USING ASYNCHRONOUS VIDEO TO PROMOTE LEARNER ENGAGEMENT THROUGH THE ENHANCEMENT OF ASSESSMENT AND FEEDBACK

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Abstract

The University of Huddersfield-funded 'Video Enhanced Response in Feedback Loops' Project (VERiFy) is using a participatory action research methodology to explore the potential of asynchronous video to promote closer learner engagement in the assessment and feedback process. The initial stage of the project has seen the involvement of academic practitioners at two Higher Education Institutions and from three subject disciplines, Computing, Psychology and Business. This paper presents the interim findings from the first evaluative cycle of an ongoing project, highlighting examples of how learners from Computing and Business disciplines engaged with and responded to the use of asynchronous video to enhance assessment and feedback, and how effective strategies are being developed for its use as a tool to promote dialogue.

Introduction

The opportunity for reflexivity is often cited in contemporary educational theory as a key benefit of asynchronous text-based approaches in online and blended learning communities (Garrison & Kanuka, 2004; Humfrey, 2010), however opportunities for reflexive discussions between learner and tutor within the framework of the assessment and feedback process are often limited (MacDonald, 2006), and, where feedback is summative, can lack the timeliness of formative feed-forward (Glover & Brown, 2006).

Text-based modes of communication have also been found to place limitations on the engagement of learners within the creative and numerate disciplines, for whom text can be less effective than audio-visual media (Shaffer, Doube & Tuovinen, 2003; DeVaney, 2009), and can act as a barrier to inclusivity for learners with conditions such as dyslexia (Woodfine, Nunes, & Wright, 2005).

Research exploring alternatives to asynchronous text-based approaches to enhance learner engagement with feedback has focused primarily on the use of audio (e.g. Belfer & Morgan, 2005; Ice, Curtis, Phillips & Wells, 2007; Doolan & Simpson, 2010), while technical considerations such as file size and bandwidth have meant the use of video in online and blended learning communities has previously been overlooked and under-researched. Against a backdrop of pedagogical developments in the areas of blended and mobile learning (Hung, Lin & Hwang, 2010), improvements in file compression, together with expansions in the provision of internet access and the development of more robust mobile communications networks, mean that greater consideration can now be given to using video to enhance the assessment and feedback process.

Background, Context and Related Research

The VERiFy Project is employing a participatory action research methodology to examine the emerging potential for asynchronous video to (i) enhance the assessment and feedback process through the integration of mobile technologies, (ii) encourage greater learner engagement within blended learning communities, and (iii) offer greater inclusivity for learners with difficulties such as dyslexia.

Academic practitioners at two UK Higher Education Institutions (UKHEIs) are engaged in the 12-month project, which sees the participation of learners from three subject disciplines: Computing, Psychology, and Business. The initial stage of the project has focused on the experience of learners in Computing and Business; in this first action research cycle the emphasis has been on providing learners with an initial exposure to video in both assessment of and feedback on their work, and an evaluation of the learner response to the introduction of this intervention, leading to three case studies detailed in the paper.

The findings of this initial evaluative phase are feeding into the development of a video feedback loop system; this pedagogic intervention will be deployed in the later stage of the *VERiFy* project, and is designed to encourage learner participation in dialogue with tutors around feedback on specific aspects of their work, and

to promote a greater degree of reflexivity by situating the feedback process at the centre of a conversational framework (Laurillard, 2002).

Blended Learning

Blended learning is well established, although a broad range of definitions of this term appear in the literature. Procter offers a simple definition, describing blended learning as "the *effective* combination of different modes of delivery, models of teaching and styles of learning" (2003, p. 3), although specific reference to any online element is notably absent, whereas for Rovai & Jordan this is an integral component: "a blended course can lie anywhere between the continuum anchored at opposite ends by fully face-to-face and fully online learning environments" (2004, p. 4).

