

# Teaching Action of Virtual Reality Video Creation Based on Viewers' Cognitive Behavior

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## Abstract

How to make good use of videos to promote the school, so that potential students and parents can have a more comprehensive understanding of the characteristics of the school, is becoming more and more important. This study aimed to explore the action research of film and television design action learning in the international volunteer service of University of Science and Technology (HKUST) by cooperating with Pei Hwa Independent High School (PHHS) in Malaysia to shoot a virtual reality (VR) enrollment promotional video. It explored how an action learning plan could achieve the United Nations Sustainable Development Goals (SDGs) and recorded the process of creation and teaching design models. A total of ten students from the International Volunteer Film and Television Service Team of Chung Chou University of Science and Technology (CCUT) were selected as the research subjects for a two-week course with 88 sessions. Qualitative data were collected through observation, interviews, and document analysis. From planning to implementation, this action research on teaching action of VR video creation of viewers' cognitive behavior was divided into the planning period, the action research and shooting period, and the action learning post-production period. Conclusions verified that HKUST students' practical ability and learning attitude were improved after the action research, and the specialties they have studied in Taiwan can obtain imaging results and the output of imaging education abroad.

## Keywords

Cognitive Behavior, Action Research, Enrollment Promotional Video, VR Video

## 1. Introduction

### 1.1. Background

In her analysis on the development trend of the AI industry in 2021, Chen

(2021) suggested that the emphasis on stereoscopic images in the development trend of the AI industry is an urgent task. Enrollment is the top priority for each university at present, so the enrollment videos of many schools are equipped with virtual reality (VR) to be diversified, interesting, and immersive, to promote the schools. The enrollment videos can express the characteristics of high schools, stimulate students' recognition for studying at the schools and further impress prospective freshmen with the advertised schools, thereby generating their willingness to enroll.

Therefore, this study discussed the concept of creation, scene equipment, preparation of funds and talents, and integration of resources based on the process of the International Volunteer Team of CCUT shooting a VR enrollment promotional video and recording the action education research in Malaysia in 2019.

## 1.2. Motivation of Research and Creation

In line with the Ministry of Education's policy of action education, actions and services are also good ways of education. In addition to internships, the author truly realized the importance of action learning. As a result, in recent years, HKUST has actively developed an international volunteer service team with independent characteristics, extending the service target and learning level to the international level.

The main content of the "Research on the teaching activities of VR video creation based on viewers' cognitive behavior (RVRV)" is a structured curriculum. To achieve the goal of filming VR videos overseas, it seems that it is insufficient with a structured course. It is best to learn the connotation courses of film and television service learning. Courses can be mainly divided into social service, humanities, art, design, and communication, according to the ability of related majors to deal with problems in series and the field of department-based courses. The theme of this action plan focuses on education, service, and humanities and art, so the corresponding courses include Values of International Volunteering, Beetle Ecological Volunteer Exploration, Micro Film Making, Introduction to Cultural and Creative Industries, Lighting and Photography. What kind of theoretical basis and knowledge perspective can be used to support this structure? The application of film aesthetics theory, the basis of cultural and creative industry theory, film and television professional knowledge and skills, and the perspective of international volunteer service can support this plan structure. This program is mainly an action education model of experiential education, aiming to complete the VR enrollment video requirements of the service recipients and promote the service providers' learning and development through planned international volunteer service actions and action learning process of structured design.

Course design and teaching include the following options:

**1) Main plan: The action plan for VR promotional video shooting.** Recording the VR video creation and summarizing the general situation of the

course development, expecting to improve the design teaching content and teaching methods.

**2) Accompanying plan: The action plan for teaching shooting operations in film and television summer camp and holding film festivals and awards.** The professional knowledge learned by HKUST students in Taiwan can be verified to obtain the results of video teaching and the output of video education abroad in the form of action research.

**3) Accompanying plan: International volunteer and national diplomacy action plan.** The United Nations Sustainable Development Goals (SDGs) are to be achieved through the reflection on service learning of the research on the teaching action of VR video creation based on viewers' cognitive behavior.

