

Using Machinima to Promote Computer Science Study

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Abstract

The project develops a Machinima animation promotional film for the Department of Computer Science at Heriot-Watt University, and evaluates whether the promotional material is more engaging and entertaining than traditional materials; more informative about the provider (its values and facilities); promotes Computer Science as relevant to student lives; uses media immediately recognisable to the student; and is innovative and differentiates the provider from others in the marketplace. Real interviews with current students relating their likes and dislikes of the University were coupled with computer game animation to create an entertaining and informative multimedia advertisement. The multi-stage evaluation with potential applicants has shown that these students respond positively to the content and presentation of the innovative multimedia film, and are encouraged to choose Computer Science and Heriot-Watt University for Tertiary education.

Keywords: Machinima, Animation, Computer games, Computer Science, University enrolment.

1 Introduction

From a peak in 2002/03, numbers of full time undergraduate and first year Computer Science students have been falling year on year (Universities UK 2007). Often potential students see Computer Science as ‘nerdy’ and do not see it’s relevance in the technologies they consider “cool” eg Apple’s iPhone and Nintendo’s Wii. Although frequently blogging on social networking sites such as Facebook, MySpace, and Twitter, posting videos on YouTube, listening to/watching podcasts, and playing online multiplayer computer games, these students see Computer Science as irrelevant to their lives (Munro. 2006). There is competition between Tertiary Education providers to fill places and to attract the very best students. Traditionally paper prospectuses, and more recently web-based information, have been used to sell the Education provider and the courses on offer.

The aim of the project is to develop advertising and promotional material which 1) is more engaging and entertaining than traditional materials, 2) is informative about the provider (its values and facilities), 3) promotes Computer Science as relevant to student lives, 4) uses media immediately recognisable to the student, and 5) is

innovative and differentiates the provider from others in the marketplace.

The project involves iterative and participatory research design with students and academic staff in the Department of Mathematics and Computer Science, and media and communication staff at Heriot-Watt University (HW), Edinburgh, UK. The project firstly evaluates student opinions to existing traditional poster advertising and then develops and evaluates novel and contemporary advertising using Machinima film-making.

2 Poster advertising

Heriot-Watt University developed a poster campaign in 2005/6 with the aim to engender a progressive image for the University. The advertising poster for the Department of Computer Science was developed (prior to the research project) using focus-group consultations with current students with the view to promote the multi-cultural nature of the department, strong links with industry and potential job prospects, to show computer science to be relevant to the lives of potential students, and to appeal to both genders (see Figure 1).



Figure 1: Advertising poster of the Department of Computer Science, Heriot-Watt University (2005)

The poster was used during student recruitment for entrance academic year 2005/6 and displayed on the department website, at external recruitment fairs (schools and tertiary education expos), and around the faculty. The research project commenced with an anonymous

evaluation of the impact of the poster with prospective students considering computer science at the university. Four questions were added to the existing feedback questionnaires which were completed by students attending university open days and department interview days (where students spend a full day in the department, meeting staff and current students, participating in lectures, and given tours of research project).

The evaluation was interested in the discursive comments of students about the poster, which are compiled in Table 1.

Comments from students in the evaluation show that the poster is not successfully promoting studying computer science at Heriot-Watt University. Generally, students who are interested in studying computer science are not greatly affected by the poster, however males unsure of what and where to study take from the poster a message that girls study computer science (at HW). The comments suggest that the poster does not encourage female prospective students to study computer science (at HW) and that female students suggest that the poster corroborates the stereotypical image that females are in the minority in computer science. Both male and female students report that the poster does not accurately portray student life and simplifies decision-making around choosing which degree to study. Furthermore, students do not believe the story and instead view the poster as being scripted and created by staff with the aim to increase computer science enrolments. Students also comment that if Heriot-Watt University is actively and explicitly attempting to attract students to computer science (and female students) then does this reflect falling student numbers and a poor experience for current students.

The poster evaluation evidenced a need for the university to reconsider student recruitment advertising for computer science. The project involved a two stage research, design and evaluation of an alternative advertising style using Machinima. Stage 1 (Machinima film of the poster) will evaluate the response and reaction of potential students to Machinima-based advertising; Stage 2 (Machinima of student interviews) will develop and evaluate a Machinima advertising film addressing the concerns and comments of prospective students to the poster advertising.

