

Investigating Aesthetic Effect of Visual in Online Higher Educational Video Lecture Experience

Miguel Sousa, Fiona Carroll, *Member, IEEE*, and Rita Kop

Abstract—Technology not only influences the way that learning experiences are developed, but it also has an effect on how people engage with the learning, and the way that students understand the learning material. In fact, the increased use of technology in education as a result of COVID-19 lockdowns has vastly extended the range of traditional teaching and learning approaches tapping into sensory capacities never explored before. Moreover, evidence from the literature suggests that learners rely heavily on their senses to process information and visual design can be used to influence a successful learning experience by evoking positive embodiments and emotions in learners. Designing for the aesthetic emotions has the potential to support student satisfaction, cognitive development, sense-making and support in creative engagement and innovation. All learners have different preferences of how to deal with the presented information to best support their learning, and same is the case with designing for the aesthetic. Designers can cater for these different preferences by developing learning experiences that afford cognitive and affective connections and associations. **This paper reports on research that explored the** role of the aesthetic in the design of the higher educational learning experience. The research involved a survey investigating student perceptions of what the effects of changes to the aesthetics of video lectures on students' learning experiences were. The findings highlight various aspects of the aesthetic and the potential impact that these can have on students' learning.

Keywords—e-learning, aesthetic, video, visual, online

I. INTRODUCTION

TECHNOLOGY not only influences the way that learning experiences are developed, but it also has an effect on how people engage in learning, and the way that students make meaning of the learning material. In fact, the use of technology in education has vastly extended the range of traditional teaching and learning approaches tapping into sensory capacities never before explored. **There have been numerous studies that have shown that** as learners we rely heavily on our senses to process information and the more senses lecturers can engage in their teaching, the more they can help students in their learning [1]. Research by Uhrmacher [2, p.613] highlights that “providing aesthetic learning experiences is likely to include student satisfaction, an increase in perceptual knowledge, episodic memory retention, meaning making, and creativity and innovation”. This is an interesting finding as learners all have different preferences of learning, which means that in designing for the aesthetic, designers

M. Sousa is with the University of South Wales, Pontypridd, Wales, UK e-mail: miguel.sousa@southwales.ac.uk.

F. Carroll is with Cardiff Met University.

R. Kop is with Yorkville University.

Manuscript received April 19, 2005; revised January 11, 2007.

should address these different preferences by creating learning experiences that afford cognitive and affective connections and associations. Malamed [3] highlights that making e-learning visually appealing will enable lecturers to increase motivation and enhance the learning process by influencing the learner's emotions. This suggests that the aesthetic learning experience should be perceived as an enriching experience that results from the specific use and grouping of certain elements which sensually attract and arouse the learner into the sharing and making sense of information.

The “engaged interaction” between the learner and the learning material has the power to manipulate the perceptions of the learner to create new understanding. In order to illustrate how and why people use the aesthetic learning processes, Ausring and Sørensen [4] were drawn to the socialisation theory of Hohn (1998) who believed that when a person is engaged in socialising, they gain an understanding of themselves through three learning methods: basic empirical learning, aesthetic learning and discursive learning. This means that designers can use the aesthetic activity to express the unspeakable which includes the subjective, emotions and sensory experiences [4]. **This paper reports on qualitative research that explored the** role of the aesthetic in the design of the higher educational (HE) learning experience. This article investigates the effects of changes to the aesthetics of video lectures on student's learning experiences at a higher education institution.

II. WHAT DO WE MEAN BY THE TERM AESTHETICS?

Looking back through history, the earliest and most substantial contribution to the subject of aesthetics was supplied by the ancient Greeks - the term aesthetics comes from the Greek word *aisthetikos*, meaning “of sense perception” (i.e. the study of sensory or sensori-emotional values). Plato believed that pure beauty consisted of proportion, harmony and unity among their parts. However, Aristotle took things a little further and developed by scientific analysis certain principles of beauty and art (i.e. order and symmetry and definiteness). Yet despite this early start, it was only in the 18th century (1735) that aesthetics emerged as a distinctive discipline of philosophy when the German philosopher Alexander Baumgarten first coined the term “aesthetics” to refer to sensuous knowledge (i.e. cognition by means of the senses). From then, it was applied to the judgements of beauty (i.e. Kant) and then later, it broadened its boundaries further to focus on the experience (i.e. Dewey).

We are particularly interested in a vein of aesthetics called Pragmatic Aesthetics which originally emerged in the late 1800s in North America. Its main drive was to bring theory closer to the experience of art and in implementing this it caused traditional questions about aesthetics to change the ideas about experience [5, p.10]. It was a movement that began with Dewey, for whom all art is the result of the interaction between the living organism and its environment: "every experience is the result of interaction between a live creature and some aspect of the world in which he lives" [6, p.45]. In his book *Art as Experience*, he further suggests that the experience based on this interaction can lead to a transformation [6, p.22]. It suggests an integration of both the body and the mind – an aim towards a humanist perspective of learning, in which the whole creature takes part [7].