Garrison & Kanuka describe blended learning as an "emerging trend in higher education to blend text-based asynchronous Internet technology with face-to-face learning" (2004, p. 96), highlighting the requirement for "effective integration" of these two elements, and emphasising the importance of "not just adding on to the existing dominant approach or method" (p. 97). Notably, the authors focus on the integration of synchronous face-to-face (F2F) with asynchronous *text*-based communications (ATCs), but do not explore wider blends of F2F with other asynchronous forms of online communication such as audio or video, which lend themselves to application in creative and numerate disciplines more naturally than ATCs (cf Boyle, Bradley, Chalk, Jones & Pickard , 2003).

For the purposes of this study, Rovai and Jordan's (2004) broad definition of blended learning is adopted, whereby elements of online activity are effectively integrated with F2F learning, rejecting Garrison & Kanuka's (2004) insistence on the necessity of using ATCs.

Asynchronous Video

As noted by Griffiths & Graham, "self recorded video clips contain many of the verbal and non-verbal cues that exist in a face-to-face environment" (2009, *Asynchronous Video*, para. 2). While uni-directional asynchronous video can afford learners opportunities for repeated playback of the media otherwise unavailable in a non-recorded face-to-face setting, employing a dialogic strategy offers opportunities for learners to harness the benefits of both the reflexivity of asynchronous learning, and those visual and non-verbal cues absent in a text-based environment.

Mobile learning

Expansions in the availability of video-enabled mobile communications devices have been accompanied by the rise of a technological context ripe for a proliferation in mobile learning; while the emergent ubiquity of smart-phones does not in itself mean that either learners or tutors are fully prepared for a new age of mobile learning (Corbeil & Valdes-Corbeil, 2007), research suggests that formative assessment-based approaches to mobile learning can result in improvements in both students' attitudes to learning and their overall achievement (Hwang & Chang, 2011). Against this background, it is anticipated that the development of feedback-response systems which enable learners to access feedback in video form, and to respond using camera-enabled phones, will support engagement with formative feedback.

Dyslexia

Dyslexia is recognised as a "protected characteristic" covered by the provisions of the Equalities Act 2010, with the implication under the Special Educational Needs and Disability Act 2001 that UKHEIs are required to ensure that "disabled students are not placed at a substantial disadvantage in comparison with students who are not disabled" (HMSO, 2001, c. 10). Typically, a learner diagnosed with dyslexia will experience discontinuity in the visual processing of textual information, with observable effects ranging from minor misspelling of words to more significant degrees of inability to process information from textual sources.

Against the background of an emphasis on asynchronous text-based learning resulting from strategies to promote reflexivity, learners with dyslexia can find themselves placed at a disadvantage by approaches which emphasise an asynchronous text-based definition of blended learning (Woodfine *et al*, 2005). Research has found, however, that learners with dyslexia can display improved engagement with feedback which has been provided as an audio commentary (Hope, 2010), and by substituting an asynchronous video conversation for text-based feedback it is hoped to afford learners with dyslexia greater opportunities to engage more closely with feedback through the removal of this serious obstacle.

Case Studies Exploring Video-Enhanced Feedback

Computing

Undergraduate learners studying computer games within the Department of Informatics at the University of Huddersfield currently use the *Mahara* e-portfolio system to demonstrate the development of games and to showcase their work within a 'closed' blended learning community. Individual learners may elect to make their e-portfolio visible outside the community, however the pedagogy is one of providing a safe place to experiment with ideas and development techniques, and the option of restricting access to logged in registered users is adopted by default. Learners populate 'Views' with weekly blog entries documenting the development of their work, supplemented by concept artwork, screenshots and video walkthroughs, while the games themselves can be downloaded for peer review, with the facility for feedback to be left by peers and tutors.