Since the promotion of international volunteering in 2011, with the strong support of the school and the active participation of students, considerable service experience has been accumulated. The statistics of the number of service teams, the number of participants, the Service satisfaction and location are as shown in **Table 1**.

This service location is in a remote village in Johor, Malaysia with limited resources (**Figure 1**). Through the two main axes of "film and television education" and "cultural special photography", the International Volunteer Film and Television Action Plan provided high school students with another way of learning through flipped education.

This study mainly aimed to understand the existing film and television aesthetic connotations and the skills of HKUST students through the process of RVRV and teaching. It also aimed to observe the learning effectiveness of video creation by HKUST students during the service process and explore whether HKUST students' learning cognition, attitude, and skill level gradually increased and whether their behaviors became more correct and positive after the RVRV teaching through the action research. Finally, personal teaching experience and suggestions were expected to be put forward for future researchers' reference. The purposes of this research are as follows:

1) Understand current HKUST students' cognition, attitude, and skills towards RVRV.

**Table 1.** List of international volunteer teams in the past years.

Year	Volunteer number	Service location	Service satisfaction
2011	17	Olango Island, the Philippines	86% satisfied
2012	11	Olango Island, the Philippines	85% satisfied
2013	7	Johor, Malaysia	87% satisfied
2014	10	Johor, Malaysia	88% satisfied
2015	7	City of Kuching, Malaysia	81% satisfied
2016	10	City of Kuching, Malaysia	85% satisfied
2017	14	Sibu City, Malaysia	86% satisfied