In more recent times, the philosopher Berleant follows a similar train of thought when he discusses aesthetics with a strong emphasis on engagement and interaction with objects and the environment [8, p.2]. This "aesthetic engagement," he believes, joins the object and the appreciator into perceptual unity. Berleant talks about three related characteristics of aesthetic engagement: continuity, perceptual integration and participation. He promotes the idea that art and other individual and cultural experiences are intertwined and cannot be separated; it achieves continuity between a variety of aspects. This aesthetic engagement joins the senses and creates further meaning in the form of a perceptual integration that brings together the sensory, conscious, physical, social sharing and integration of both the perceiver and the object in the aesthetic situation in a certain level of participation. Berleant suggests that artists have made us understand that the world of arts involves not just the mind, but the whole person.

As [9, p.121] says, the aesthetic is not a reaction to "some stimuli, but rather as an interpenetration of energies shared between subject and object." These ideas are highly relevant to learning and this ability to deeply engage the senses to increase motivation and enhance the learning process has the potential to contribute positively to the field of online learning; the following sections will explore in detail the relationship between the concept of the aesthetic and learning.

III. EMOTIONAL DESIGN AND LEARNING

Several researchers have acknowledged the importance of a holistic approach to learning design ([10], [11]). Moreover, a body of knowledge is developing that suggests that learning is affected by a variety of issues related to the learning setting and the learning context, but also that perhaps assumptions that have been made about how the brain functions have not been correct. Cognition and intelligence have been based on a particular perspective that saw cognitive processes determined by the verbal-linguistic, logical-mathematical, and bodily-kinesthetic ([12]; [13]; [14]). These type of "intelligences" have for a long time been the determinants on which intelligence (and their quotients) have been built. However, especially in the field of education a consensus is

developing that other aspects in the "human" determine how they learn, but also influence their motivation to learn and engagement in learning ([15]; [12]; [16]). Brookfield [15] emphasises that learning involves risks, discomfort and struggle, which are all highly emotional, while Palmer's [16] work on the teacher highlights the importance of teacher identity and involvement of the teacher at a deep personal level in the interactions in the classroom. Brookfield [15] and Palmer's [16] work both are mostly based on engagement in the face to face classroom, but the technological developments and the possibilities for online interaction and online learning and classrooms challenge even more these notions of emotional engagement of stakeholders in learning.

Shaviro [17], for instance, suggests that in the future, learning will be more complicated because of the complexity of the functions of the brain and mind and the lack of knowledge on what consciousness is or how it works as philosophers and scientists disagree over very basic issues. "We have no idea how to get from the brain to the mind: from electrochemical processes in our neurons to things like feelings and thoughts and experiences" [17]. He questions what consciousness is in an era in which technology becomes more and more prominent and we would argue that the ideas of cognition of the past might be inadequate to deal with technological challenges of tomorrow [11]. It is clear that apart from the verbal-linguistic, logical-mathematical, and bodily-kinesthetic, also the emotional, interpersonal and intrapersonal and forms of creative and naturalist might play a role in learning as suggested by [12] when he developed his ideas of multiple intelligences.

IV. THE 'ENGAGED' INTERACTION AND 'EMBODIED' COGNITION

One of the theories that most encapsulates some of the issues related to technology, action, aesthetics and learning is "Actor Network Theory" (ANT). Latour [18] suggests that the world and all objects, as well as all persons, knowledge, and locations, are connected. A teacher might be a knowledgeable actor, but so is a video of a particular situation. How a situation is presented and how social actors are engaging with it will all influence the experience of the actors in the setting. The people involved, the aesthetics of the technology used will all affect the emotions that are roused and the engagement achieved. As expressed by Latour [18, p.44] "Action is not done under the full control of consciousness; action should rather be felt as a node, a knot, and a conglomerate of many surprising sets of agencies that have to be slowly disentangled".

When we think of deep engagement, the term embodiment comes to mind. Until recently, sensory inputs and motor outputs were seen as secondary, they are now seen as integral to cognitive processes [19]. Dourish [20] places interaction at the centre of the picture and considers not only what is being done but also how it is being done. Uhrmacher [2] highlights how active engagement, sensory experience, connections, imagination, perceptivity and risk-taking are all conditions that encourage aesthetic experience. This is important in learning design as these aesthetic experiences support deep

engagement as well as cognitive engagement, an increase in knowledge, student satisfaction, meaning making and creativity [2]. This suggests that in terms of learning the embodied cognition and particularly the power of the aesthetic to trigger emotions, associations and intuitions as a means to fuelling the creation of richer and more effective learning experiences is important.

