both PC based VC and online library resources have become increasingly effective (Anderson 2008, 53), an opportunity exists to reach out to students off campus and well beyond the UHI region.



## 6 Bibliography

Anderson, T. (2008) Towards a theory of online learning, in Anderson, T. (ed) *Theory and Practice of online learning*, 2<sup>nd</sup> edition, Athabasca University Press, Edmondson, pp 45-74.

Babb, K. A., Ross, C. (2009) The timing of online lecture slide availability and its effects on attendance, participation, and on exam preference. *Computers and Education* 52, pp 861-881.

Badenhorst, Z. and Axmann, M. (2002) The educational use of videoconferencing in the arts faculty: shedding a new light on puppetry. *British Journal of Educational Technology* 33 (3), pp 291-299.

Bondareva, Y., Meesters, L., and Bouwhuis, D. (2006). Eye contact as a determinant of social presence in video communication. *Human Factors in Telecommunication (HFT)*.

Calodine, R. (2008) *Enhancing E-learning with media rich content and interactions*. Information Science Publishing, New York.

Clarke, S. (2009) Using Video-conferencing to Teach in HE, in Houston, M. (ed) *The Teaching Research Interface: Implications for Practice in HE and FE*. Escalate, The Higher Education Academy, Bristol. pp 12-17.

Clarke, S. (2010) Videoconferencing in Higher Education. *Viewfinder* 79, pp 6- 8.

Engstrand, S. and Hall, S. (2011) The use of streamed lecture recordings: patterns of use, student experience and effects on learning outcomes. *Practitioner Research in Higher Education* 5 (1), pp 9-15.

Frind, T. (2009) The impact of video conferencing on distance education courses: A University of Namibia case study, in Marshall, S., Kinuthia, W. and Taylor W. (eds) *Bridging the Knowledge Divide*. Library of Congress, Washington DC, pp 149-160.

Gill, D., Parker, C. & Richardson, J. (2005) Twelve tips for teaching using videoconferencing. *Medical Teacher*, 27, (7), 2005, pp. 573–577.

Gillies, D. (2008) Student perspectives on videoconferencing in teacher education at a distance, *Distance Education*, 29 (1), pp 107-118.

Hartley, J. and Betts, L. R. 2010. Four layouts and a finding: the effects of changes in the order of the verbal labels and numerical values on Likert-type scales". *International Journal of Social Research Methodology*, 13 (1), pp. 17-27.

Hoyt, J. E., Howell, S. L., Lindeman, S. and Smith, M. (2013) The feasibility of offering videoconferencing courses: Quality issues and lessons learned. *The Journal of Continuing Higher Education*, 61 (2), pp 94-103.

Knipe, D. and Lee, M. (2002) The quality of teaching and learning via videoconferencing. *British Journal of Educational Technology* 33 (3), 301-311.

The Learning Institute (2012) *Recording lectures does not make a scrap of difference to attendance*, Queen Mary College, University of London. [retrieved 9<sup>th</sup> September 2014]

<http://www.learninginstitute.qmul.ac.uk/elearning/casestudies/joyhinson/>

Nicholls, M.E.R., Orr, C.A., Okubo, M. and Loftus, A., (2006) Satisfaction Guaranteed: The Effect of Spatial Biases on Responses to Likert Scales. *Psychological Science* 17 (12), pp. 1027-1028.

Pitcher, N., Davidson, K. and Goldfinch Napier, J. (2000) Videoconferencing in Higher Education. *Innovations in Education and Training International*, 37 (3), pp 199-209.

Reay, D., David, M.E. and Ball, S. (2005) *Degrees of Choice: Social Class, Race and Gender in Higher Education*, Trentham Books, Stirling.

Sams, A. and Bergmann, J. (2013) Flip Your Students' Learning. *Educational Leadership* 70 (6), pp 16-20.

Thomas, E. (2001) *Widening Participation in Post Compulsory Education*. Continuum, London.