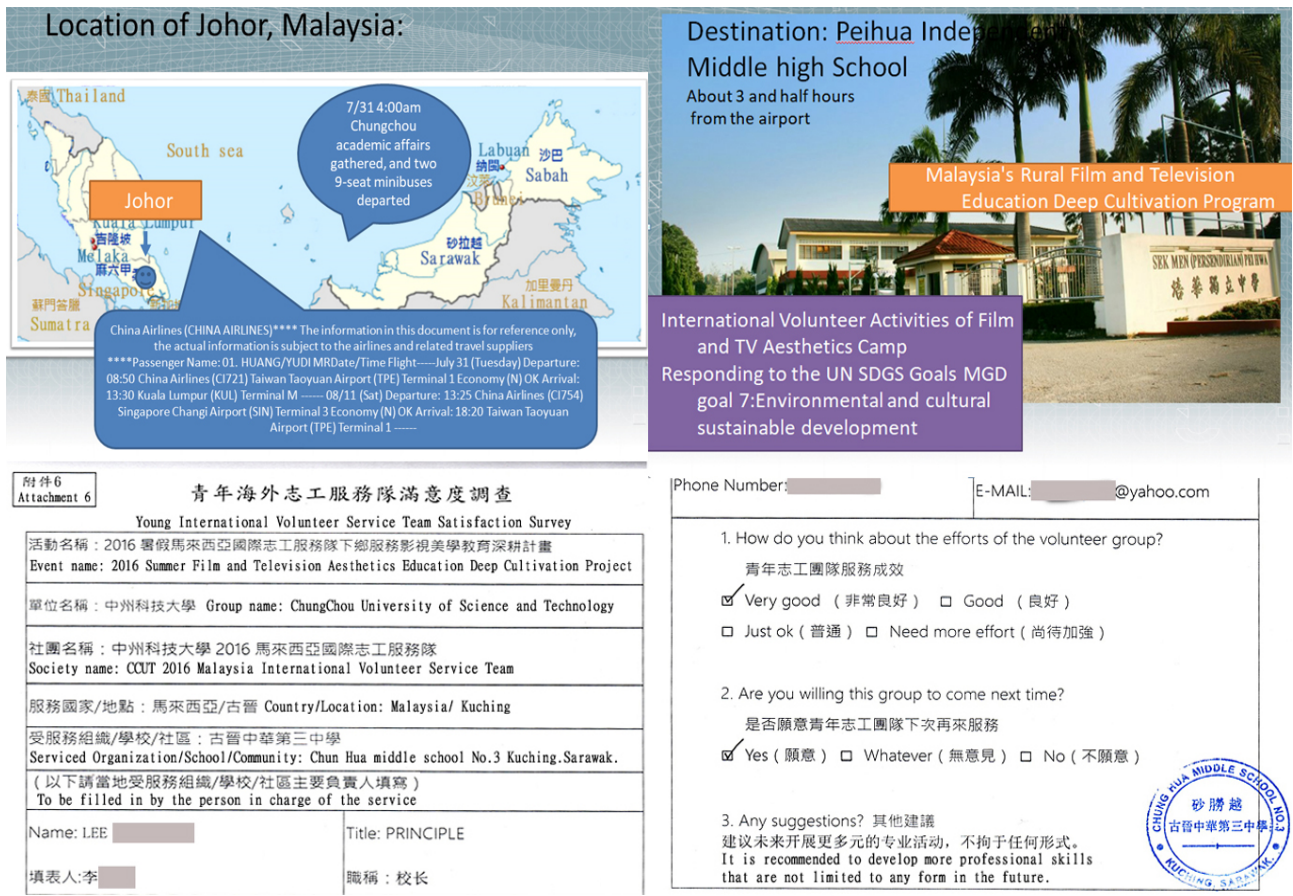


Figure 1. Service location map, Pei Hwa Independent middle High School, and satisfaction survey.

- 2) What is the applicability and result of the designed RVRV?
- 3) Understand the development of cognition, attitude, and skills of HKUST students during the RVRV teaching process.
- 4) Understand whether there are significant differences in the learning effect of RVRV (cognition, attitude, and skills) among Malaysian high school students with different cultural backgrounds.
- 5) Propose an appropriate model of RVRV design and teaching for HKUST teachers.

Table 2 lists the shooting range of this creation. This creation was mainly shot with a 2D video camera, supplemented by aerial photography, and the shooting area did not exceed the campus of PHHS. Taking seven days as the shooting period, in order to effectively record the daily performance of the teachers and students of PHHS, the shooting started from the campus life on July 31, 2018 and ended on August 8, 2018, which included the club and sports activities of the Malaysian PHHS.

## 2. Literature Review

### 2.1. The United Nations Sustainable Development Goals (SDGs)

On September 25, 2015, the 193 member states of the United Nations adopted

**Table 2.** Definition of the shooting range.

Orientation	Content
Definition of facets	VR video shooting range—teacher and student interviews, dynamic and static club activities, courses, micro-movies of film and television camp, campus life, and scenes.
Shooting focus	VR image display construction. Characteristics displayed in wearable devices by observing VR images Filming from the same equipment interface.
Authoring tools	VR Camera, Monocular Camera, Action Camera, Editing Software, Aerial Camera.
Authoring goals	VR images displayed on wearable devices, traditional 16:9 4K video.

**Figure 2.** 17 goals of the United Nations for sustainable development (Goals) (Source: United Nations Sustainable Development Knowledge Platform: <https://sdgs.un.org/>).

the 17 (SDGs) of the 2030 Agenda for Sustainable Development (**Figure 2**). These global goals are expected to guide the actions of the international community in the next 15 years (2016-2030).

United Nations Secretary-General Ban Ki-moon mentioned on the International Volunteer Day on December 5, 2016, “International volunteer work helps the future of mankind and the planet, and the commitment and passion of International Volunteer can also inspire us”. Ban Ki-moon also pointed out that international volunteer is the key to achieving the Sustainable Development Goals (SDGs). Only a correct understanding can make the participation of International Volunteer truly a missionary trip (Tseng, 2017).