For educational sites, there are certain conventions. For example, where retention and readability, are a major concern; black on white or a closely related combination of text should be used [21]. Moreover, according to Bonnardel et al. [22] the colour orange is favoured not only for information processing, but also to support the memorization and retrieval of information acquired from a website. In conjunction with these conventions, it is the specific selection and grouping of certain stimuli that can also sensually attract and arouse the emotion of the learner into the deeper engagement level and understanding of the information. Furthermore, Lockner and Bonnardel [23] suggest that it is the arousal of positive emotions that can improve learning. Moreover, Schneider et al. [24] highlight that the use of decorative pictures that make a learning text aesthetically appealing, rather than just merely text providing information, has the power to generate more effective multimedia learning experiences. They demonstrate how images with the right degree of positive affective charge or strong connectedness to the content of the text can enrich learning materials [24]. It is this positive affective charge that fuels the “engaged interaction” between the aesthetic learning object and the learner’s past experiences, memories, knowledge etc. and in turn, harnesses new thoughts, feelings and a deeper level of learning. Visual clues can play a role in this.

V. VIDEO AND LEARNING

Groening [25] explains that in the mid-18th century Alexander Gottlieb Baumgarten compared aesthetics and sensuous knowledge, with/to the more logic perspective of intellectual knowledge. Clearly, these two forms of knowledge are not exclusive, but can reinforce each other if used in a way to complement and support each other, in the same way that Latour [18] argues that how the social interacts with the technological is not a matter of technology or society, but what is the best sociotechnological compromise [18]. If we further consider what Lockton, Rickets, Chowdray and Lee [26] argue that much of our meaning making in the real world outside educational institution is qualitative, rather than quantitative, institutional learning in “symbols” in the form of letters and words might not be the only, or even the best, to support learning in an educational context. They give the example of a ‘windsock’ on a bridge that tells much more about the wind conditions than if the wind speed were expressed in numbers. “We think and act in response to, and in dialogue with, qualities of phenomena, and relationships between them” [26, p.1844]. This suggests that using video can be a pedagogical tool that supports engaged interaction through connecting sensuous knowledge with intellectual knowledge. As the

information is presented qualitatively, in a way that appeals to the senses, it will be easier and more intuitive to make meaning of it. When considering online learning with most of the information being presented in text, one might wonder if “talking head” videos that at least include some “embodied allocations” [27] and “emotional clues” [28] will enhance the learning environment and learning experiences as the prevalence of text use in such learning environments does not support the qualitative in learning.

However, there are many different types of educational videos in use and as learning designers we are curious about the effect of particular videos on meaning making by students. For instance, would prospective football coaches be more engaged by the presentation of a case study video in the form of a football game or of a coach explaining particular challenges via video? How would a variety of presentations of “talking head” videos be perceived by learners? Would they find talking head videos more inspiring than reading text? Would the quality and aesthetics used in the videos influence the learning experience and how? **These issues are at the heart of our inquiry.**

VI. STUDY

This study aimed to find out if different types of videos and visual clues would influence the perception of the engagement in the learning experience of students in an undergraduate Football Coaching and Development program.

A. Introduction

The research focus in this paper is twofold: firstly, it examines students perceptions of the aesthetics and changes to the aesthetics of the videos used. Secondly, it analyses in detail the different video aesthetics and probes which aesthetics learners perceive to have more of an impact on their learning and why.

B. Background and description

The University of South Wales runs a two- year long FdSc Football Coaching and Development with the option to do a one year top up into a BSc Hons Football Coaching, Development and Administration program. This is a blended learning program where students are based in football clubs around the UK with the support of a mentor facilitating the daily classes. In these classes, students watch video lectures and complete tasks presented by the lecturers. As it is a football coaching program, there is also a practical side where each student works with the club and the community. Students are expected to visit the university campus several times a year where they meet the lecturers, have mentored sessions and do some practical exams. Every year, students on this program are asked to fill out an extensive questionnaire to provide the university and the clubs with feedback on their experience. As evidenced in Griffiths et al. [29], these questionnaires have been proving very important in the development of this program.

One of the main aspects being developed every year has been the learning materials, specifically the lecture videos. Over the last six years many changes have been made in order to provide lecture videos that are not only engaging to the students but also the best possible solution to help students with their learning. As noted, students in the second and third year have experienced a change in their videos from the previous to their current year. As demonstrated in Figure 1 and Figure 2, the videos are now cleaner with a plain white background instead of images/logos. The lecturer is further away from the camera being now possible to fit half a body in the shot where students can see the hand movements. Informative images, including graphs and text can now appear on the screen together with the lecturer as demonstrated in Figure 2 which contrasts with the previous years where either the lecturer or the images were on the screen at any one time. Sound was also improved by using a room located in a quieter area with more appropriate acoustics. Further development has been done since this study and the lectures are now recorded in a fully soundproof video studio.



Fig. 1. Print Screen from a video used in the academic year 2015/2016



Fig. 2. Print Screen from a video used in the academic year 2016/2017

For Part 1 of the study, all second and top up students were given, as part of their residential questionnaire, additional questions to gauge their perceptions about the learning materials. The intention of these questions was to find out if students noticed the changes in the aesthetics and how important, aspects such as image quality and sound were in their learning.

A. Research methodology

As part of the residential time where students visit the university campus for three days, both second and third year students on the blended learning Football Coaching course were asked to fill an online questionnaire created with Google Forms. The questionnaire was divided in fifteen parts and all students were asked to fill it out. Most questions were multiple choice and some had the option to comment. Considering the number of students, the three day residential visits were done in groups of approximately thirty to forty students at each time and took four weeks to complete. **Students were given the option to take part in the** research or to opt out.

