

# Innovating Animation Teaching System: An Experimental Survey on the Integration of Design Thinking and Creative Methods for Animation Education in China

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## Abstract

This paper discusses outcomes from an experimental survey on the integration of Design Thinking (DT) and Creative Methods (CM) for animation education in Chinese universities. The survey was conducted on 62 college students at two different universities, namely, Kunming University in Yunnan and Hunan University of Science and Engineering in Hunan. Two experimental stages, pretest and posttest experiments, were adopted in the completion of the survey. In understanding the teaching effect of DT and CM, an analysis was performed based on six parameters: Familiarity, Performance, Ability, Time, Reference, and Attitude. The analytical findings thus become a basis for the development of an integrated Animation Teaching System as a pedagogical approach in animation education.

## Keywords

Design Thinking, Creative Methods, Animation Teaching System, Higher Education

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## 1. Introduction

Animation talent training has long been a question of great interest in a wide range of animation applications. Animation, as a comprehensive creation process, is categorized broadly into commercial animation, experimental animation, artistic animation, and narrative animation (Zhao et al., 2018). For these kinds of animation applications, its creations inspire people's experience, emo-

tion and comprehension through visual images. In addition to that, animation applications also include game animation, engineering animation, advertising animation, and user-interface interactive effects (ibid). The applications appropriate animation as a design strategy for solving-problem and service provider.

This paper focuses on commercial animation application with a particular reference to animation education issue. The workflow of commercial animation covers five main phases, namely, conceptualization or planning, pre-production, production, post-production, and distribution (Yoon, 2015). From animation education perspective, there are few challenges in accommodating the whole workflow for teaching and learning activities. Su and Wang (2013) for instance highlight the lack of consistency between courses syllabi in animation programme which has caused some graduates to be unclear with animation production process even after completing their four-year undergraduate programme. Apart from that, animation students also face a difficulty with their idea development during the early conceptualization and pre-production phase. Responding to this, we argue that there is a need to inculcate thinking skill as a pedagogical approach in animation education.

Design Thinking (DT) is a thinking skill that emphasizes design as a kind of “purposeful creative behavior” (Henriksen et al., 2017). The thinking skill highlights a structured guidance to acknowledge relationship between knowledge and practical problems. It encourages the creation of new and fresh knowledge whilst proposing practical solutions and alternatives to the identified problems. A considerable amount of literature has been published in contextualizing DT as a thinking discipline for problem-solving. Dorst (2011), in this respect, emphasizes DT more as an interdisciplinary synthesis rather than a stylized concept (Dorst, 2011). DT is understood as a versatile thinking model that is applicable to various knowledge disciplines. These include educational design thinking, commercial design thinking (Clark & Smith, 2010), product design thinking (Yuan & Lee, 2014) and architectural design thinking (Holubchak, 2020).

DT can be loosely described as a generic logical thinking procedure in dealing with unpredictable problems during design process. Designers cannot predict what kind of problems they will face in their works. Therefore, when applying DT in creative activities, adjustments are engaged during the processual procedure in order to achieve intended outcomes. Manifesting this underlying concept, numbers of well-known DT models have been proposed over the past few years such as IDEO and d. school of Stanford University (Smith et al., 2015), the Double Diamond of British Design Council, and Dorst’s DT formula (Dorst, 2011). While the former are applicable for business management and product design, the latter is seen suitable to be applied into animation design process. Based on Dorst’s DT model, this study explores the use of “what + how (leads to) result formula” to be used in animation education (see **Figure 1(a)**). The exploration is conducted with an aim to assess the integration of DT in teaching and learning of animation programme.

Creative Methods (CM) is a thinking approach that encourages speculation, uncertainties and imaginary possibilities (Craciun, 2010). It is used to cultivate the “thinking outside the box” and moving out of comfort zone attitude while dealing with complicated problems. The commonly used CM models are brainstorming, mind mapping, 5W1H, synectics, and causal layered analysis. For this study, CM is engaged as an auxiliary tool to be integrated together with DT for animation teaching and learning.

