

A Development of 2D Cartoon Animation to Safe Driving Promotion A case study Mahasarakham University

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Abstract. Around the world, traffic accidents are a major problem to the public health, society and to the economy. This problem is growing every year and leading to loss of lives and properties. The World Health Organization (WHO) has declared the year 2004 as the year for accident-free roads to stimulate and encourage all countries to focus on road safety. Speed, Carelessness and negligence of rules while driving by the students within the University campus are cause for accidents. This study has resulted in developing a 2D cartoon animation for campaigning to reduce accidents. There are two main objectives, the first is to develop 2D animation with high quality and the second is to study the attitude and satisfaction of 267 undergraduate students who are samples for this study. The research tools consist of media expert questionnaire, attitude and satisfaction questionnaire and 2D animation titled “Safe Driving”. This study results showed that the quality of 2D animation was of high level, students had positive attitude towards the media and their satisfaction levels are high.

Keywords: animation, cartoon, 2D animation.

1. Introduction and Motivation

Traffic accidents are the major problems in the countries around the world, which affect both public health and social problem since the accidents lead to loss of both human life and their properties. Traffic accidents are increasing because of convenience of road, the speed of the vehicle, and negligence on the part of the driver. Traffic accidents are damaging the economy of the country as a whole. World Health Organization has declared the year 2004 as the year for accident-free roads to stimulate and encourage all countries to focus on road safety [1].

Mahasarakham University is located in North Eastern part of Thailand. There are 20 faculties and about 40,000 students including of undergraduate, postgraduate, and research students, who come from all parts of Thailand and neighboring countries such as China, Cambodia, Vietnam and Loa PDR. Increasing in the number of students also add to the traffic problems in and around the University campus. The study of accidents in the area around the university campus including Ban Tha Khon Yang and Ban Kham Reang, found to be high almost every day. The most accidents were caused by the students of the University, who reside in and around the University campus. Motor bikes are mostly involved in the accidents. Another reason is that the students are lacking the knowledge of traffic rules. Statistics of the accidents within and around the University campus during the year 2010 has shown that 95% of accidents happened involving motorcycles [2]. The top 5 causes for death of a student are: first cause, over speeding (more than the limits) 32.03%, second cause was less distance between two vehicles (driving distance behind other vehicles) 22.78%, third cause was not using indicators (no signaling while park/slow down/turn 8.18%, fourth cause was violating traffic signals (driving in violation of traffic signals and signs) 7.41%, and the fifth cause was drunken driving 6.18%.

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The major media campaign will help to build awareness, knowledge and understanding of safe driving. Especially, media in the form of cartoon animation will play an important role among all the age groups and it is favorite and popular among the Thai children [3]. For reasons mentioned above, designing and developing a high quality cartoon animation may help the students to adjust their driving attitudes and skills. This media can help reduce accidents on the roads apart from complying with the policies of the University in the campaign for safe driving by the students in and around the campus.

2. Related Works

Sirama Srisuparp and colleague [4] reported their research about knowledge and behavior of the traffic of Mahasarakham University students. The study exposed that 95.05% of students are driving motorcycle and 73.06% have driving licenses. Most of them 74.17% use normal speed of driving between 40-60 kilometers per hour (kph) and 35.56% use maximum speed of driving between 61-80 kph, and 30.28% use maximum speed between 81-100 kph. During the last year, 48.80% of students violated traffic rules/laws and 17.69% were involved in the accidents. Regarding the test measures on the knowledge of traffic rules/laws 69.72% students passed the exam and 30.28% did not pass the exam. There are many researches on applications of computer animation and we can summarize that the animation affect all ages and sex [5] by creating a character, a story that is funny and entertaining. [6].

3. Research Methodologies

The research methodology followed for this study are as detailed below.

3.1. The objectives

In this study, we want to find answers to a question, the cartoon animation with high quality may make changes among the audience, if so, there are 2 main objectives they are:

- To develop a 2D cartoon animation which has high quality
- To study the result of animation with target audience and the results mean both the students' attitude and satisfaction levels.

3.2. The processes of research

To find the answers of research question and objectives as mentioned above, we apply ADDIE model that is an Instructional Systems Design (ISD) model [7] to our development process shown Fig 1.