B. Participants

All 147 students present at the course residentials filled out the questionnaire. The participants ranged from nineteen to fifty-two years old with the average age being 22 years old. Over 90% of participants were male (136 'male', eight 'female', two students "preferred not to say" and one ticked "other"). Participants were students based in 30 football clubs from all around the UK; they were learning through blended learning and studied off-campus and used the videos for learning regularly. Three participants disclosed some form of colour blindness and one preferred not to disclose a disability.

C. Findings

Historically, the continuous improvements to the video learning experience have been based on student feedback. Students who participated in study part 1 (who experienced the recent change from Figure 1 to Figure 2) found the new cleaner videos better to learn from when compared to the ones from the previous years. 108 students found the change to be an improvement compared to 35 who felt there was no change and four students who found the changes to be negative. One of the main transformations to the learning videos, was the change to the duration of the videos. Whilst previously the 50minute lectures were given to the students as one video, after feedback and several iterations, the lectures are now divided in smaller chunks and where possible, with tasks bridging the shorter videos. As the findings show, this change seemed to be very well received with over 100 students agreeing that the length of the videos is now good (see figure 3). Only one student felt the videos were too short, though 39 students felt that the videos were still long and/or too long.

VIII. STUDY PART 2

In this study, we were also interested to find out what parts of the video were more important for the students' learning experience. As the findings show, students felt both, video and audio, are very important. One hundred and thirty two students ranked the video quality important and very important, whilst 130 students chose the same for sound. No students answered not important or not very important for either. Finally, when asked about other details such as colour contrast or the arrangements of objects on the screen, we can see a more diverse range of answers even including some not important or not very important. For example, 55 students felt this was very important whilst three felt it was not very important.

Scale	Count of how participants rated the length of the videos
Good	104
Long	26
Short	2
Too long	13
Too short	1

Fig. 3. Feelings on the length of the video

D. Discussion

From this study it was clear that quality of the video and audio is important in student perception about their learning experience and that video aesthetics influence the experience. The findings show that most students preferred a simple video with as few distractions as possible. Moreover, audio quality seemed to feature as the most important factor when studying and learning through the medium of videos. We noted that the majority of the less positive comments/ suggestions were about the overall experience with an emphasis on the lecturer's performance as opposed to the actual specific video aesthetic. Comments such as "record where the sound won't come out tiny" and "better sound on videos" will continue to be taken into consideration and the relevant changes will continue to be made to the online delivery of the course. For example, a new soundproof studio has now been built in order to improve what the findings highlight to be the most important aspect of the video learning experience. In addition, more work will be undertaken to enable lecturers to connect more naturally with their learners. As we have already discussed, "embodied allocations" [27] and "emotional clues" [28] will continue to have an emphasis in enhancing the learning environment and learning experiences. Furthermore, the possibilities for improving the use of the video screen space (i.e. animations of the information provided etc.) will also be embarked on.

Following on from Part 1 of the study, Part 2 of the study aimed to evaluate the quality of video aesthetics and the role that this plays in online video learning. Twenty-three students (nine females and 14 males) between the ages of 18-41+ years took part in the study; these students were fulltime on the campus and didn't have the day-to-day experience of actually studying with the videos. The study was conducted using the Qualtrics online survey software.



Fig. 4. Videos 1-5

Participants were randomly presented with five short online learning video examples (see figure 4). After each video, participants were asked 'What is your first impression of this video (i.e. what stands out the most for you)?'. After which participants were asked to rate (on a seven- point Likert Scale) their level of satisfaction of the video experience in terms of communication, presenting the lesson, triggering imagination, enhancing knowledge of the subject being learnt, actively engaging in the full lesson. Following this an open ended question to describe the aesthetic of the video and then rate the aesthetic of the video were asked (using a five- point likert scale from terrible to excellent). The focus was on the visual quality of the video, the audio quality of the video, the visual layout of the video, the colour arrangement used in the video and the visual attractiveness of the video. Finally, participants were asked how they felt after watching each of the video examples. The final part of the study required participants to watch all five videos again and then rank them in terms of preference, engagement, aesthetic pleasure and impact on their learning.

1) *Video Design*: For many students, an understanding of a subject is achieved through the reading of the lecturer as well as the reading and listening of words and images on a set of lecture notes. As a result, in digitising the experience, both lecturer and lecture notes should be captured with an effective balance so that the student is not only attracted to the relevant parts of the video but also is engaged in the understanding of the content of the material. The essence of the HE video lecture experience emerges from the student aesthetically interacting with the video content (i.e. a give-and-take interaction which evolves from the senses, intellect, intuition and cultural interpretation of the experience).