Since July 2011, teachers and students of HKUST have actively participated in international volunteer activities by making use of their majors. In the 107-year “Taiwan Youth Overseas Peace Work Group” program subsidized by the Youth Development Administration of the Ministry of Education, a total of 15 teachers and students participated in international volunteer communication and service

at Aihua Elementary School and PHHS in Johor, Malaysia from July 31 to August 11. There were 11 corresponding items, and four items corresponding to film and television education in the preliminary analysis of the SDGs of the United Nations and the sustainable issues of international volunteer services of CCUT (Table 3).

## 2.2. Action Research in Teaching

This teaching research uses the core spirit and Visual creative thinking mode, integrated into the teaching of visual story design, through visual symbols, visual imagination, visual rhetoric, The design and implementation of four-stage units such as visual story design can indeed increase students' visual professional intelligence. Ability, creative thinking, and expanding the concern for the surrounding environment, but also to implement the sharing and exchange of teaching peers (Chuang, 2021). The study makes three main contributions. First, it posits that any action research project needs to consider the four elements of problem identification, theorization, creating guiding concepts and intervention. Second, based on these elements mirrored in service action research, it outlines and analyzes three approaches to action research (i.e. theory-enhancing, concept developing and practice-enhancing). Third, it suggests a move from instrumental to a more conceptual relevance of the research and elaborates on the criteria for research quality (Elg, Gremyr, Halldórsson, & Wallo, 2020).

Creating teachers' professional learning communities (PLCs) is an effective

**Table 3.** Preliminary link between the SDGs of the united nations and the sustainable issues of action services.

SDGs of the United Nations	Issues Corresponding to Action Services	Service Action Plan
Goal 1 Eradicating poverty in all forms everywhere	Training and education, Local neighborhood	1. Holding a summer camp for film and television. 2. Teachers and students in Taiwan donated supplies.
Goal 4 Ensuring equitable and high-quality education without distinction and promoting lifelong learning.	Sustainable development of wisdom, effective learning environment.	1. Holding film and television aesthetics courses, with more than 100 people participating in the shooting. 2. Campus promotional video shooting: 1) Shooting a VR promotional video. 2) 3D teaching of film and television animation. 3) Aerial shooting teaching.
Goal 8 Promoting inclusive and sustainable economic growth, achieving full and productive employment, and ensuring a good job for everyone.	Free elementary and secondary education, vocational and higher education opportunities.	1. First action service the same as Goal 4. 2. Knowledge and skills in film and television, including education for sustainable development, sustainable living models, global citizenship, appreciation of cultural differences, and cultural contributions to sustainable development.
Goal 17 Strengthening implementation methods of sustainable development and activating global partnerships of sustainable development.	Financial support, investment promotion.	1. Against competitive behavior through service consumption. 2. Ensuring that all students acquire the necessary knowledge and skills in film and television, and promoting sustainable development.

bottom-up way of bringing innovation into the science curriculum and professional development. Conduct Action Research activities—analyze their teaching and their students' learning processes, draw conclusions, and make changes in order to improve their teaching and the learning of their students. Participation in an Action Research workshop influences teaching practice, so teachers become more student-centered. Moreover, the teaching culture improves as the community increases the degree of cooperation among teachers, focusing on the processes of learning rather than the accumulation of knowledge. This enables students to be innovative, creative, and critical. In addition, trust is developed among the participants, which enables them to discuss and analyze their students' cognitive and affective problems, misconceptions, and learning outcomes (Mamluk-Naaman, 2018).

### 2.3. Types and Models of Enrollment Promotional Videos

Promotional videos are divided by type: 1) Image video, 2) Opinion ads, 3) Series ads, 4) Micro-documentary ads, 5) Social issues, 6) Observational ads, 7) Fake documentary ads videos, 8) Interview ads, 9) KOL influencer videos, 10) MG animation videos, and 11) 3D animation videos.

Regarding the link between propaganda film and documentary mode, Bill Nichols published *Introduction to Documentary* in 2001, which divided the 20th-century documentary development type into six models as the basis of research (Wang, 2003). In this study, the promotional video was boldly linked with the documentary model allowing the audience to have a viewing experience, and an objective cognitive perspective was sought from watching promotional films (Table 4). By employing the self-attribution model in the seven attributions of marketing, the self-attribution model was designed according to our strategies, such as improving the popularity of the school, changing viewers' perceptions, and enhancing conversions.