3 Machinima advertising

The project develops dynamic movie advertisements for the Department of Mathematics and Computer Science. The visuals are created using Machinima, a film making and animation technique which uses games characters and games engines to control, record and edit the stories. Machinima has seen growing popularity in the film and gaming sectors however has not yet achieved the same level of public awareness. We proposed that the potential student will be familiar and engaged with the characters and the games in the advertisements but will be intrigued by the new film style. The response to the advertisements will not only depend on the graphical quality but also the script and content, however the innovative film making can differentiate Heriot-Watt University from other education providers and relate computer science to the lives of students.

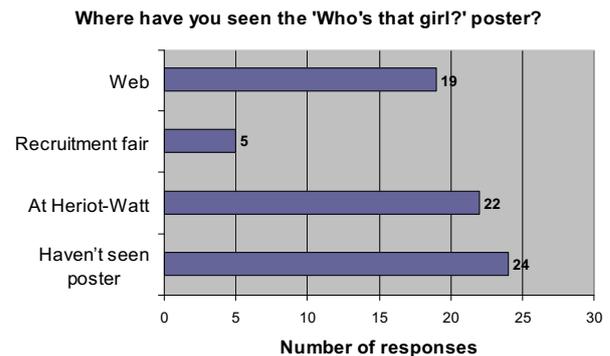
Number of participants (visiting students) = 59

1. Male / Female

Male	42	(71%)
Female	17	(29%)
2. Where have you seen the 'Who's that girl?' poster?

Web	19	(32%)
Recruitment fair	5	(8%)
At Heriot-Watt	22	(37%)
Haven't seen poster	24	(41%)

(you may tick one or more options above)



2. Has the poster affected your decision to study computer science, and how/why?

(representative selection of positive and negative comments from respondents)

- (female) Not really, I want to study CS at Uni anyway. The poster is a bit condescending saying that girls doing CS are cool.
- (male) Yes, I thought that it would just be loads of guys but there's some girls as well
- (female) No, the poster simplifies Uni life and getting a degree. It is a bit stereotyped to have students drinking coffee and going 'clubbing'
- (male) No, I've been programming computers since I was little. I want to do computer science at University and get a job in IT

3. Has the poster affected your decision to study at Heriot-Watt University?

(representative selection of positive and negative comments from respondents)

- (male) Yes, HW has a reputation as being a technical Uni with more boys and than girls, but I see that HW has girls in CS
- (female) No, the poster doesn't tell me anything about HW and what it would be like to study here!

Table 1: Responses to question about the computer science advertising poster from students visiting the university on information days

3.1 Growth of Machinima

Machinima is an animation technique which is created through utilising the real-time rendering capacity of modern day computer games. Animation production using Machinima can be more cost effective than conventional 3D key frame animation (eg Shrek or Toy Story) as the animation is rendered in real-time during the playback. Similarly, Machinima does not require banks of powerful computers and costly software to render the animation, and instead can be produced using off-the-shelf computer game titles. The Machinima project was developed as part of a Computer Science Masters Dissertation Research project (Munro 2006), and thus prospective students can view firsthand what can be achieved, and the wide ranging skills learned, through studying computer science at Heriot-Watt University.

Most commonly Machinima is used to create short films for entertainment purposes. The most notable of these is the web episodic series of 'Red vs. Blue' based on the Halo game series (Roosters 2006). The animated series has been altered very little from the original game, and although an extremely playable game, Halo also has a high degree of limiting constraints in the game engine. The actors are helmeted soldiers with only a small range of gestures and postures. Even with these constraints it is possible to create humour and emotion in Machinima through strong development of the actor's personality and interaction. Since the faces of the characters are not visible and they cannot gesture individually, the personality of each character is presented through customisation of the actors e.g. armour colour, and small personal nuances of the human players who control them. The series draws the attention of over 450,000 registered users/viewers of the web series (Roosters 2006).

Machinima has considerable potential for growth. Paul Marino in a study of the evolution of audience behaviour, states that in the younger generations, the animated characters of the last generation have been replaced with video game characters. He concludes that the younger generation will be comfortable with and accept Machinima like computer games (Marino 2004).

The biggest evolution in Machinima is the rate of improvement in the visual imagery, since the first Machinima 'Apartment Huntin' (Clan 1999). The graphics in Machinima are as realistic as the games engine on which they are based. Although Machinima is primitive it is on an upward technology curve. Next year Machinima will be twice as rich (Biever 2003).

