

# User Generated Videos as Support for Teaching and Learning 3D Animation

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**Abstract.** This paper reviews the use of User-Generated Videos as support for teaching and learning 3D animation. Video as a rich medium have been known to be advantages in engaging learners, capturing and demonstrating content which are difficult to articulate with text or image alone, promoting collaboration as well as functioning as a medium for reflection. Video sharing websites as a social media platform allow students to share their thoughts and feedback on the video they viewed. However, these User-Generated Videos may contain outdated, inappropriate or inaccurate content. As most of the videos are viewed out of the classroom, the use of these videos is subjected to the digital literacy skills of the students themselves. The use of video instruction for learning are investigated through 29 students undertaking Computer Modeling and Animation course in the Faculty of Creative Multimedia. In the 14 weeks in creating an animated talking head, through observation and their progress report, the use of User-Generated Videos content for solving animation problems are reviewed. Results shown that most students used free video content that are readily available online for solving animation problems compared to other references, the students were heavily reliant on internet for learning as compared to text based media or printed publications.

**Keywords:** User-generated Content, Video instruction, YouTube, 3D animation, teaching and learning

## 1. Introduction

This paper reports the use of User-generated Videos (UGV) content in the process of creating an animated output in a structured course. Video Sharing Websites such as YouTube and Vimeo have emerged as a prominent repository of UGV content [1]. 3D animation students and instructors are taking advantage of the availability of the content shared on these websites for teaching and learning 3D concepts, skills as well as referring to creative animation videos for ideation and inspiration. These uploaded videos are known as a type of User-generated Content which is created by users themselves out of their free time with added creativity and knowledge [2]. As most students today have short attention span [3], videos are used as a motivational tool and as a medium to grab students' attention [4], [5].

## 2. The video advantage

There are many types of video content shared on video sharing websites. Fadde (2008) listed categories of videos as demonstrations and explanations, screen captured presentations, mini lectures, interviews, real world scenarios and others [6]. Schwartz & Hartman (2007) on the other hand categorized videos according to the forms of learning (doing, seeing, saying and engaging) [7] while Kruitbosch & Nack (2008) categorized the videos based on user's creation technicalities of whether the videos are self-generated or are mashups of existing content [8].

Videos are not uncommon in classroom teaching. Instructional videos have been used in classroom teaching for the past three decades and are also popular instructional medium used in distance education [4]. Many studies have shown that videos are beneficial to learning. The use of videos for teaching and learning has resulted in valuable collaboration, communication and reflection among learners and instructors [4],[5], [9], [10], [11], [12], [13]. Video is a popular and engaging medium especially to students with short attention span as it is a rich medium presenting materials that incorporates multimedia content for e-learning [3] presenting complex information and processes clearly as compared to single medium. Besides that, interactive videos allow students to have repetitive viewing where they can pause and replay the content to help understanding and improve retention [4].

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UGV as compared to pre-loaded or disk-based videos are user published videos uploaded onto social media sharing websites [2]. Using UGV as a learning tool has many advantages; one is the added knowledge incorporated in the video content and the social interaction between users when comments and sharing happens. Secondly, it is popular, free, user friendly and mobile friendly. You can also obtain a lot of information within a relatively short period of time. For example, by keying in “facial animation tutorial” in YouTube search returned about 10500 video results (as of 20th April, 2012).

While YouTube houses the largest collection of 3D animation related instructional videos, Vimeo, second largest video repository to YouTube contains mostly creative video artworks that students can use for as examples, reference and inspiration. The video content on Vimeo is less saturated as compared to YouTube as it contains more original UGV from experts or experienced users as compared to mashups in YouTube. These video sharing websites allow for tags, annotations, comments and subscription, thus enabling students to search, read comments and reviews to speed up filtering of information [14]. Using YouTube, students can also sort videos according to relevance, view count, ratings and upload dates to further help them access information they need. With video sharing websites, students can link and share the videos with their peers to their social networking media using the share options. As most videos are viewed during the students’ self-learning time, students are able to learn at their own pace and in the comfort of their own environment.