The creation of this VR promotional video mainly combines poetic, interpretive, and observational models. The three types are used comprehensively, and the balance point is clearly found.

The English of VR is Visual Reality, Visual means "vision", and Reality means "real information", so some people translate it as virtual reality. Virtual Reality is a three dimensional computer based interactive environment which simulates reality. For designing a virtual reality system, one has to deal with ideas of spatial relationships and computer graphics which in turn are affiliated to mathematics, physics, arts and also human psychology. In these virtual or synthetic environments, one has to take into account various physics laws like gravity, air resistance, and speed etc. (Gandhi & Patel, 2018). The application range of VR video is very large. In today's actual performance applications, multimedia VR video can be used to extend the relationship, and the application examples of VR video in recent years are too numerous to enumerate.




This study analyzes the characteristics of VR video design and other related

terms and summarizes the following attributes according to the survey results (Table 5).

**Table 4.** Correspondence table of the audience viewing experience of promotional film link documentary model (Wang, 2003).

Model	Documentary	Promotional video
Poetic models	“Reassembling fragment of the World” transforms historical material into abstract expression, with a unique discourse as the text, allowing viewers to interpret freely, without intellectual persuasion, which is the combination of 20 <sup>th</sup> century and modernism.	It presents the aesthetic elements of the rhythm of the film with lyricism, metaphors, and gorgeous audio and video, deliberately ignoring traditional narrative methods and specific time and space backgrounds.
Model of interpretation	The film was narrated through an omniscient point of view often in the form of “Mediated by Voice of God narration”, which is a common expression in the 1920s and 1930s.	The most common model of a promotional video is to analyze and explain the promotional material to the audience through a lot of narration or dialogue, and persuade the audience through the guidance of persuasive people of high social class.
Model of observation	In a kind of “Direct Cinema” that can be observed purely objectively where the photographer and the equipment pretend to be absent, the photographer is like a fly on the wall, present without interference, and the viewer can see the film attentively.	With the rapid development of photographic equipment, the improvement of equipment has made the shooting of promotional films more and more delicate and refined, and also allowed actors to perform freely, emphasizing the real reaction of general documentaries.
Model of participation	In “Veritable Cinema”, the photographer appears in the image being recorded, talks to the person being photographed, and witnesses honestly like an eyewitness.	With interactive relationships, viewers and photographers appear in the film at the same time. With dialogue and discussion, both sides observe and participate in the film.
Model of introspection	(Reflexive Cinema) Understand the repetition of truth and fiction, uncertainty, inability to judge, and then reflect on the subject consciousness of the self, echoing the criticism of the 1980s.	The promotional material is thoroughly deconstructed, so that the audience can understand the artificial operation of the promotional material, question the doubts about each construction system and finally reflect on the recommended results.

**Table 5.** Differences between Virtual Reality (VR), Mixed Reality (MR), Augmented Reality (AR).

Type	Virtual Reality (VR)	Mixed Reality (MR)	Augmented Reality (AR)
Picture	 <p>HTC official website</p>	 <p>Microsoft official website</p>	 <p>Techbang.com</p>
Content description	Entering the computer technology to simulate the three-dimensional and high-fidelity 3D space by wearing a special display device (VR glasses). Shuttling or interacting in the virtual environment through the controller or keyboard.	The real world integrates with the virtual subjects. Subjects in the real world can coexist with objects in the digital world and generate interaction in real-time.	It is the technology of augmenting virtual information into the real space, presenting the combined state of the virtual and real world through auxiliary devices such as screens and through the combination of the recognition technology of the camera and the computer program.