Control of the actors in the Machinima can be achieved using puppeteering or scripting. In puppeteering the game players have full control of the actors, through keyboard, mouse or control pad, just as if the player was playing the game, and relies on the ability of the game player for the quality of acting, and fluidity and accuracy of movements of the actor. The disadvantage is that the range of movements of the actor are limited to what can be achieved in the original game. These movements are commonly the directional movements, crouch, jump and idle animations. Scripting has similarities with the processes of current animation techniques. Characters are controlled using a script or algorithmic based control. Affects such as facial manipulation for lip and expression

synchronization to speech are possible which are not readily controllable through the original game play.

4 Machinima film of poster

To consider the response and reaction of potential students to Machinima advertising, the project developed a pilot Machinima film of the 'Who's that girl?' script used in the poster advertisement, see Figure 2.



Figure 2: Machinima screenshot based on top-left frame of the 'Who's that girl?' poster



Figure 3: Machinima screenshot based on middle-middle frame of the 'Who's that girl?' poster



Figure 4: Machinima screenshot based on bottom-left frame of the 'Who's that girl?' poster



Figure 5: Machinima screenshot based on bottom-right frame of the 'Who's that girl?' poster

The Machinima film was created using the Sims 2 game engine. All aspects of the original poster were replicated in the film including the appearance of the main (male and female) characters. The text conversation in the poster was replaced in the Machinima film by a voiced conversation recorded using computer science students.

The ‘Who’s that girl?’ Machinima film was incorporated into a continuously looping projected presentation and displayed at university open days and department interview days. The original ‘Who’s that girl?’ poster was displayed prominently alongside the projection film. An anonymous evaluation was completed with prospective students considering computer science at the university, by adding 6 questions to the existing feedback questionnaire. The evaluation was interested in the comments of students about the poster and Machinima film, which are compiled in Table 2. Students were also asked how the poster and film advert made them feel: interested or excited, unenthusiastic or inspired, confused or informed, bored or entertained. Students were controlled in which medium they could view, or in which order or how frequently.

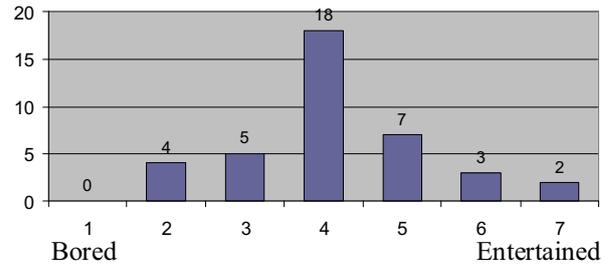
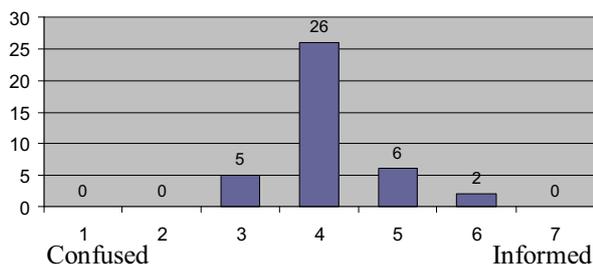
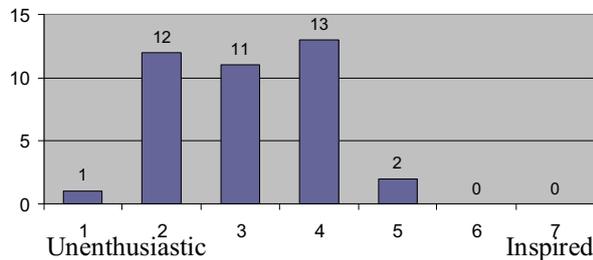
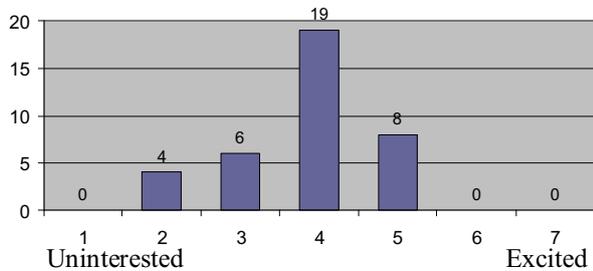
Number of participants (visiting students) = 39