Nonetheless, there are disadvantages in using video for learning. Though videos are much easier and cost less to create today as compared to decades ago, the development time needed to create an instructional video is still much longer as compared to the development time for a lecture [15]. Besides basic hardware and software requirements, knowledge on video authoring, instructional design and creativity are needed to create good videos [16]. While heavily dependent on users’ contribution, UGV may contain safety and legal issues which exists the possibilities of offensive, inappropriate, invalid, out of date, biased or inaccurate content [17]. However, the use of these videos is subjected only to the digital literacy skills of the users, which is their “ability to locate, organize, understand, evaluate, and analyze information using digital technology” [18]. Though there are measures taken into keeping the social media sites safe, education institution and instructors have to work hand in hand to ensure that students access relevant content useful to students’ learning.

### 3. The learning context

In the context of 3D animation: students have to combine their understanding of animation theories and principles with their animation techniques and skills in order to realize their ideas and concepts. In a 3D animation classroom, instructors give lectures, tutorials and workshops with other methods of instruction which include hands-on demonstration, animation screenings, discussions and other activities to motivate and engage students. Generally, instructors guide students through the animation production process. A 3D animation production goes through 3 stages of process which are pre-production, production and post-production [19],[20]. Technically a 3D animation student has to deal with many different tools or software in the production process of creating a simple animation. Table 1 list the general processes and tools need at different stages of an animation production.

Table 1: Animation production stages, processes and tools

Production stage	Process	Tools
Pre-production	Ideation and design, research and reference	Sketch and storyboard tools, Image and video capturing and manipulation tools
Production	Creation of 3D objects, adding surface texture and lighting simulation and rendering output	3D tools, image manipulation tools for surface textures creation
Post-production	Compositing , visual and sound adjustments	Editing tools for visual adjustments and compositing; sound editing tools for adjusting overall sound design for animation

There are many methods of creating a 3D animation which methods may vary depending on the content of the animation. As instructors and students have limited face to face time per week, besides the necessary

lectures and tutorials, classes are used for consultation and discussion of the design and technical approaches for animation problem solving. As the problems faced by students differ from case to case basis, there is limited time for detail explanation or demonstration for solving each student’s animation problems, which usually involves a tedious, linear and repetitive process. Therefore the use of video tutorials and creative animation videos are suggested to ensure the flow of the process and reduce the need for the instructor to repeat. During class time, students will also share and discuss methods (UGV and other learning alternatives) they have referred to in solving the animation problem.

#### 4. User generated videos as support for learning 3D animation

To identify how UGV are used in the animation process, this paper looked into 29 students’ 3D animation process of creating an animated talking head of themselves. They are second year animation students which all of them are pre-equipped with the knowledge of the animation process and the basic tools need to achieve the outcome. The challenge of this course is to achieve realism of the animated head. The animation was completed over a course of 14 weeks with final output of a 30 second animation synced with voice over including a detail evaluation report of the animation process. The author is the said instructor for the students, and played the role of the facilitator to ensure that the students were on the right track and progressed timely.

##### 4.1. The animation process

In pre-production, students captured their face image for analysis and to be used as reference in the production process. Students determined the animation process, researched, studied and reviewed techniques and methods needed to solve the animation problems. Fig.1 is the screenshots example of the production process of a creating a realistic human head animation. Firstly during pre-production stage, edited orthographic image is used as background reference for the creation of the 3D model; students studied their own face topology. After that at production stage, a 3D model is created based on the student’s choice of modeller followed by unwrapped face textures mapping. Once the model is completed, the head model is rigged, animation control setup and animated. A self-recorded video of their own talking head was used as a guide for their realistic facial animation, capturing any secondary facial movements. Lastly, the animation is lit and rendered and composited in post production for adding titles and other visual enhancement.

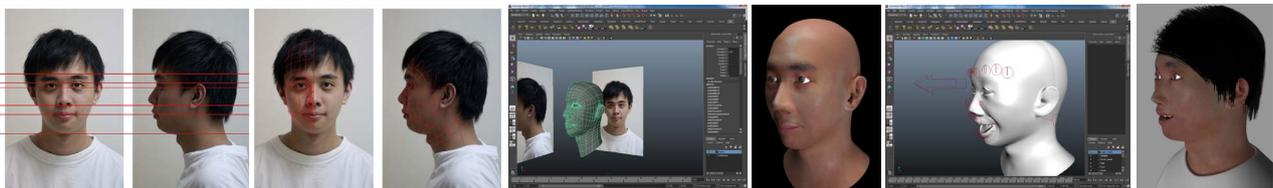


Fig. 1: The production process of a head animation. From left to right: Aligning the image orthographically; Edge flow and face loops study; modelling in 3D; texture mapping; animation setup; rendering. Courtesy of Chaow Jen Hou (2011)

##### 4.2. The use of UGV for 3D modeling and animation of a talking head

The use of UGV as support for learning 3D animation in this context of solving the animation of an animated talking head are reviewed based on the 3 stages of production.