By integrating both DT and CM models, the study conducts an experiment separated into two different stages: pretest and posttest survey. The experiment covers a comparative analysis between normal teaching process and the integration of DT & CM in animation pedagogy. We term the pedagogical integration as “Animation Teaching System”.

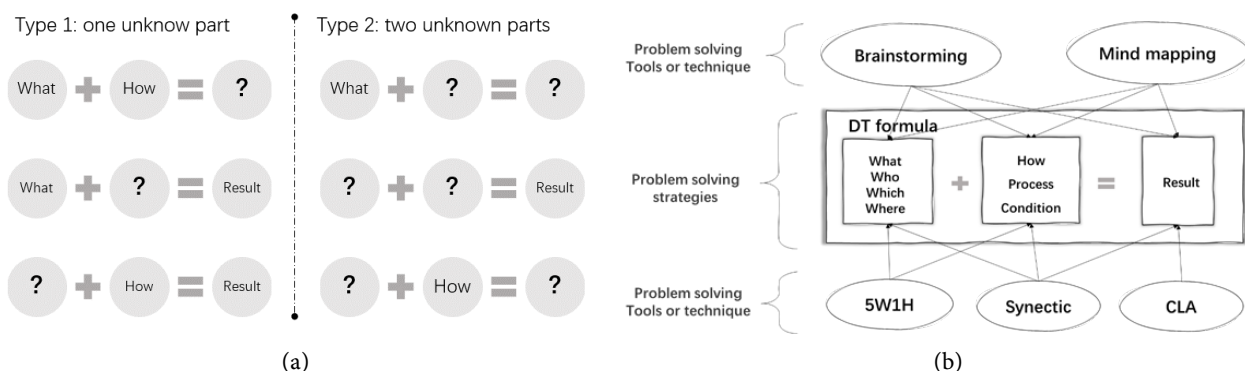
## 2. Animation Teaching System

Storyboarding is a common practice in creative animation production process (Mou, 2015). In this study, storyboard is adopted as an object of study for analysis. DT and CM are used as a guidance strategy for assisting animation educator and students (see **Figure 1**). The coordination between storyboarding, DT, and CM is what we refer to as “Animation Teaching System” (ATS). We hypothesize that the use of ATS will enhance the students’ creativity and their problem-solving skills in developing constructive solutions and ideas.

From the teachers’ perspective, DT and CM are engaged as a pedagogical tool. It is used as a guidance for encouraging creative responses from the students when dealing with specified animation task. Two main objectives are outlined in the study: a) using DT as a thinking model framework for animation production process; and b) adopting CM as a technique for problem-solving in animation storyboarding. Following these two objectives, an experiment is set up to assess the intervention of ATS in animation studies (see **Figure 2**).

## 3. Research Method

The experiment was conducted in two different higher education institutions in mainland China, located at the western and central region. The first institution