1. Male / Female

Male 30 (77%)
 Female 9 (23%)

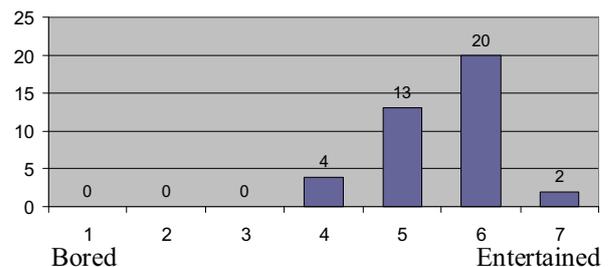
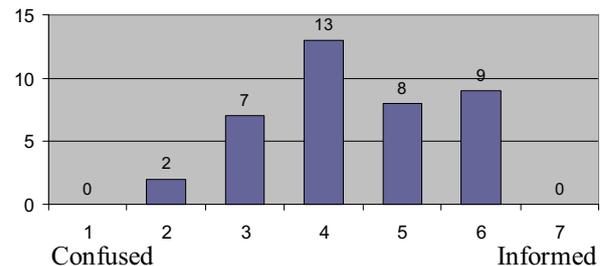
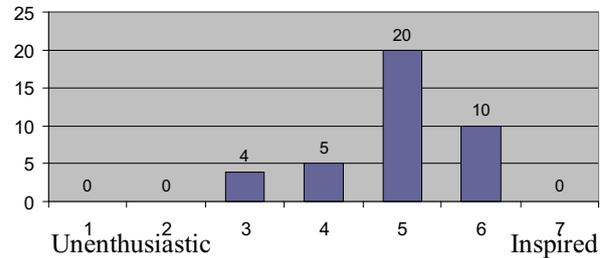
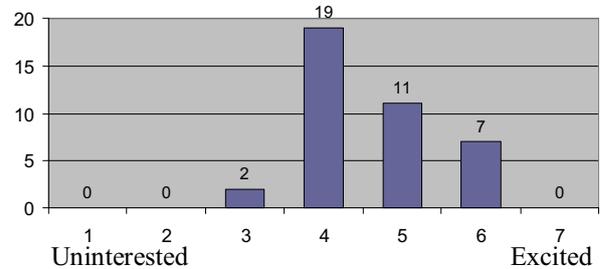
2. How did the Poster ‘Who’s that girl?’ make you feel? (7 point Likert scale). Number of student responses shown for each element on the Likert scale.

	1	2	3	4	5	6	7	
Uninterested		4	6	19	8			Excited
Unenthusiastic	1	12	11	13	2			Inspired
Confused			5	26	6	2		Informed
Bored		4	5	18	7	3	2	Entertained



3. How did the Film of ‘Who’s that girl?’ make you feel? (7 point Likert scale). Number of student responses shown for each element on the Likert scale.

	1	2	3	4	5	6	7	
Uninterested			2	19	11	7		Excited
Unenthusiastic			4	5	20	10		Inspired
Confused		2	7	13	8	9		Informed
Bored				4	13	20	2	Entertained



4. Which advertisement did you prefer?		
Poster	0	(0%)
Film	39	(100%)

And why?

(representative selection of positive and negative comments from participants)

- (male) The film is better than the poster. Great that they have used a computer game (Sims) to sell computer science to students. The characters and animation looks great
- (female) The story is a bit cheesy but the film is quiet clever

5. Has the ‘Who’s that girl?’ film affected your decision to study computer science, and how/why

(representative selection of positive and negative comments from participants)

- (male) Yes, I was going to go to <other university> to study computer game design, however will think about doing computer science instead
- (female) No, I’m not going to choose computer science just because I’ll meet guys!!!

6. Has the ‘Who’s that girl?’ film affected your decision to study at Heriot-Watt University?

(representative selection of positive and negative comments from participants)

- (male) I knew that HW is a technical University – the film shows that they know their stuff. I like that they are using computer games
- (female) I like how the film is based on the Sims. It’s amazing how they have made an advert using the Sims. Heriot-Watt must know technology

Table 2: Responses to questions about the computer science advertising poster and Machinima film from students visiting the university on information days

Responses show that participants prefer the film over the poster, and feel more excited, inspired, informed and entertained by the Machinima film than the original poster, Table 2. Students comment about the media and how it was created (computer games / the Sims) rather than the content of the media, suggesting that the film is more engaging but that the presented message is not memorable.