Indeed, for the video to be effective it must have both strength and clarity, it must have the ability to attract the student's attention and also the ability to keep the students interest. Bruce Green Georgeson [30, p.107-110] suggest that whenever one tries to make sense of information visually, one associates features that are close together; that look similar; that follow a smooth continuity rather than abrupt change; one favours closed rather than open figures; one sees small

areas as figures on a larger background; symmetrical areas as figures against asymmetrical backgrounds and one perceives areas seen as surrounded by others as figures. In line with this, this study explores different visual relationships in the video particularly the weight in the visual space to add and subtract to the narrative movement and engagement through the whole moving picture. In these video experiences, visual weight is measured by the extent to which a visual element demands a student's attention and then maintains their interest. When a visual is weighted it can become a focal point and by creating focal points we have the power to draw the student into the video and compel them to look at certain things, which in turn, can help glue the story and hence their learning together. It is this strategic arrangement and composition of elements in the video that allows for the construction of associations and meanings through feelings, intuitions, thoughts, memories etc. which one can then stitch together to form a deeper understanding of what they are experiencing.

In terms of the five videos, each one has been, at some point, part of a live module and although a mix of the styles presented are still used, some have been favoured in relation to others based on the results of the feedback given by the students over the years.

Video 1 is a lecture where a camera was set up at the end of the room where the lecturer has a lapel microphone. As a result the sound can be of good quality depending on the microphone but being recorded during a live lecture still limits the recording quality in terms of light, noises and interruptions that might occur during the lecture. This style of recording is still used for online delivered modules in the course this study is based, but mainly in order to provide distance learners the possibility to watch some guest lecturers that might have come on campus to deliver a lecture. When possible the guests are also asked to go into the studio afterwards and record the content again in a more controlled environment in order to provide distance students with a better quality recording.

Video 2 is the type of recording used in the course to replace video 3. For this recordings the online student was considered as a priority. Instead of watching a lecturer delivering content to other students, this was the first step taken in order to have the lecturer talk directly to the student based outside the campus. For this to be possible a media technician was added to the team in order to set up a video camera for recording and also to edit the video before it is available to students. Lecturers would do an introduction looking directly to the camera but then the powerpoint slides would be edited to replace the lecturer in the video in order to allow the lecturer to look at their notes on a laptop. The student would then see either the lecturer talking to camera or listen to the lecturer while the slide was displayed. Overtime and with more investment this example of recording develop into video 4 style.

Video 3 is an example of a lecture captured using technology such as Panopto available in many Universities. In this case, a webcam was available in the classroom and Panopto was installed on the classroom computer where the lecturer can

log in and set up the recording. This can include video from the camera as well as powerpoint slides and even screen recordings. Although the course we base this paper on started with this kind of recording, very rarely it is now used in the program as a way to deliver online content. The University of South Wales is still using lecture capturing for on-campus based lectures (or as we have seen during COVID-19 lecture capturing for on-zoom based lectures). This type of recording is many times limited in terms of image quality with often dark video and the lecturers walking outside the shot. Sound quality depends on the equipment available in the room but usually a microphone is either on the projector or in the computer desk resulting many times in poor sound quality.

Video 4 is an upgrade on video 2. A video studio was built and equipment such as a teleprompter and lights were added to the set up. These allowed for a controlled environment in terms of sound and light and also allowing the lecturer to read their notes while looking at the camera. The result is the possibility of keeping the lecturer on the screen for the whole duration of the video lecturer and the main points or images to be added next to the lecturer instead of replacing them. Although still trying to improve the quality of the image and sound in various ways, the style is still the main one used for the distance learning lectures this paper is based on.

Video 5 is a typical example of a tutorial video where the computer screen is recorded while the lecturer talks the students through the information as they navigate a website or program. This style is still used at some points when there is the need to show how to do something on a computer. Most times it comes in between video 4 style videos as part of the lecture.

A. Results

Participants gave in-depth feedback on the quality of the videos. In video 1 for instance, although students noted the authenticity of the video, they also found it hard to fully immerse themselves as highlighted by one student: 'hard to fully immerse myself into the video as it was very short and it started off not really knowing what was going on.' One student felt 'it was like the movies recorded in the cinema quite disturbing'. It was noted by others that 'the picture quality wasn't the best' and that it was 'quite dark and hard to see what's going on'.

In video 2, students remarked on the background: 'The video is interesting but the background is distracting and it is hard to focus on just listening to the speaker'; one student noted that the 'Background is very cluttered'. Whilst in video 3, they felt that the focus was not enough on the main subject, the lecturer: 'the angle of the camera is not good' and that it was 'difficult to focus on the lesson and see the lecturer'. One of the participants highlighted that the 'Screen of presenter needs to be bigger, need eye contact from the presenter not to be distracted'. In contrast, during the video 4 experience, participants said that 'It is very clean. The image captures my attention and shows me it is a cyclic process'; it was found to be 'Excellent, good eye contact, clear and concise'. In video 5,

remarks were made about the low quality of sound and image: ‘couldn’t hear very clearly (echo)’ and ‘the picture is not sharp what is quite disturbing’.