**Figure 1.** DT formula (a) and CM framework (b) (Source: Author, 2020).

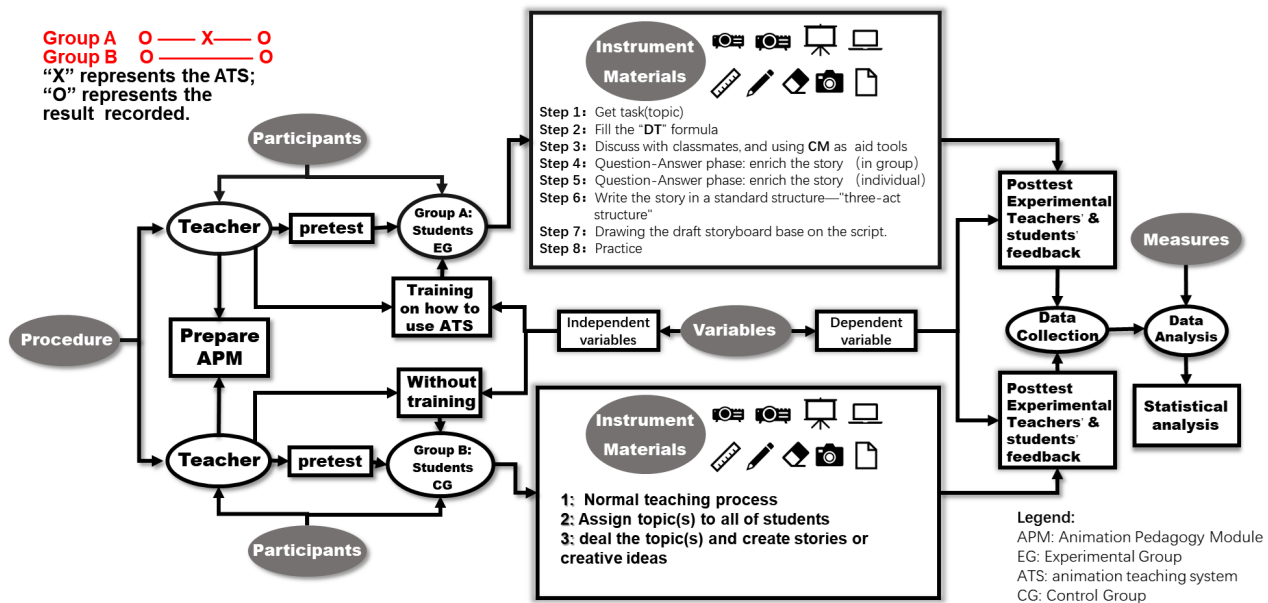


Figure 2. Experiment diagram (Source: Author, 2020).

is Kunming University (KU) in Yunnan province and the second one is Hunan University of Science and Engineering (HUSE) in Hunan. A total of 62 respondents of animation students, 27 from KU and 35 from HUSE, participated in the experiment. The respondents underwent two different experimental stages: pretest and posttest. During the pretest, normal teaching was conducted by which students were assigned task to produce storyboards based on specified animation theme. In the posttest, students were introduced with ATS. They integrate DT and CM as a thinking guidance model for their ideas development. Since the respondents are beginners, second year degree students of animation programme, they are given time to be familiar with the DT and CM thinking approach during the experiment. In assessing the intervention of ATS, a questionnaire was designed to evaluate students' feedback and performance. The questionnaire is structured into six parameters, namely, Familiarity, Performance, Ability, Time, Reference, and Attitude.

### 3.1. Questionnaire Design

Using Likert scale as scaling response, the questionnaire asks respondents to rate their feedbacks according to the following parameters:

- **Parameter 1:** Familiarity

Question 1: *Rate your familiarity with the animation theme in developing a proper storyboard.*

The first parameter focuses on respondents' familiarity with the animation theme for producing a related storyline. The question asks respondents' understanding in developing a creative storyboard with and without the intervention of ATS.

- **Parameter 2:** Performance

Question 2: *Rate your readiness and awareness in structuring the storyline upon receiving the task.*

The second parameter is concerned with respondents' performance in responding to the animation task assigned. As such, the question asks respondents' awareness and readiness with and without the intervention of ATS.

- **Parameter 3: Ability**

Question 3: *Rate your difficulty in responding to the task assigned.*

The third parameter emphasizes respondents' ability in comprehending the animation task. The question asks respondents' difficulty in completing the task with and without the intervention of ATS.

- **Parameter 4: Time**

Question 4: *Rate if the time limitation influences your storyboard creation.*

The fourth parameter highlights the issue of time spent in animation storyboarding. The question asks respondents the effect of time period in the completion of their tasks.