We conclude from stage 1 that using film based advertising created using Machinima techniques is engaging and interesting to prospective computer students visiting Heriot-Watt University. The Machinima film promotes the University as technically competent and understanding of contemporary media. The pilot Machinima film is based on the original ‘Who’s that girl?’ poster and student comments mirror those of the poster evaluation, that the story is i) unbelievable and unrealistic; ii) simplistic and doesn’t tell the viewer anything about the computer science degree or studying at Heriot-Watt; iii) is gender-based and an explicit

attempt to attract female students (and male students expecting to see more female students in their classes); iv) and is created by staff for students rather than by students for students

4.1 Machinima interview advertisement

Stage 2 of the project is concerned with addresses the limitations of the stage 1 pilot film whilst retaining the student interest and engagement of Machinima advertising. The stage 2 Machinima film is in a documentary style and uses real unedited voice recordings of students at Heriot-Watt University discussing their experiences and views of the university. Elements that would reflect negatively on the university were avoided, such as discussions around nudity, violence, or promotion of illegal acts. The advert must be interesting to current cultural tastes and attention grabbing, furthermore maintain the attention of the student for the duration of the film. The content must be informative and understandable in both pace and context, and also to be delivered without bias, so that the film is received as informative rather than a sales pitch.

4.2 Film script

The film is in a traditional documentary style showing interactions between an interviewer and interviewees, where the interviewee talks to the interviewer and not directly to camera. The viewer feels that they are present with the interviewer as the interviewee is being recorded, making the stories more believable and the content unbiased. The advert is based on Aardman Animation’s, Creature Comforts (Aardman 2003), which is a mock documentary where the characters in the series are represented as animals who speak with human voices and discuss experiences and values, see Figure 6. The project attempts to recreate the humour of the Creature Comforts series by juxtaposing the appearance of the characters and action to the content of the human speech, including secondary events, and consistent elements binding individual scenes together.



Figure 6: Example screenshot from Creature Comforts

4.3 Student Interviews

The content of the documentary was populated using student interviews. Interviewees were informed that the recordings were to be used to create an advertisement documentary for the university but were not told that their voices recordings would be synchronised to computer game characters. The interviews were conducted in a non-linear format, where the interview was a conversation between the interviewer and interviewee, rather than question and answers. The format resulted in the interviewee's tone being more natural and relaxed, and it allowed for the interviewer to take advantage of unexpected stories that occurred. The role of the interviewer was to start the conversation and to keep it flowing, and the questions were neutral and open so not to lead the interviewee. Even so the interviewer could not appear to be neutral, in manner or reaction to the conversation, as this would stifle answers from the interviewee. Reaction to answers through gesture and body language was widely used as audible reactions would contaminate the audio recording.

Once the interview was completed, full details of the Machinima project were disclosed to the participant and further consent request for use of their voice recordings in the game-based animations. Additionally, all interviews were videoed to assist the animator recreate the interviewee's facial expressions, body poses and gestures on the game character.

4.4 Machinima implementation

The animations were separated into different visual styles replicating cinematic effects and using the most suitable games engine for each effect. The introduction animation sequence and final sequence contextualizes the advert, representing the university buildings and current students. The games engine used was 'The Sims 2' which can model the university buildings, see Figure 7 and control multiple characters, see Figure 8.



Figure 7: Accurate model of the internal layout of Computer Science Department for the introduction scene.

The main body of the animation was created using Half-Life 2, which can more accurately represent and control multiple actors recounting the interviewed stories. Two different control methods were adopted in the production of the advert: puppetry method (the Sims 2) and scripted

method (Half-Life 2). The animations are set in the style of the parent game, preventing the actors from looking out of place which may occur if they were placed in unrelated environments.



Figure 8: 'The Sims 2' Machinima animation of student characters in model of computer lab.

Using a scientist is a strong and simple visual link to academia, and is also a strong theme used in science fiction and horror games. The background noticeboard contains Heriot Watt themed posters, which are discussed and linked in the transcript of the interviewee (scientist) reasserting the university brand, see Figure 9. The interviewee talks about cycling to the university and the scientist's bicycle is visible in the scene. Additional objects, such as the Hawaiian dancer ornament, maintain the viewer interest over multiple watches of the advert.