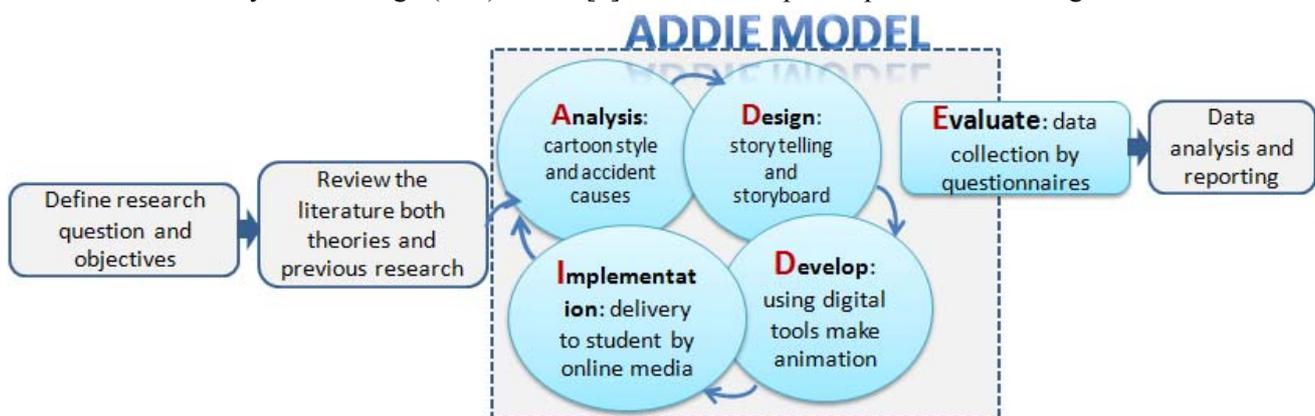


Fig. 1: research diagram.

In the process of evaluation, there are 2 jobs in designing the questionnaires that include media expert questionnaire to test the animation quality and attitude, and satisfaction questionnaire to recheck with students who are research sample. For this research, we selected 267 undergraduate students from the students enrolled for the subject named Computer and Presentation, which is a general education subject. To check the quality of cartoon animation design, we invited 9 experts, who are from the area of communication art, public relation, new media and digital art.

3.3. The designing

The design process is the important part for this research since it is to find the answers to the research question. We proceeded with caution and checked for accuracy as well while designing. The results of the design consist of two parts: cartoon animation design and questionnaire design. The storytelling of the cartoon animation is presented in the form of 2-dimension cartoon animation, which focuses on the issue of safe driving. This is divided into four parts, each part about 30 seconds to make an acknowledgment of the safe driving and ways to prevent accidents.

- Part#1 named “Limitation in speed driving”, to describe the speed on the road as required by law.
- Part#2 named “Turn on the signal”, the drive must give signals before parking, slow down or turn.
- Part#3 named “No violation traffic signal/signs”, to caution the driver against the negligence.
- Part#4 named “Drunk no drive”, motorists are often lack consciousness due to intoxication.

The example of character designed and storyboard shows in Fig 2.