A thematic analysis was undertaken on participants’ responses to the individual videos in addition to this quality assessment. As seen above, video 5 is the only video experience that did not visually include the lecturer on screen, instead it was solely a recording of the lecture notes. This resulted in this video 5 experience being described as monotonous. Participants clearly did not feel that this presentation of the lecture was a ‘video’ in comparison to the other videos (i.e. the word video appears in the descriptions of all the video experiences except for video 5). Also from the findings, the presence of the ‘lecturer’ is clearly an important entity to have on screen, in video 3 the lecturer is situated in a small box in the front right hand corner of the screen whilst the lecture notes take prominence on the screen. As a result, the background appears in the descriptions of all the videos except from video 3. Furthermore, focus on the lecturer is clearly of importance and it is not just about placing the lecturer on the screen, but it is about getting the visual balance right. The words distracting and distraction feature in the descriptions of video 2 and 3 where we can argue that the visual balance between the lecturer and the lecture notes can be somewhat conflicting (i.e. the participant is finding it difficult to know where to focus). Also, as we would expect, there is a sense of moving and movement from video 1 which is the only video presenting the real life lecturer-lecture scenario. From these findings, it is evident that participants were drawn to the main features in video 4 (i.e. diagram and voice), and they were also finding the visual layout and balance on the screen easier, clearer to make out and to understand.

Similarly, when specifically asked to describe the aesthetic of the video participants expressed their distraction at times in Video 1, 2 and 3. In contrast in video 4 and 5 participants described their experience as good, clear, understandable, professional, which suggests a positive experience. Focusing on the data retrieved from experiences of video 4 and 5, the openended question asking participants to describe the aesthetic of the video highlighted a range of deeper differences. The comments made by participants for video 4 especially expressed their appreciation for the plain, simple and clear look, while they also emphasised how much the high quality of the ‘talking head’ video in combination with the presentation helped in their meaning making. In detail, seven female participants and nine male participants felt the visual layout of video 4 was excellent and/or good. Whilst, even though video 5 was seen to express what needed to be conveyed, some participants (only three female participants and four male thought it has a good visual layout) did not always find that this basic video was as clear and communicative as they would have liked.

No. of participants who rated....	Visual Quality		Audio Quality		Visual Layout		Colour arrangement		Visual Attractiveness	
	Excellent	Good	Excellent	Good	Excellent	Good	Excellent	Good	Excellent	Good
Video1	0	4	0	3	0	1	0	2	0	1
Video 2	3	3	3	3	2	4	3	2	1	4
Video 3	1	2	2	4	1	4	0	8	1	6
Video 4	7	10	6	8	9	7	7	8	5	8
Video 5	1	3	1	4	1	7	2	2	2	2

Fig. 5. Rating the aesthetics of the videos

Figure 5 represents the ranking of all five videos in order of preference, engagement, aesthetic pleasure and impact on their learning. As we can see, the experience of video 4, and particularly its aesthetic, was being viewed more favourably by most participants. This suggests that the clean screen and the combination of a focused lecturer talking with presentation is the preferred option of most participants.

B. Discussion

The data retrieved from this study highlights the potential impact that the aesthetic of online video can have on students’ learning, which confirms the findings by Malamed [3]. On one level, this study has shown the importance of a clear background enabling students to more easily engage with the lecturer but also supporting them to keep focused and alert. It highlights the power of non-verbal communication (i.e. the camera close up and capturing the lecturer’s eye contact and hand gestures) as a means to also engage. In fact, it emphasizes the impact of the video layout on the experience (i.e. structuring the lecturer and content side by side on a level plane); for example, the diagram presented in video 4 was noted as being very effective especially, as one could view the lecturer and diagram at the same time. Moreover, the feel (i.e. having an approachable feel) and timing were also considered critical to the experience.

On another note, the study highlighted that some participants deemed the video “boring” if they could not see / make the visual connection with the lecturer. As we have discussed in the theoretical part, much of our meaning making in the real world is qualitative, so enabling the learner to connect with the lecturer in a way that appeals to their senses, will make it easier for them to make sense of the information being delivered ([27]). Silvia [31] associates the aesthetic emotion with thinking and comprehending. He points out that these emotions involve knowledge in several senses; first, the emotions stem from people’s appraisals of what they know, what they expect to happen, and what they think they can learn and understand ([31]). Second, the emotions, for the most part, motivate learning, thinking, and exploring, actions that foster the growth of knowledge ([31]). This means that the aesthetic has the potential to generate “interest” which as Silvia [32] points out is an emotional and motivational state

that facilitates exploration, engagement, and learning. Similarly, a distracting background and a monotonous tone of voice on the video proved to have negative implications for the overall experience (i.e. less interest resulting in a lack of engagement). Moreover, participants did not favour the real life lecturer and lecture slides experience (picture in picture) shown together. This speaks to the same issue of a distracting background, but, also to the need for a high quality video as a poor quality video was disengaging, even though the slides were in the picture.