Case Study 1: Computing – Year 1

Thirty-five learners were engaged in two computer game development exercises, working collaboratively on 3D game design and 2D game programming briefs which were later assessed on an individual basis. The learning blend saw learners spend one session of two hours per week in a studio setting where a broad range of instructional video tutorials were embedded within the e-portfolio system as resources to scaffold learning (Vygotsky, 1978), while the tutor was available to provide face-to-face feedback on work-in-progress. Learners were expected to spend 12 hours per week working unsupervised, however the tutor was available for email contact outside the studio session. The learning design required individual presentations at three stages: concept development and storyboarding, work in progress, and finished product. Video evidence of presentations was recorded using screen-capture software, while the presentation narrative was recorded using a clip-on microphone, with the two streams integrated into a single file by Techsmith's *Camtasia Studio*.

Presentations lasting c.5-8 minutes typically generated a file-size of 0.8-2.0Mb per minute once reduced to a resolution of 640x480 and compressed to MP4 format by the *Camtasia* software, resulting in a requirement to handle files in the range 5-15Mb. Tutor feedback was integrated with the learner's video file by recording a voiceover in conjunction with the use of the cursor to highlight areas of significance on the screen. In the majority of cases, only short clips from the learner's presentation were required for the production of the video feedback file, resulting in video feedback files of 2-4 minutes in duration, and the adoption of this approach yielded final output file-sizes of 1.5-6.0Mb. These files were well within the institutional file-size limit for email attachments, and the video feedback was then emailed to each learner individually; around 50% of learners in this group use a smartphone, with applications synched to their university email accounts notifying them of the arrival of new messages.

A qualitative evaluation of this approach was conducted using semi-structured interviews both with learners and, later, tutors, with follow-up questions sent by email.

Case Study 2: Computing – Year 2

Twenty-five learners were engaged in a collaborative group-work computer game development exercise, working in teams of five learners comprised of one programmer and four designers. The learning blend saw learners spend one session of three hours per week in a studio setting where the tutor was available to provide face-to-face feedback on work-in-progress in the role of project manager, or 'coach' (cf Schön, 2000). Learners were expected to spend 12 hours per week working unsupervised, and as the tutor was engaged on a part-time basis there was no other contact between tutor and learners outside of the studio session. The learning design required regular group presentations of work in progress, and engagement on a monthly basis with a self-peer-tutor assessment process (McConnell, 2006). Video evidence of presentations was dual-recorded using both screen-capture software and tripod-mounted Cisco *Flip* camera hardware; once again, the presentation narrative was recorded using clip-on microphones, and integrated with the screen capture file recorded using *Camtasia*.

Presentations lasting 15-20 minutes typically generated a file-size of 30-35Mb per minute from the *Flip Ultra* camera at 640x480 in the device's native MP4 format, however once the file was compressed using the *Camtasia* software, file-sizes of 2.0-3.0 Mb per minute were achieved, resulting in a requirement to handle files of 30-60Mb.

Screen captured videos were captured directly through Camtasia at a native resolution of 1280x1024, resulting in raw file-sizes of around 120Mb per minute in the native AVI format. Once the screen resolution had been reduced to 640x480 and the files compressed, the resulting output in MP4 format yielded file-sizes of 0.8-1.0Mb per minute, resulting in a requirement to handle files of 12-20Mb.
Video files were then uploaded to the group's private dedicated space on *Mahara*, affording team members the benefit of the opportunity for reflexive self-evaluation while also allowing any absent individuals to view the recordings for the purpose of peer-review. Tutors then overlaid clips extracted from these videos with talking-head feedback/feed-forward recorded using a laptop webcam, combining and compressing the files using *Camtasia*'s video editing facility, before making these available in *Mahara* in the same manner.

Finally, learners recorded their own feedback to tutors on the feed-forward received from them, thereby engaging learners and tutors in a conversational framework, intended both to ensure that the learner voice was heard within the learning process, and to provide a mechanism through which to clarify areas in which misconceptions might arise. Learners were encouraged to provide evidence of engagement with this process by producing a further video demonstrating any amendments or improvements to their games based on the peer feedback received during the live presentation and the tutor feedback received in video format.

In common with Case Study 1, this approach was also evaluated qualitatively, using a similar combination of semi-structured interviews, with follow-up questions sent by email.