UHI Learning and Information Services (2012) *Using the TCS video recording service* [retrieved 9<sup>th</sup> September 2014] [http://www.uhi.ac.uk/en/lis/vc/vc-recording-and-the-tcs/at\\_download/file](http://www.uhi.ac.uk/en/lis/vc/vc-recording-and-the-tcs/at_download/file)

UHI Learning and Information Services (n.d.) *UHI Personal Video-conferencing* <http://www.uhi.ac.uk/en/lis/vc/UsingUHIJabber.pdf>

UHI Learning and Teaching (2012) Video conferencing: Student guide, [retrieved 9<sup>th</sup> September 2014] [http://www.uhi.ac.uk/en/lis/vc/UHI\\_VC\\_student\\_guide\\_print.pdf](http://www.uhi.ac.uk/en/lis/vc/UHI_VC_student_guide_print.pdf)

Winslow, B., Wiggins, K.D., and Carpio, M. (1998) Using multimedia computer technology to teach US history at Medgar Evers College, City University of New York, from three perspectives. In Tinkle, D. (ed) *Writing teaching and researching history in the Electronic Age, Historians and Computers*. Library of Congress, Washington DC, pp 129-154.

Zandervliet, D.B. and Fraser, B.J. (2005) Physical and Psychosocial Environments Associated with Networked Classrooms, *Learning Environment Research* 8, pp 1-17.

## 7 Appendix 1

The message was titled “Survey of VC Teaching and £100 Prize Draw” and the main text read

“Would students studying by videoconference please consider undertaking the survey accessible through the link below.

<https://www.surveymonkey.com/s/GJ6QMSN> ”

This took the student through to the survey itself which was headed by the following message.

“As a UHI student studying by video-conference you are requested to take part in this survey. You are not obliged to take part in the survey. You do not need to provide your student number, but if provided you will be entered in a prize-draw for £100 of Amazon Tokens.

Data will be held securely and your individual survey return will not be shared with any UHI staff or third parties. Your name will not appear in the report, and your responses will not be individually attributable.

By completing this survey you are giving consent to being involved in this research and for quotes from this questionnaire to be used in the research report as long as your identity is strictly protected.”

Twenty-nine survey questions followed, those marked with a star required an answer, the remainder were optional.

1. If you wish to be entered for the prize draw please enter your student number.

2.\* Which UHI Partner are you enrolled with?

- Argyll College
- Highland Theological College
- Inverness College
- Lews Castle College
- Moray College
- North Atlantic Fisheries College (NAFC)
- North Highland College
- Orkney College
- Perth College

- Sabhal Mòr Ostaig (SMO)
- Scottish Association for Marine Sciences (SAMS)
- Shetland College
- West Highland College
- Other (please specify)

3.\* How do you usually attend VC classes?

- At the main campus
- At a learning centre
- From a non-UHI site, via PC based videoconferencing

4.\* What programme are you enrolled on? (for example History and Politics or Scottish Cultural Studies)

5.\* Your current level of study through the medium of VC?

- SCQF 7, HNC / first year degree
- SCQF 8, HND / second year degree
- SCQF 9, Third year / ordinary degree level
- SCQF 10, Fourth year / honours level
- SCQF 11, Masters level

6.\* To which age group do you belong?

- 17-21,
- 22-25,
- 26-40,
- 41+

7.\* Gender?

- Male
- Female

8.\* Approximate number of modules you have taken which have been supported by videoconferencing?

- 1

- 2,
- 3-6,
- 7 or more

9.\* Were you provided with training in the use of the VC equipment? (tick all that apply)

- I have received training locally from my enrolling partner staff
- I have received training through my programme organised across the VC network
- I accessed online training resources from the UHI website
- I have received no training in VC use beyond what I picked up in the modules for which I was enrolled.

10. Please comment on the effectiveness of any training given.

11.\* Which of the following VC delivery spaces have you experienced for learning and teaching? (tick all that apply)

- VC equipped lecture theatre / auditorium
- VC classroom with twin screen and control console
- VC classroom with remote control rather than fixed console.
- VC via Jabber / Movi / Conference me on a PC

12. Please comment on the suitability of these spaces for networked learning and teaching.

13. For your most positive VC module experience please comment on what was good about it

14. For your least positive VC module please comment on what made it a bad experience.

15\*. Have you felt able to contribute actively in VC classes?