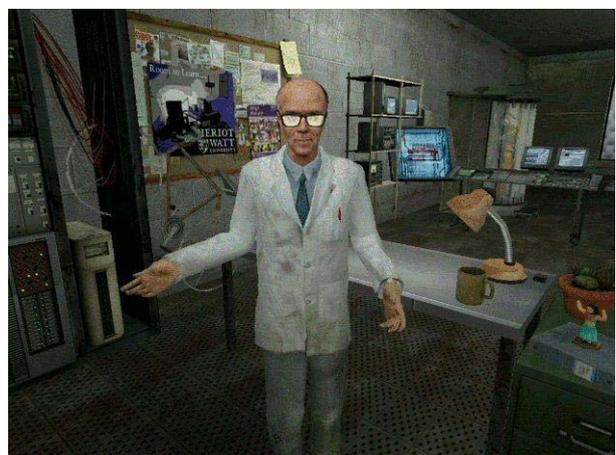


Figure 9. Screenshot from film showing example scene from scientific laboratory.

4.5 Movement and character control

Understanding the ways that the game engine interprets and displays the range of available actor gestures, interactions and movement is important in creating believable animation. Generally any movement in a computer game requires a call to a pre-created movement sequence. For example if a game character is controlled to walk from one point to another, the games engine calls a sequence containing a single complete foot step and the sequence is looped until the destination point is reached.

Science during open days were asked questions about their opinions of the university prior to watching the film, and then after watching the film. Participants were asked how the film made them feel: interested or excited, unenthusiastic or inspired, confused or informed, bored or entertained. Responses show that participants feel excited, inspired, informed and entertained by the Machinima interview film, Table 3. Although we do not have data to compare the student perception of both the Machinima poster and interview films, we can infer from the high Likert rating for the interview film that students respond favourable to the content and presentation of the Machinima interview film.

	1	2	3	4	5	6	7	
Uninterested					22	13	9	Excited
Unenthusiastic				4	7	22	12	Inspired
Confused			2	9	13	9	11	Informed
Bored						11	33	Entertained

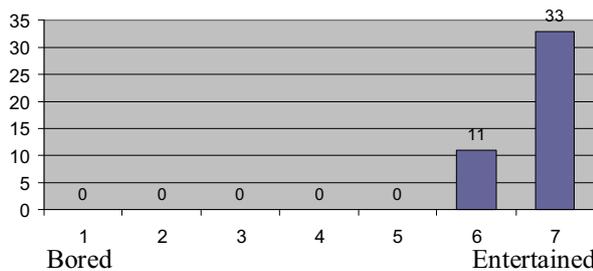
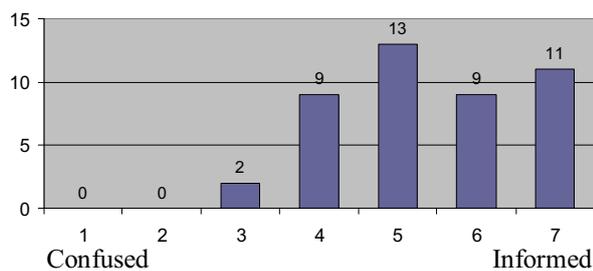
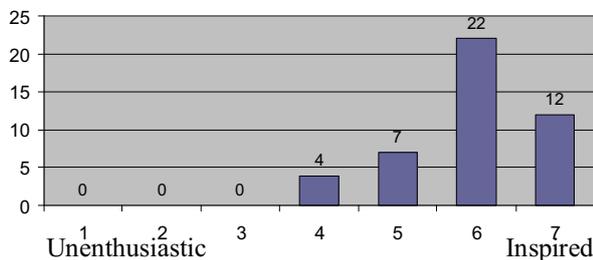
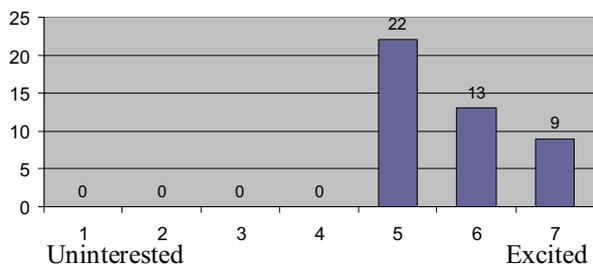


Table 3: How did the film make you feel? (7 point Likert scale). Number of participant responses shown for each element on the Likert scale

Participants were asked their opinion of the facilities of the university. Responses indicated that the majority of potential students rate the facilities positively, Table 4.