According to Boyd Davis [33], there are two contrasting strategies of organising elements in the planar graphical space: the configurational and the pictorial. The configurational is where the elements are combined in the two-dimensional space of the composition itself. In the pictorial, meanwhile, they are combined in an assumed world space. This picture in picture approach combines both the pictorial and the configurational and is more commonly used as a lecture capturing option for on-campus students to be able to review a lecture. However, online students are clearly looking for a custom made experience, a pictorial approach where the lecturer is focused on them, rather than on students in a lecture theatre.

IX. CONCLUSION

The purpose of this two-part study was to explore, discuss and elaborate upon the role of the aesthetic in the design of the higher educational learning experience. Particularly, looking at the effects of changes to the aesthetics of video lectures on student's learning experiences. The findings highlight the need for simple, non distracting aesthetic (i.e. for well produced clean video where the online student is the focus, rather than a lecture theatre,). These clear preferences strongly feature in the findings from the study but interestingly are more noticeable in the data captured from the blended learning students studying off-campus (study part 1) when compared to those who study fulltime on campus and don't have the day-to-day experience of actually studying with the videos (study part 2). Interestingly, in study part 1, age/maturity (i.e. all the seven participants over thirty years of age felt the video length was good) and interest in the subject (i.e. seven of the eight females agreed that the length of the videos was good) were important factors in the student's perception of the video length. Interestingly all eight females felt is was important or very important and six of those participants over thirty felt is was important or very important .

The data gathered made the design team think about how a combination of different camera shots (i.e. close-up, extreme close-up, over the shoulder, medium and long shot) can be further explored to capture the right eye and hand gestures in order to achieve the desired visual connections, "embodied allocations" ([27]) and "emotional clues" ([28]). The use of a teleprompter, as used currently, seems to be very much appreciated by the students as this makes it possible for the lecturer to be constantly looking at the camera and making it

more engaging for the student watching the video. Also, the length of the video and the sound quality, including the lecturer's voice, need to be taken into consideration whilst establishing this engagement. Moreover, the aesthetic design of the learning experience needs to facilitate that students can effectively engage with both the lecturer and the information they are delivering. As the findings show, some students prefer the interplay between the lecturer talking and the information presented on the screen.

From this study some future research is warranted. For example, to answer questions on how the lecturer interaction with the content in real time affects engagement in learning. This might be achieved by a study that compares the lecturer writing the important points on a whiteboard in real time whilst delivering the lecture, with an animation happening in realtime next to the lecturer. Another issue worth exploring is how authenticity through (real time) video capturing could foster engagement while not at the same time causing disengagement because of its lack of affordance for learner immersion There was an indication in the data that the perception of aesthetics and how it might impact the learning experience between male and female /younger and older students is different and this also needs further exploration.

The rise of online learning during the COVID-19 pandemic has made this research even more important (i.e. how we design of engaging online learning experiences). As previously discussed, the development team will keep talking to the students and will keep trying to understand what students find effective for their learning and what not in terms of the specific role of the aesthetic in the learning experience. However, more in-depth experimental research is needed into how exactly the aesthetics and the aesthetic emotion they generate will motivate learning, thinking, and exploring.

REFERENCES

- [1] A. Pitts, "Learning Is Multi-Sensory: How To Engage All The Senses So Children Really Benefit — How to Learn," 2012.
- [2] P. B. Uhrmacher, "Toward a theory of aesthetic learning experiences," *Curriculum Inquiry*, 2009.
- [3] C. Malamed, "Why Aesthetics Matter to Learning," 2015.
- [4] B. D. Austring and M. sørensen, "Aesthetics and learning," 06 2011.
- [5] A. Berleant, *Art and engagement*. 2010.
- [6] D. W. Prall and J. Dewey, "Art as Experience.," *The Philosophical Review*, 1935.
- [7] C. Haskins and R. Shusterman, "Pragmatist Aesthetics: Living Beauty, Rethinking Art," *The Journal of Aesthetics and Art Criticism*, 1992.
- [8] V. Rantalla, "THE THINGMOUNT WORKING PAPER SERIES ON THE PHILOSOPHY OF CONSERVATION ENVIRONMENTAL EXPERIENCE: Beyond Aesthetic Subjectivism and Objectivism," tech. rep.
- [9] H. S. Weddington, "Education as Aesthetic Experience: Interactions of Reciprocal Transformation," *Journal of Transformative Education*, 2004.
- [10] F. Carroll and R. Kop, "A learning, research and development framework to design for a 'holistic' learning experience," *E-Learning and Digital Media*, 2011.
- [11] R. W. Picard, S. Papert, W. Bender, B. Blumberg, C. Breazeal, D. Cavallo, T. Machover, M. Resnick, D. Roy, and C. Strohecker, "Affective learning - a manifesto," *BT Technology Journal*, 2004.
- [12] H. Gardner, "Multiple Intelligences After Twenty Years," *Education*, 2003.