Business
Case Study 3: Business – Year 1
In the Business School at Edge Hill University, an academic tutor employed a low-tech, low-cost approach with 20 Year 1 undergraduates who were required to give group presentations on a topic in groups of 5 learners; within the learning design for a module, the emphasis of the exercise was on demonstrating the quality and effectiveness of presentation skills, with the aim of helping learners to improve their technique. Presentations lasting around 10 minutes were recorded using a 1st generation *Flip* camera, initially yielding video files in the device's native format of 30-35Mb per minute, resulting in a requirement to handle files of 250-400Mb, which were transferred to the tutor's laptop.

The tutor then played back the videos on her laptop, using the integrated microphone to record her feedback to learners as a voiceover, before overlaying this onto the audio track timeline of the original video recording of the presentation using the *Movie Maker* software bundled with the *Windows* operating system. Learners were then invited to watch the feedback video in a private setting, and asked to complete a short questionnaire, yielding qualitative data on their experience of receiving feedback.

Findings and Discussion

Findings - Asynchronous Video
A key technical consideration identified at the start of the project as carrying the potential to impact negatively on the distribution of video feedback to learners was the associated file-size. One finding emerging from this first action research cycle has been the significance of finding the right balance in the trade-off between file-size and video quality, and the subsequent recognition of the need to develop effective strategies for the distribution and placement of video feedback in order to promote learner engagement with it.

While devices such as the *Flip* camera can record in high definition, creating very high quality content, this can result in excessively large file-sizes for the purposes of distribution, and while it remains feasible to burn large file-size videos to DVD and to hand this to the learner for self-review, this introduces a distancing of the video content from the e-portfolio system. Consistent with Doolan and Simpson's (2010) findings in relation to embedding audio files within a wiki, this study found that levels of learner engagement with feedback and participation in a conversational framework were improved when the feedback was situated within the learning environment itself.

Across all three participant groups there was an overwhelmingly positive response to the introduction of video as a technology to enhance assessment and feedback within their subject areas. Reflecting on the first video received, one Computing group learner, Participant 2S, noted that:

> *"... even a short voiceover of the presentations by the tutor would have been very useful, but watching that video of our presentation from Mahara with[the tutor] as a 'talking head' I thought was fantastic; great quality and sound and I had no problem with buffering when skipping back and forth ..."*

... while another offered the following comment:

> *"... putting the feedback video inside our group's Mahara area was a really good idea – having it right there alongside our blogs and shared discussions meant we could go back and watch it again to check we'd picked up on everything we needed to look at as we continued developing our game ..."*

In contrast to this enthusiasm however, one Y1 learner gave negative expression to the experience. Reporting a personal learning preference for feedback through synchronous face-to-face contact, Participant 1AM cited the delay in the opportunity to ask questions as a drawback:

> *"If the tutor is criticising your work wouldn't it be better if they were there to do it with you there so you can question them on it?"*

Similarly, in the Y2 group, one learner gave a negative account, questioning whether the provision of suitably clear and detailed feedback from tutors on highly technical issues might be better achieved synchronously:

> *"When you know there's something wrong in your event-driven animation code and you just want to know where the problem is like I did, well, I'd have preferred to have been able to talk it through with the tutor, say on Skype, or perhaps even using MSN or something."*

These two exceptions notwithstanding, the majority of learners in Computing were clearly engaged with the video feedback process, as further evidenced by those learners who demonstrated their knowledge of video production techniques by offering suggestions for what would constitute an ideal file-size and resolution:

> *"I would say it worked fine with a video of around 480p quality (standard TV definition)... [and this] keeps file size down."*

Achieving an optimum balance of quality and proximity to the learning environment therefore appears to be a significant factor in using video to promote learner engagement with the assessment and feedback process.