- At all times
- In most sessions
- In some sessions
- Very rarely
- Never

16. If you have felt unable to contribute in VC discussions, why?

17.\* Are module tutors at remote sites available to you by phone and email outside the VC sessions?

- In all cases
- In most cases
- In some cases
- Very rarely
- Never

18. How have you found the use of VC by other students on VC led modules?

19.\* Have you made presentations yourself by VC

- Yes
- No

20. How did you find the experience?

21.\* How much do you use the Streaming of Recorded VC classes?

- I have never used it
- I have used it once or twice
- I use it quite often
- I use it regularly
- It is the main mode of delivery for a module that I usually cannot attend live.

22. Please comment on the quality and usefulness of streamed recordings and any drawbacks to having lessons recorded?

23\*. Have you made friends with students based at other locations through your use of VC for study?

- Yes
- No

24\*. Would you feel able to ask a staff member who has taught you by VC (from another site) for a reference?

- Yes



- No

25.\* How would you rate your experience of learning and teaching by VC with UHI?

- Overwhelmingly positive.
- Generally good occasionally falling short of its potential
- Good in parts but frequently falling short of its full potential
- Adequate, but significantly inferior to face to face teaching in most instances.
- Wholly inadequate for the delivery and support of quality education.

26. What aspects of modules' delivery were least satisfactory?

27. What most impressed you about modules' delivery by VC?

28. Have you any suggestions for the better use of VC in UHI's learning and teaching?

29. Would you be willing to be contacted by phone and asked follow up questions?

- Yes
- No

## 8 Appendix 2



Figure 1: A screenshot of a VC lesson in progress from an auditorium at Inverness College

Note the three decapitated students on the back row of the auditorium and a tutor facing away from the camera for the full session. Without apparent irony the tutor asked the remote students to adjust their camera because she could not see their faces. A second camera facing the tutor is available for when presentations are being made and the local students could have been asked to move to the front row to better engage with the virtual cohort when the audience facing camera was selected (Copyright UHI).



Figure 2: VC with twin monitors and a fixed console being used by the author to make a presentation from Shetland College.

Note the single camera between the two monitors. The screen on the left is displaying “active view” of the remote participants, plus a self-view picture-in-picture to help the local user correctly frame their camera. The right hand monitor displays a presentation input from a PC (Copyright UHI).



Figure 3: A staff member using PC based VC from an office in Shetland College, Lerwick.

Note the small camera mounted on top of the computer monitor, which is displaying the active speaker at the remote site and a smaller self-view. The camera has to be directed manually and usually has no ability to zoom or move to wider angle. A headset with microphone minimises background noise when used in a shared office space (Copyright UHI).



Figure 4: A screen shot of a multisite VC with the active speaker in the large screen and the other participants displayed in smaller “continuous presence” windows.

This configuration allows some indication of the degree of student engagement throughout the virtual classroom. However note the lack of detail in the individuals depicted second from the right on the bottom row (Copyright UHI).

## 9 Revisions Table

Suggestion	Response
Remove numbers relating to questions and respondents.	Questions / student reference numbers in brackets removed from the text.
Links to earlier studies and wider theory.	Additional comments and citations added for the following; <ul style="list-style-type: none"><li>• Anderson, T. (2008)</li><li>• Bondareva, Y., Meesters, L., and Bouwhuis, D. (2006)</li><li>• Calodine, R. (2008)</li><li>• Frind, T. (2009)</li><li>• Reay, D., David, M.E. and Ball, S. (2005)</li><li>• Thomas, E. (2001)</li><li>• Winslow, B., Wiggins, K.D., and Carpio, M. (1998)</li><li>• Zandervliet, D.B. and Fraser, B.J. (2005)</li></ul>