### 3. Research Method

#### 3.1. Research Structure

According to Huang, research and teaching are like the spirals of DNA interdependent on each other. Research and teaching must be integrated with each other and at the same time, more emphasis is placed on the implementation and practice of the real field. Secondly, HKUST has always put practice as the main factor, which is why action research was adopted in this study to verify teaching. Problems must be found in the teaching process of the course and solved in a systematic way. Practitioners adopted an attitude of questioning inquiry and criticism, and reflected in the process of practical action to improve practical work (Cai, 2000). Action research is an activity of self-criticism and introspection. It is a research process in which practitioners solve practical work problems met in the context of their actual work (Wu, 2001). The spirit of action research, is practice-centered, practical-oriented, and critical-enlivened (Chen, 2017).

Based on the spirit of action research in the creative research in the field of the art design, it proposed research suggestions for the practice of communication content design from five aspects, including research starting point, circular process, reflection during research, data collection and analysis, and collaboration. It is expected to supplement the current thinking and practice of combining communication research with practice (Lin & Lin, 2021).

The structure of this study first discussed the focus of the research from the question and then explored and organized the relevant theories and current situations through literature to understand the current research field and the discussions of scholars and experts in the past on related issues. The main findings suggest that action research may be regarded as a multidisciplinary method and that it can be implemented jointly with other methodologies; not just qualitative methods but also quantitative research. Consequently, action research may now be defined as a meta-methodology or an umbrella process (Erro-Garcés & Alfaro-Tanco, 2020). After proposing the “Research on Teaching Action of VR Video Creation based on Viewers’ Cognitive Behavior”, various research variables of VR video creation and film and television summer camp were explored through the action research method. Combined with observation and interview methods, first-hand information was obtained through evidence collection, and the collected information was evaluated and analyzed more carefully by assessing the teaching and curriculum plan. The curriculum design and teaching methods of the Film and Television Action Plan of the International Volunteer were adjusted, and VR video works were constructed for wearable devices display. The evidence of action research was presented, and research conclusions and related suggestions were put forward. **Figure 3** was shown the framework of this action research.

This study was formatted into five sections, including introduction, literature review, research method, implementation and analysis, and conclusion and suggestions.