The duration of the video was identified as a related factor in both the provision of video feedback of an appropriate file-size and the learner engagement with that feedback. Where tutor feedback on a presentation was perceived by learners as overly lengthy this carried the risk of abridged viewing, especially in cases where feedback was detailed and technical. One learner's reflection on this aspect is typical of responses received to a follow-up email interview question on the topic:

> *"... any feedback we get which actually shows us how to make our games better is great, but it probably only needs to be 5 minutes long."*

In the Business School group, the tutor suggested it had been the experience of her learners that:

> *"... it had been of help to watch the video footage back and ... [they] would find tutor feedback embedded onto the original footage of great use as they felt it would improve their future presentations ... [by providing] detail on specific aspects of their presentation".*

In an aside which highlighted the potential for an efficiency saving in connection with standard requirements for internal moderation and the external examination process, the Business School tutor offered an observation on another benefit of using video, noting that:

"... the use of the Flip to capture the footage required only one tutor to be present during the presentations, therefore avoiding additional costs for a second tutor and enabled time to be used more effectively. The moderator and external assessor can also have access to this footage subsequently."

Findings - Mobile Learning

Moves towards the integration of video feedback with expanded provision of mobile learning opportunities received a mixed reception, and while enthusiasm was expressed by a number of Y1 learners, for example Participant 1BG:

"I loved seeing the tutor's feedback on my iPhone - that was cool! I wish all the tutors would do this!"

... the financial implications of receiving video on mobile devices was a concern expressed in the cost-benefit analysis approach taken by some Y2 learners, including Participant 2J, owner of an Android-based smartphone:

"I doubt I'd look at it on my mobile much though, it's just not worth using up my data allowance on it when I can watch it on a uni computer for free!"

Clearly, the enthusiasm expressed by the Y1 learner yields little in terms of recognition of the *learning* potential offered by mobile learning initiatives, however the willingness to embrace both video feedback and its delivery to a mobile device suggests that moves towards an expansion in the provision of mobile learning opportunities might be welcomed by learners in the future. While recognising concerns surrounding bandwidth implications, this learner's comment highlights the need for greater awareness of the opportunities offered by both localised campus-wide wifi networks and national facilities such as the JANET *eduroam* service.

With many UKHEIs offering registered learners access to web-based connectivity using the wifi functionality embedded in most 3G and 4G-capable smartphones, a minor configuration of the phone to use a university username and password can allow the user to avoid using up potentially costly data allowances on pay-as-you-go services and data-limited monthly contracts. Indeed, the proliferation of campus wifi networks in UKHEIs also increases the feasibility of extending access to mobile devices within libraries and 'learning zones' such as that at Lancaster University, leading to the introduction of schemes such as the *Duke Digital Initiative* at Duke University in the United States where learners were provided with a pre-configured mobile device pre-loaded with campus apps and for use on the campus network (DDI, 2006).

Findings - Dyslexia

There were eight learners with a diagnosis of dyslexia in the two Computing case study groups, five of whom were in Y1 group, and the remaining three in the Y2 group. This represents samples amounting to 14% and 12% respectively. Perhaps unsurprisingly given the nature of the condition, all dyslexia-affected learners stated that they had previously encountered problems with text-based feedback, with one Y2 learner, Participant 2P, commenting:

"... to be honest, it's always been pointless getting an A4 sheet of comments along with my grade at the end of a module and then expecting me to do anything with it. Looking at some of the feedback I've had on other modules ... well, you know, as someone with dyslexia, I'd be lucky to get through the first paragraph before giving up, and so if I could see from my grade that I'd have to resubmit work for a module I'd just go and see the tutor and say 'what have I got to do to pass?'"

The same learner's comments on a preference for video over text-based approaches to feedback were typical of those made by dyslexic peers:

"Getting feedback on my work in a video like this is brilliant, I love it! After making our own videos for the assignment it's really helpful to be able to play them back whenever I want to - and with the lecturer telling me which bits of my work I could improve on I can really pinpoint what I've got to do to get good grades".