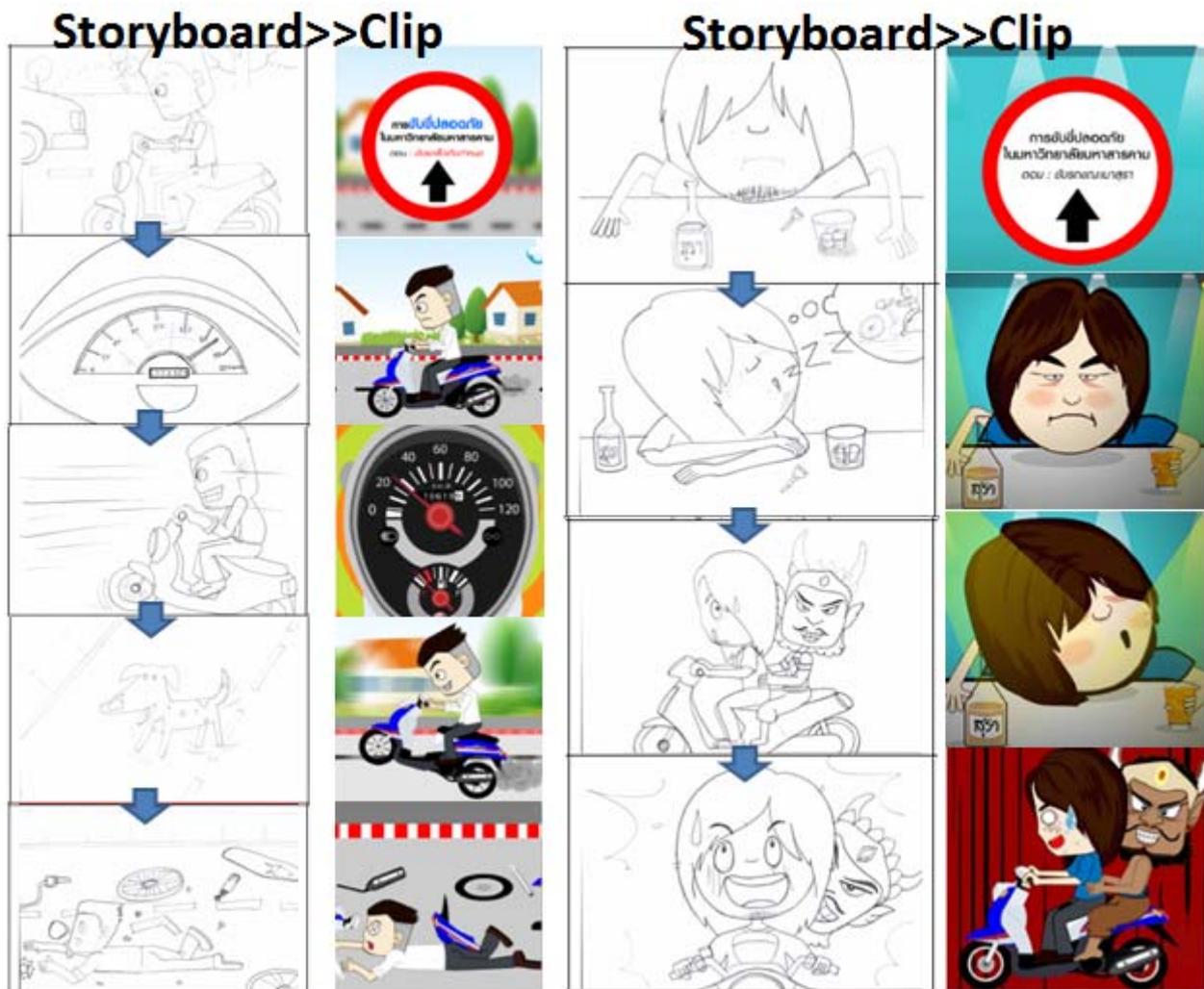


Fig. 2: The example of screenplay.

We designed a structured questionnaire with 5 scales. This corresponds to a scale 1-5, with 1 being lowest agree/level, and 5 being highest agree/level. Animation quality questionnaire divided into 2 parts, one with 14 questions for content design and the other with 20 questions for animation design. In the same way, the questionnaire design for satisfaction, there are 10 questions for content design, 11 questions for animation design, 7 questions for graphics design, and 7 questions for audio and script design. And there are 5 questions in the attitude questionnaire.

4. The Results

This study shows the following results as detailed below.

4.1. The quality of developed animation

Table 1 and 2 shows the list of questions and the level of animation quality that came from expert opinion.

Table 1. Animation quality: Content design.

<i>Question List</i>	<i>Statistics Value and Meaning</i>		
	\bar{X}	<i>S.D.</i>	<i>Quality Level</i>
1. Contest is clear and easy to understand	4.66	0.57	Highest
2. The sequences of story is corresponding to the objectives	4.66	0.57	Highest
3. The description of contest is clear	4.00	0.00	High
4. The contest is appropriate to target	4.00	0.00	High
5. The content is presented in relation to each other	4.00	1.00	High
6. The amount of content in each scene are described as appropriate	4.33	1.15	High
7. The amount of content in the animation is appropriate	4.00	1.73	High
8. Usign Thai language is correct to describe the content	4.66	0.57	Highest
9. The use of graphics match the content	4.33	0.57	High
10. The steps of presenation of the content	4.00	0.00	High
11. The accuracy of the content with storytelling	4.00	0.00	High
12. The ranking of importance of content	4.00	0.00	High
13. The storytelling is easy to understand	5.00	0.00	Highest
14. The interest of storytelling	4.66	0.57	Highest
Overall	4.30	0.39	High

Table 2. Animation quality: Animation design.