- **Parameter 5: Reference**

Question 5: *I can finish the storyboard without any references (such as other famous animation storyboards, related short videos etc.).*

The fifth parameter focuses on respondents' reliance on reference materials for developing creative ideas. The question asks respondents' original idea and imaginative thinking skill with or without ATS.

- **Parameter 6: Attitude**

Question 6: *ATS is useful in the process of creating my storyboard.*

The last parameter has an explicit concern on the impact of ATS. The question asks respondents' attitude on the use of ATS as a pedagogical approach.

### 3.2. Data Analysis

A descriptive analytics is conducted to understand the frequency distribution pattern of the ordinal Likert data according to the previous six parameters: Familiarity, Performance, Ability, Time, Reference, and Attitude (Boone & Boone, 2012).

## 4. Results and Discussions

By analyzing the respondents' feedback from the questionnaire (n = 62), we investigate the frequency distribution of the parameters and understand how ATS approach can be improved in the future.

### 4.1. Familiarity

Question 1: *Rate your familiarity with the animation theme in developing a proper storyboard.*

Interpretation: The result reveals that most students are slightly less familiar with their animation tasks on storyboarding during the pretest. As shown in **Figure 3**, there is a clear change in the posttest by which more students are seen

to be better, familiar with their tasks. The finding thus shows a positive impact of ATS in improving the students' understanding on storyboarding.

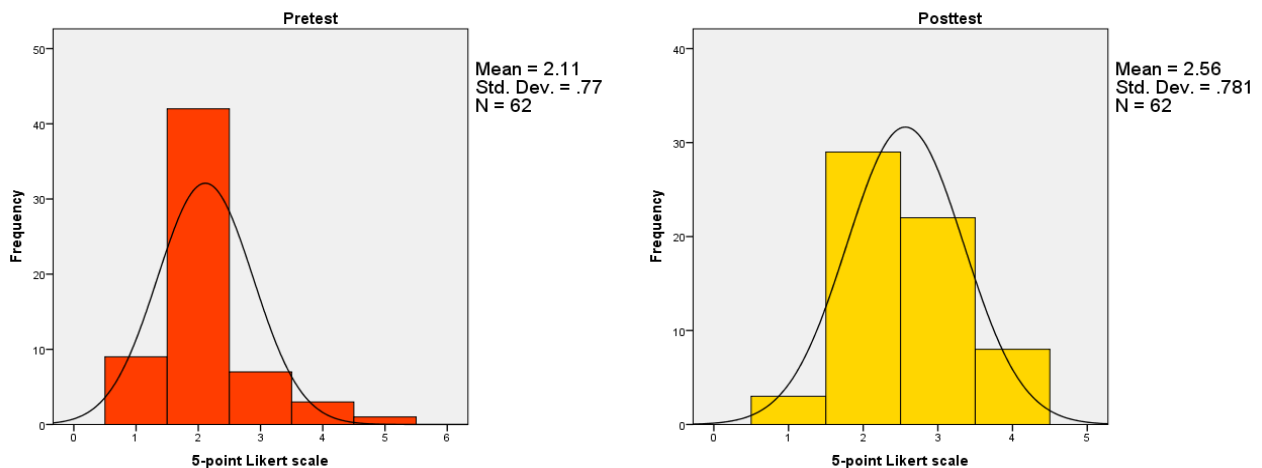
### 4.2. Performance

Question 2: *Rate your readiness and awareness in structuring the storyline upon receiving the task.*