While these comments underscore the learner's grade-focused approach to the higher education experience, it is clear that the opportunity to achieve more than a basic pass has excited this learner in particular; following up this point in an interview with the tutor later, it was clear that an improvement in motivation and a desire to engage with feedback had already been picked up on. The tutor reflects:

> *"It's been very encouraging to see [Participant 2P] playing a much more active role in the group than I might have expected from his performance last year. We used to send emails back and forth, but it just didn't get to the nub of the issue when we were looking at programming problems, and even attempts to use screenshots only got us so far. This year, well, it seems that using video to assist in solving problems which are essentially visual is making a real difference for him – OK, he still has to battle with the development environment being text-based, but he really seems to be getting the hang of the kinds of patterns in the code which were giving him problems and implementing workarounds accordingly."*

A welcome but unexpected outcome of introducing learners to the practice of producing videos to showcase their work was seen with one dyslexic Y1 learner: Participant 1BC. Entirely independently of the request to capture game-play footage, Participant 1BC began to post videos of work-in-progress to a YouTube account, sending the tutor a link by email in order for the problems in the coding to be presented visually and requesting tips on how to proceed. In the original conception of the *VERiFy* project, it had been intended that the use of *Mahara* as a 'safe-place-to-fail', in conjunction with the development of an intervention offering private accounts for housing and receiving video feedback, would afford learners a degree of privacy regarding feedback on their work, in line with institutional policy.

Pre-empting the deployment of the intervention, Participant 1BC's approach serves as an example of how the repurposing of social technologies for educational ends (cf Hemmi, Bayne & Land, 2009) is not the sole preserve of academics and institutions, but can also be very much learner-led.

Findings - Summary

The overall learner and tutor response to the use of asynchronous video has thus far been overwhelmingly positive, with many requests received from learners in Computing for the scheme to be extended to other modules. Those learners who received feedback as a talking-head overlay reported very high levels of satisfaction with the process, and there are indications that levels of engagement with the feedback have been boosted, while those learners who received tutor feedback as an audio voiceover overlaid onto a video indicated an expectation that the use of a talking-head commentary on their work would be of additional benefit.

The *VERiFy* project will move into its second stage in September 2011, seeing the deployment of the video feedback loop system across a broader range of subject areas, and while it is clear that there is enthusiasm for mobile learning from some learners, the indications from the initial phase of the project suggest that engaging learners with mobile learning may require tailored training for both academics and students.

This study has also found that the use of asynchronous video as a vehicle for the delivery of feedback has afforded improved inclusivity for learners with a diagnosis of dyslexia, with clear indications of learners acting on feedback and benefitting from it. Against this background, the evidence appears to suggest that asynchronous video can be used to enhance assessment and feedback for dyslexic learners, begging further empirical research and engaging with participants from a broader range of disciplines and subject areas.

Conclusion

This paper has outlined the interim findings emerging from the initial evaluation of a project which has thus far focused on the use of asynchronous video with relatively small groups of learners in two disciplines; as such, the paper makes no claims for the generalisability of the findings. Clearly though, there is no one-size-fits-all approach to feedback, and it is recognised that even in the most visual of subject areas there will always be some learners who will prefer F2F or text-based feedback. Further to this, it is recognised that learning preferences may change according to differing circumstances, and while a learner might on one occasion

prefer video-based feedback to text, there will almost certainly be other occasions when the same learner might prefer a synchronous F2F discussion of some aspect of their work. Similarly, while a computer hardware failure might mean that the opportunity to access video feedback on a mobile phone could become invaluable, on another occasion a learner might simply benefit from a URL sent in an email.

The conclusion to be drawn here is not that video feedback should replace text or F2F-based approaches, but that it can act as a supplementary mechanism to enhance the assessment and feedback process, and promote learner engagement with it. While it may be desirable that technology should not dictate pedagogy, it is perhaps equally important that we do not allow a strict adherence to pedagogy based on asynchronous text-based learning to restrict the investigation of opportunities afforded by other technologies, instead re-focusing our efforts on developing a symbiotic relationship between pedagogy and technology to achieve the optimal balance of *blended feedback* for our learners.

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