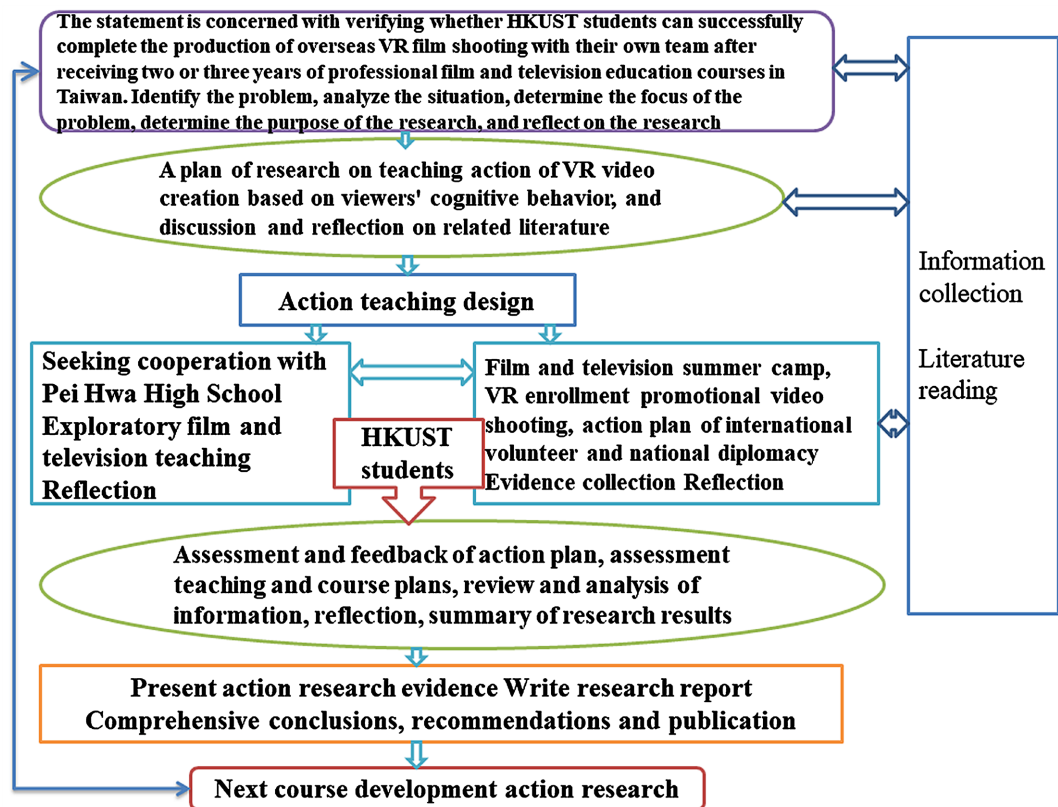


Figure 3. Action research framework (Source: this study).

The framework of the “Research on Teaching Action of VR Video Creation based on Viewers’ Cognitive Behavior” is conceived as shown in Figure 4. The curriculum plan was proposed by the researcher. It was accompanied by the general education curriculum of the planning and training of the values of international volunteers in the preparatory period. Afterwards, students with a strong willingness to participate and a strong attitude towards service awareness were selected to form the volunteer team of the experimental group. In Malaysia, students from PHHS who were willing to participate in the film and television summer camp were selected as the experimental group. After conducting action research teaching in groups, conclusions and results were put forward through verification and evaluation of the control group based on the review, observation of learning performance, counseling and reflection, revision of content.

### 3.2. Subjects

Action research mainly combines research and action, and researchers are the actors. As a result, the participants in this shooting action were the experimental group of research subjects, including ten students from the International Volunteer Team of HKUST, 30 students from PHHS in the second grade who participated in the film and television camp, and about 100 people in the third grade who participated in the filming. Among the ten students from the International Volunteer Team of HKUST, eight people were from the Department of Video

Communication, one person was from the Department of Nursing, and one person was from the Department of Tourism.

### 3.3. Tools and Process

Table 6 shows the type of camera and the purpose of the shooting. And Figure 5 is as schematics. And the auxiliary equipment is as follows: photographic auxiliary equipment, lighting equipment, production equipment, recording equipment, post-production software.

The procedure of RARV is shown in Figure 6. After analyzing the literature, the researcher designed research tools to propose action teaching design.