- [13] J. Hanafin, "Multiple intelligences theory, action research, and teacher professional development: The Irish MI project," *Australian Journal of Teacher Education*, 2014.
- [14] L. M. M. Vieira, M. Ferasso, and ..., "Connecting Multiple Intelligences through Open and Distance Learning: Going Towards a Collective Intelligence?," *European Journal of ...*, 2014.
- [15] S. Brookfield, *The Skillful Teacher on Technique, Trust, and Responsiveness In The Classroom Second Edition*. 2006.
- [16] P. J. Palmer, "The Heart of a Teacher Identity and Integrity in Teaching," *Change: The Magazine of Higher Learning*, 1997.
- [17] S. Shaviro, *Discognition*. 2012.
- [18] B. Latour, "Reassembling the Social. An Introduction to Actor-NetworkTheory (translated by Irina Polonskaya)," *Journal of Economic Sociology*, 2013.
- [19] S. McNerney, "A Brief Guide to Embodied Cognition : Why You Are Not Your Brain," *Scientific American*, 2011.
- [20] P. Dourish, "Where the Action Is: The Foundations of Embodied Interaction," *Where the action is the foundations of embodied interaction*, 2001.
- [21] R. H. Hall and P. Hanna, "The impact of web page text-background colour combinations on readability, retention, aesthetics and behavioural intention," in *Behaviour and Information Technology*, 2004.
- [22] N. Bonnardel, A. Piolat, and L. Le Bigot, "The impact of colour on Website appeal and users' cognitive processes," *Displays*, 2011.
- [23] D. Lockner and N. Bonnardel, "Emotion and Interface Design How to measure interface design emotional effect?," *INTERNATIONAL CONFERENCE ON KANSEI ENGINEERING AND EMOTION RESEARCH Emotion*, 2014.
- [24] S. Schneider, J. Dyrna, L. Meier, M. Beege, and G. D. Rey, "How affective charge and text-picture connectedness moderate the impact of decorative pictures on multimedia learning," *Journal of Educational Psychology*, 2018.
- [25] S. Groening, "Introduction: The aesthetics of online videos," 2016.
- [26] D. Lockton, D. Ricketts, S. A. Chowdhury, and C. H. Lee, "Exploring qualitative displays and interfaces," in *Conference on Human Factors in Computing Systems - Proceedings*, 2017.
- [27] L. Ka"ant" a, "Teachers' embodied allocations in instructional interaction," *Classroom Discourse*, 2012.
- [28] R. Al Tawil, "Nonverbal communication in text-based, asynchronous online education," *International Review of Research in Open and Distance Learning*, 2019.
- [29] R. Griffiths, J. Probert, and B. Copley, "The flipped university: exploring student progression in football coaching and development," *Education and Training*, 2018.
- [30] V. Bruce, P. R. Green, and M. A. Georgeson, *Visual perception: Physiology, psychology, & ecology, 4th ed*. 2003.
- [31] P. J. Silvia, "Looking Past Pleasure: Anger, Confusion, Disgust, Pride, Surprise, and Other Unusual Aesthetic Emotions," *Psychology of Aesthetics, Creativity, and the Arts*, 2009.
- [32] P. J. Silvia, "What is interesting? Exploring the appraisal structure of interest," *Emotion*, 2005.
- [33] S. B. Davis, "Representing space: The pictorial imperative," in *Exploration of Space, Technology, and Spatiality: Interdisciplinary Perspectives*, 2008.



Miguel Sousa Miguel Sousa is a Media Support Manager at the University of South Wales. He manages a media team that produces learning teaching content for a variety of courses in the subject areas of Sport, Police and Health. This team has been at the forefront of blended learning at USW by working with academics to develop new innovative programs with professional quality

distance learning content. Miguel's work has been a fundamental support in the growth of blended learning programs and students numbers. The variety of work done by this team has been growing from covering studio recordings, practical videos, animations, interactive tasks and much more. Miguel has been working at USW since the end of his Multimedia Studies degree completed at the same university (called University of Glamorgan at the time) in 2007.



Fiona Carroll is a senior lecturer in Digital Media and Smart Technology with the School of Technologies, Cardiff Met University, Wales. Her research over the past seventeen years has focused on the fast-changing relations between humans and digital technologies. It is inter-disciplinary and shows a substantial contribution to scholarship in the fields of Human Computer Interaction. She is very passionate about the possibilities that technology holds for society but equally, is very aware of the effects that it is currently having on us, as humans. Fiona is especially interested in the role of the aesthetic in the design and development of the online learning experience. As an accomplished academic, she has successfully won more than seventeen research grant applications and has more than forty peer-reviewed publications. She is programme director for Computing with Creative Design and Computing for Interaction and she coleads the Creative Computing Research (HAD- HUMAN, AI DATA) Centre at Cardiff Met University.



Rita Kop works as core member of faculty in the Faculty of Education at Yorkville University. She has a Ph.D. in Adult Continuing Education. After a career in teaching, HE administration, research and development activities related to education and technology in Canada, the UK and the Netherlands, she currently researches advanced educational technologies, such as Personal Learning Ecosystems and Massive Open Online Courses and how best to support 'the human' in learning. She worked as researcher for the National Research Council of Canada and as Professor in Adult Education and Higher Education in the UK and is an advocate for open learning and widening access. Her research interests: adult education, ethics of AI and analytics, online learning and teaching, widening access, the design of learning experiences.