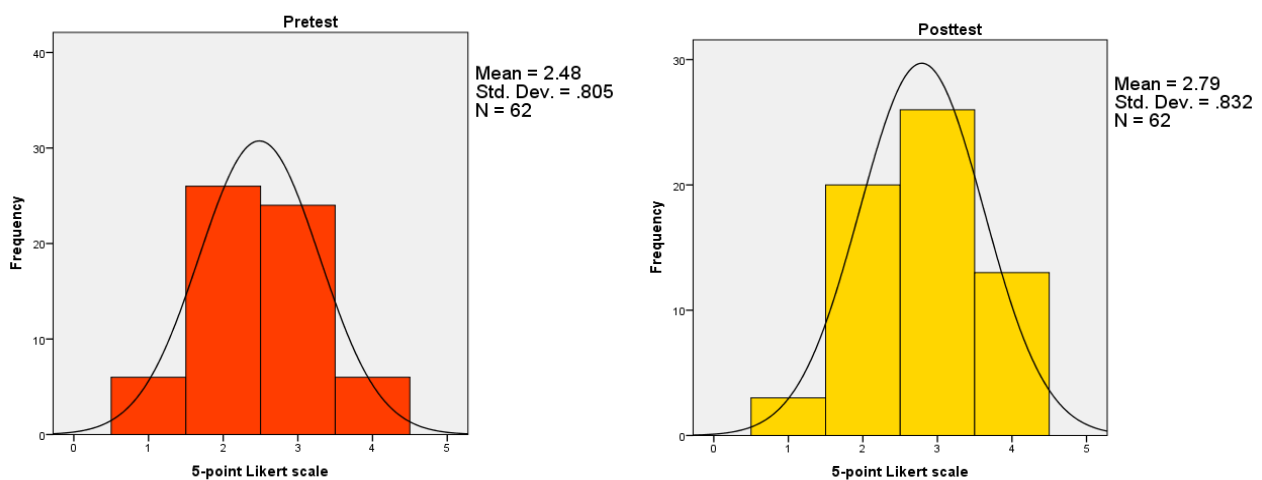
Interpretation: In general, there is a less significant difference on the performance of the students in dealing with their animation tasks throughout the experiment. The posttest's overall mean is 2.79, a small increase from the pretest with 2.48 (see **Figure 4**). However, numbers of students become more aware and ready upon receiving their animation tasks during the posttest, indicating the positive impact of ATS.

### 4.3. Ability

Question 3: *Rate your difficulty in responding to the task assigned.*



**Figure 3.** The pretest and posttest survey on Familiarity (Source: Author, 2021).



**Figure 4.** The pretest and posttest survey on Performance (Source: Author, 2021).

Interpretation: More than half of the students inform their difficulties in handling the animation task during the pretest. There is a clear shift on the students' ability in the posttest (see **Figure 5**). Many students highlight the help of ATS in making their storyboarding design works easier.