**Pre-production.** During pre-production, among other non-video reference (such as html and peers’ advice), students referred to many face animation examples, researched on modelling tutorials, which came in screen captured demos and animation test videos. Fig. 2 is some of video tutorials used as a reference for the creation process. Majority of the students opted for techniques and references which they found “less confusing”, “simple” or “easier to understand” as compared to other techniques. Though most referred to YouTube videos, some students also referred to 3D websites that belong to special interest user groups or professional organization such as digitaltutors.com. It was a surprised that none of the students referred to printed publications (books) for reference.

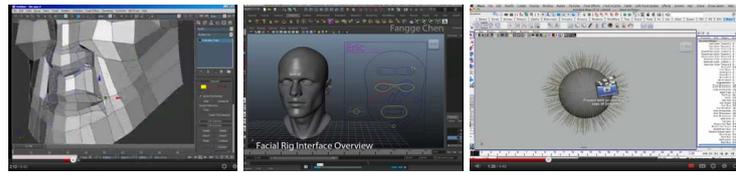


Fig. 2: Screenshots of some of the UGV tutorials used by students: From left to right - Head modelling tutorial, courtesy of Irfan Celik (2007); Face rig, courtesy of Fangge Chen (2011); Maya Hair, courtesy of rmtrammel (2010)

**Production.** At this stage, the production process is more technical. The 3D production processes consist of modelling, texturing and mapping, rigging, animation, lighting and rendering. Though mostly production processes are non-linear [20], the creation of this animated talking head is rather linear. The creation method for each student differed as each student's facial features are different from each other. The choice of modeller is also subjected to the students' preference and skills. Based on the evaluation report submitted, majority of the students referred to video instructions on the internet for reference and tutorials. Most common video reference are face modelling tutorials (polygonal technique, subdivision modelling technique, sculpting technique using Zbrush and mudbox), face rigging tutorial (Face Machine) and hair simulation tutorials (Maya Hair System). Students viewed the tutorials repetitively while doing and viewing. Some students found it stressful in coping as most of them spent a lot of time redoing and experimenting with the animation techniques before achieving the results wanted. These are usually the less competent students as they are either weak in animation skills to begin with or have lower digital literacy skills in obtaining suitable and relevant information needed for problem solving.

**Post production.** At this stage, students composited the final rendered sequence into an animation, added relevant titles and adjusted visuals and sound technicalities. Not much of activities were reported about this stage presuming that all students are already familiar with the tools and processes for post editing.

## 5. Summary and Future study

UGV has been used conveniently in teaching and learning 3D animation production. Being Digital Natives [3], 3D students have relied on the internet for quick information which was clearly noted in this study. None of the students referred to books or printed publications though there are relevant references available in the library. With or without instructors' suggestion, students are mainly using UGV for learning 3D skills and techniques as compared to static media and other medium of instruction. As these learning content are readily available on the internet, the use of it is subjected only to the digital literacy skills of the students. Weaker students have problems finding and filtering the contents for learning, not to mention understanding the content of the UGV. Though sometimes these videos are outdated and lacked sound instructional design that confused the students, students were still able to analyse and adapt their new found knowledge (from the UGV) with what they have already known to solve their animation problems.

Besides that, students are prone to select techniques or methods that are more readily available i.e. there are more creative animated videos, screen-captured modelling tutorials as compared to live 3D lectures or face mapping tutorials or fur simulation videos. Students have more confidence in producing animation work with techniques that they have more access or reference to. Nonetheless, it is still unclear whether the students' animation techniques preference was selected based on the availability and convenience of the instructional media or was selected based on the actual effectiveness of the selected technique in solving animation problems. Other limitation of the study are the reliability of the students' reports as no reports were written about references with peers or other consultation with instructors or subject experts that has taken place during class.

For future study, the following could be further investigated: 1. as students preferred video instructions as compared to other instructional methods, should instructors provide instructional videos for learning for use in classroom and beyond classroom learning rather than using existing ones on the internet? 2. As not-so digitally literate students need more guidance more as compared to their independent peers, would they benefit with instructors led video instruction rather than self-exploratory video research? 3. What are the role of the instructors should UGV be strategized as part of the main instructional medium for structured course?

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