	Yes	No
Heriot Watt has good facilities for its students.	40 (91%)	4 (9%)
Heriot Watt has approachable lecturers.	33 (75%)	11 (25%)
Heriot Watt is a friendly place to study.	44 (100%)	0 (0%)
Halls of residence are somewhere you like to stay.	31 (70%)	13 (30%)
All that you need is in one place e.g. Shops, Library, and Staff.	37 (84%)	7 (16%)

Table 4: Responses from participants about facilities at the university after watching the Machinima interview film

Prospective students were asked four detailed questions relating to the content of the film, including information presented in the script and visual elements of the animation. 41% of the participants (18) were able to recall all four elements of content correctly, 45% of participants (20) recalled between 1 and 3 of the content elements correctly, whilst 14% of participants (6) were unable to answer the questions correctly. However all 44 participants responded that the speed of the advert was appropriate for comprehension. Participants were asked before and after the film their feelings about the university. The responses of half of the potential students (22) showed that they had an improved image of the university after watching the film, with the remaining participants having a similar opinion to that prior to the watching the film, see Table 5.

Opinion before film / Opinion after film
(representative selection of positive and negative comments from participants)

Perceived improved opinion responses

- “Positive Image” / “They were positive before, but the advert enhanced all of my ideas about the place”
- “Having visited the uni on many occasions it seemed the students like their studies. Enjoyed their time (at the university)” / “I now feel I have an insight into how the student’s feel”
- “No strong vision” / “Very Positive”
- “It’s a nice University” / “It is a very interesting and mysterious place to spend my academic years”
- “I think it is a good Uni. Also has a lot of bureaucracy in situations” / “Lovely place to go for studies, research in a very nice area”
- “The Campus is nice” / “Technology Based University with great facilities”
- “It seemed like a quite interesting place to study and live” / “Heriot Watt is a modern university with a focus on industry”

Perceived unchanged opinion responses

7 respondents answered that their opinion after film was the "same as before"

- "Big University with great surrounding area and lots of courses going on." / "Quite Positive, probably I would try it if I was to go for studies"
- "Technology orientated University" / "No particular feelings"

Table 5: Responses about Heriot-Watt University from prospective students before and after watching the Machinima interview film

100% of the respondents recognised the film style to be that of the original game and felt it helped keep their interest. The juxtaposition in game style and audio content was also evaluated to determine its ability to create the humour. The students were given five options and responded with: Comical (37 respondents), Unnoticed (2 respondents), Confusing (1 respondent), Ridiculous (2 respondents), Attractive 2 respondents).

6 Conclusions

The aim of the project was to develop advertising and promotional material which 1) is more engaging and entertaining than traditional materials, 2) is informative about the provider (it's values and facilities), 3) promotes computer science as relevant to student lives, 4) uses media immediately recognisable to the student, and 5) is innovative and differentiates the provider from others in the marketplace. The project has developed a promotional advert for the Department of Computer Science at Heriot-Watt University using Machinima animation. Evaluations with prospective students considering studying computer science (at Heriot-Watt University) have suggested that Machinima is an engaging media to promote the technical competence of the university and the Department's understanding of contemporary technologies and student interests, with potential student responding that Heriot-Watt is a 'Technology Based University', and 'Technology orientated Department'. However although the Machinima media style is received well, the content of the film must be carefully considered. Students responded that the use of real interviews with current students explaining their likes and dislikes of the university are more believable, honest and realistic than scripted stories of student life. Students recognised the computer games on which the Machinima films were developed and were able to recall content from the film. Students also considered the films to be innovative and different than what they had seen before, responding positively to the unbiased documentary interview style, reporting that 'I now feel I have an insight into how the students feel', and 'They [my feelings of Heriot-Watt] were positive before. But the advert enhanced all of my ideas about the place'.

7 Future work

The project will continue with a larger evaluation with students visiting the university on open days, and with students accessing the Machinima advert on DVD and online, comparing the new promotional media with more

traditional materials such as paper and online fliers and prospectus. The project will also follow up with students who commence studies in the department as to whether the advert had any influence on their decision to study at Heriot-Watt.

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