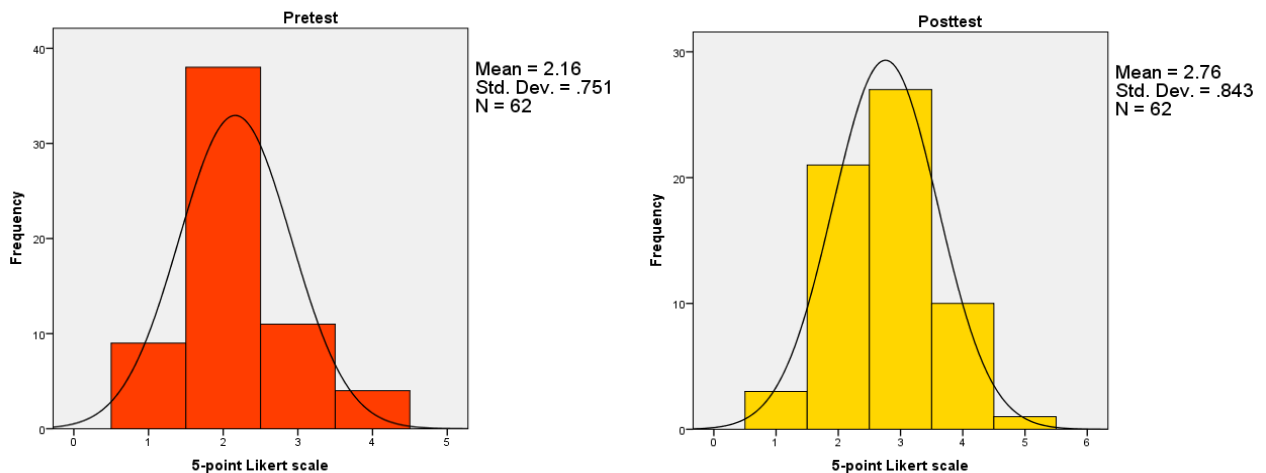
#### 4.4. Time

Question 4: *Rate if the time limitation influences your storyboard creation.*

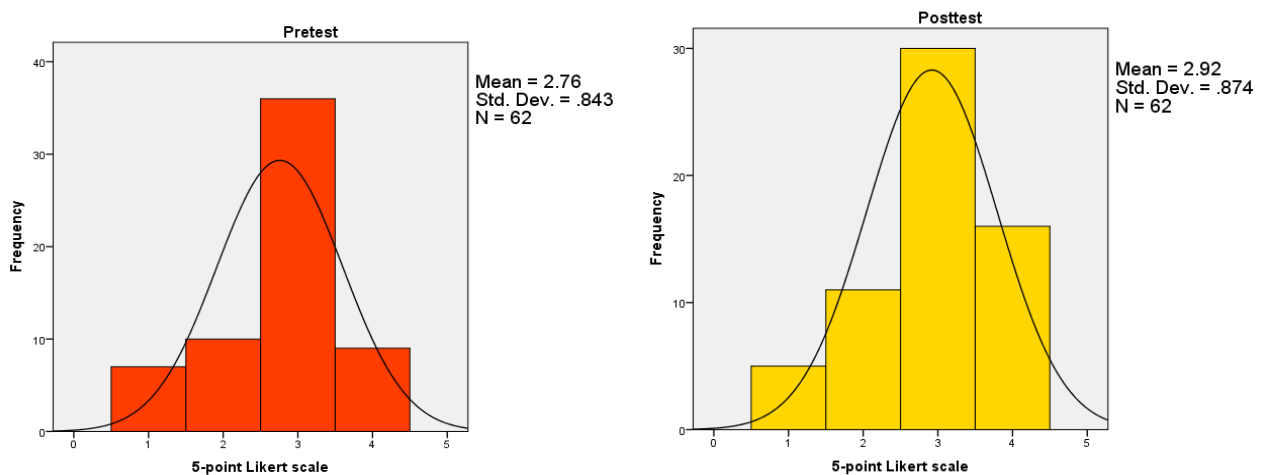
Interpretation: As displayed in **Figure 6**, the result shows an influence of time in the completion of the students' animation tasks in both pretest and posttest surveys. However, time limitation becomes less influential for many students during the posttest, indicating the benefit of ATS.

#### 4.5. Reference

Question 5: *I can finish the storyboard without any references (such as other famous animation storyboards, related short videos etc.).*