<i>Question List</i>	<i>Statistics Value and Meaning</i>		
	\bar{X}	<i>S.D.</i>	<i>Quality Level</i>
1. The character design is appropriate	4.66	0.57	Highest
2. The use of color in the design was appropriate	4.33	0.57	High
3. The manner of presenting the cartoon	4.33	0.57	High
4. The proper size of the images and scenes	4.66	0.57	Highest
5. The reasonableness of the duration of the presentation	4.00	1.00	High
6. The elements of the scence and attractiveness	4.33	1.15	High
7. The right of the image and the scene were consistent	4.33	0.57	High
8. The movements of the cartoon	4.33	0.57	High
9. The meaning of the picture	4.66	0.57	Highest
10. Pictures and cartoons stimulate attention	4.00	0.00	High
11. The lighting and shadowing are right	3.66	0.57	High
12. The use of camera angles in each scene was appropriate	3.66	0.57	High
13. The interest in the animation and graphics	4.33	0.57	High
14. The presentation technique is appropriate	4.00	0.00	High
15. Color and clarity of images and scenes	4.00	0.00	High
16. The manner of animation and sound	4.33	0.57	High
17. The clarity and accuracy of narration	4.00	0.00	High
18. The consistency of the narration and content	4.33	0.57	High
19. The appropriateness of the use of music and sound effects	4.33	0.57	High
20. The use of sound to excite the interest is appropriate	4.00	0.00	High
Overall	4.21	0.15	High

4.2. The level of student's satisfaction

Table 3 shows overall satisfaction levels of students in each part of the questionnaire. While all questions are in this questionnaire, the opinion about design and development of animation is in more satisfaction level.

Table 3. Level of student's satisfaction

<i>Question List</i>	<i>Statistics Value and Meaning</i>		
	\bar{X}	<i>S.D.</i>	<i>Satisfaction Level</i>
1. Part 1: Content design	4.17	0.39	More
2. Part 2: Animation design	4.10	0.46	More
3. Part 3: Character and graphics design	4.11	0.44	More
4. Part 4: Script and sound design	4.17	0.46	More
Overall	4.14	0.43	More

4.3. The student's attitude

Table 4 shows the agreement levels and the students' attitude towards the content with constraints in the design and development in the animation.

Table 4. Level of student's agreement

<i>Question List</i>	<i>Statistics Value and Meaning</i>		
	\bar{X}	<i>S.D.</i>	<i>Agreement Level</i>
1. I have the knowledge and idea from this cartoon animation	4.38	0.68	More
2. I will strictly abide by the rules of driving	4.35	0.69	More
3. It will brought me knowledge from this cartoon to use in daily life	4.43	0.76	More
4. I will use my knowledge to tell people whom I know to follow the traffic rules while driving	4.46	0.54	More
5. I want encourage people whom I know to watch this cartoon to learn and follow the rules while driving	4.42	0.72	More
Overall	4.41	0.53	More

5. Conclusion and Discussion

1) Development of cartoon animation showed the result of animation at high level of quality in every aspect. This may be because the research is based on the application of the development process concept 'ADDIE Model', which is good process that focus on quality [7] and in each development process step was checked by the experts both in the pre-production and post-production animation. In addition, researchers have studied the accident data and stored basic information about the students as well. The format used in the development of cartoon animation, researchers could choose the format appropriate to the age of the target group. Issues related with design, researchers followed animation design that was easy to understand with clarity and described the content with the correct language; this is consistent with the results of Shannon [5].

2) Testing the cartoon animation with the target audience found, the audiences' satisfaction level is at high level. And students have positive attitude towards the presented story. May be due to the audience understand the content; each story is not too long, graphical presentation is appropriate to the content and enjoyable. This result is consistent with Atikarn Unjanum [8], to test the teaching and learning with comics and animation found that the students are happy and attitude was positive towards learning.

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