**Figure 5.** The pretest and posttest survey on Ability (Source: Author, 2021).



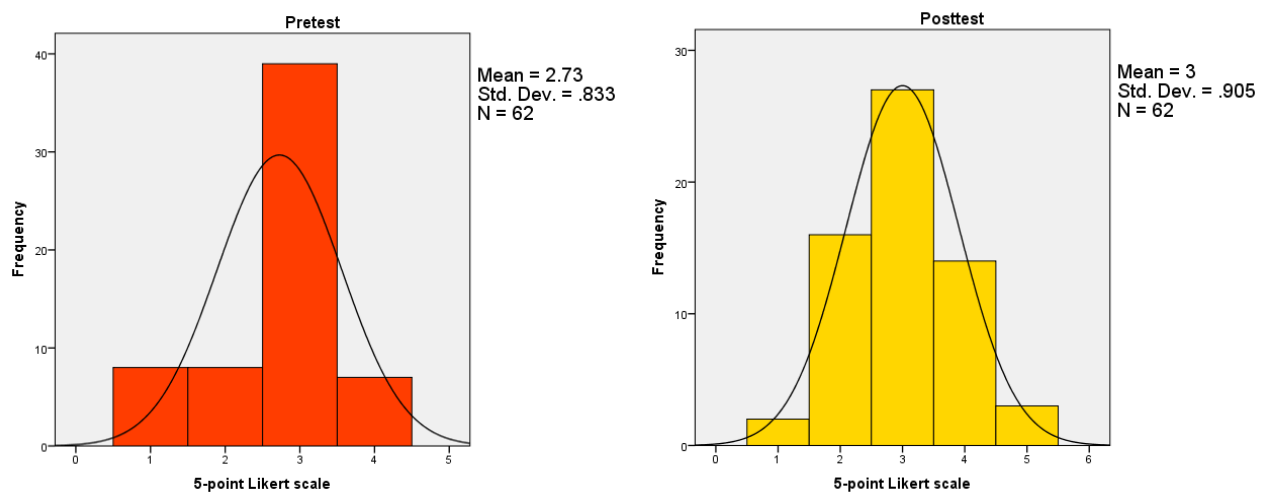
**Figure 6.** The pretest and posttest survey on Time (Source: Author, 2021).

Interpretation: The result in **Figure 7** shows that most students are uncertain whether they can finish their storyboards without any reference materials in both pretest and posttest experiments. However, an increasing number of students state their self-confidence during the posttest. The finding thus calls for a further improvement on ATS to inculcate originality and creative imagination issues among animation students.

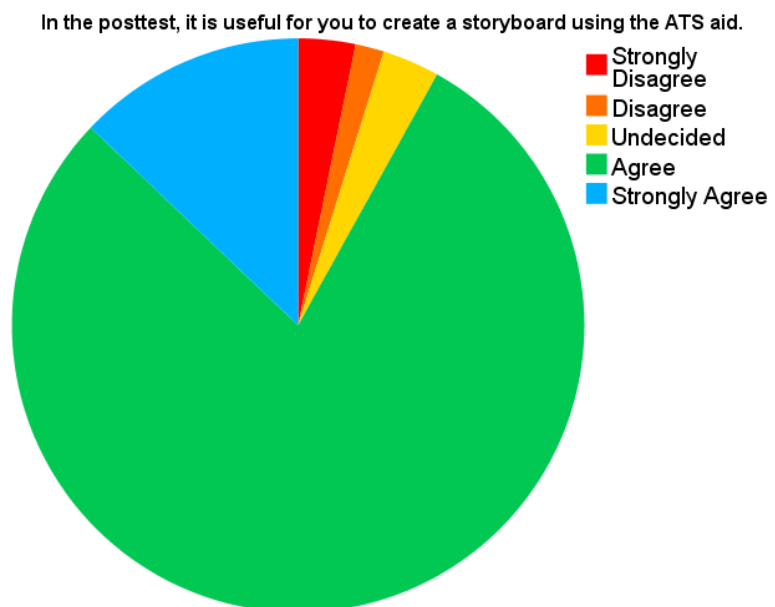
#### 4.6. Attitude

Question 6: *ATS is useful in the process of creating my storyboard.*

Interpretation: As shown in **Figure 8**, the green part presents more than three-quarters of the proportion, so the ATS approach is strongly accepted



**Figure 7.** The pretest and posttest survey on Reference (Source: Author, 2021).



**Figure 8.** Attitude on the use of ATS (Source: Author, 2021).



among animation students. ATS has improved the students' understanding and design thinking for producing creative storyboards.

## 5. Conclusion

The study shows the positive impact of ATS on the teaching and learning process among novice animation students. The adoption of DT and CM has improved the students' creativity and thinking skills. The results discussed in this paper are general assessments by combining both findings from KU and HUSE together. Detailed studies can be conducted between these two institutions separately to further obtain more insights and perspectives on ATS which can be used for its future improvement.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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