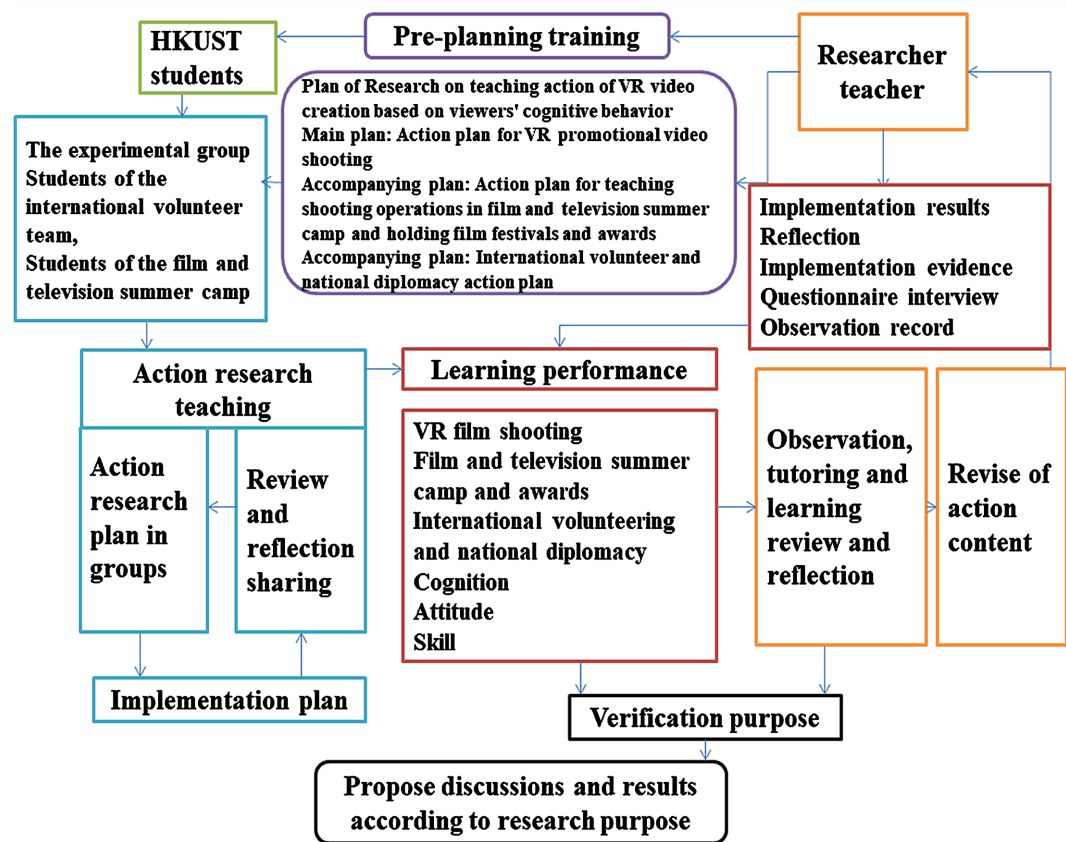


Figure 4. The framework of research on teaching action of VR video creation based on viewers' cognitive behavior (Source: this study).

Table 6. Types of cameras and shooting purposes (Source: this study).

Types of Cameras	Resolution	Format	Shooting Content
Sony A7III	4K	RAW	Aerial view, principal's visit, morning meeting, visit
DJI Phtom4	4K	RAW	Activities of associations, dynamic sports shots
Go Pro	4K	MPG	Side shot, filming work process
RICON THETA1	Spherical	RAW	Aerial view, panorama
i phone, Android, or above	4K	MOV, MPG	Micro-film creation of summer camp, side shot, filming work process



Figure 5. VR virtual reality images, 2D flat image.

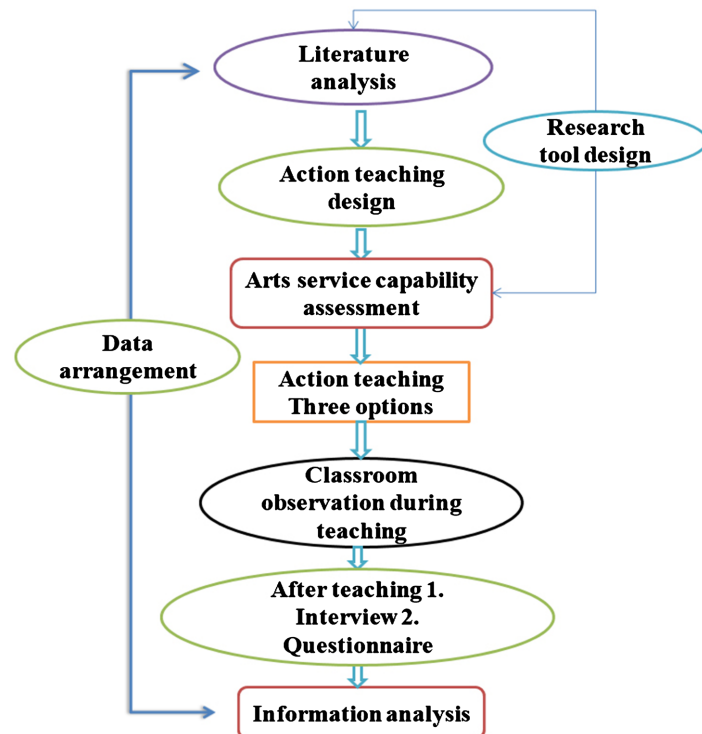


Figure 6. Research flowchart.

The research tools included simple satisfaction questionnaires, interview records, and structured observation methods. The teaching content was perfectly designed from the idea of the script and the story, the operation of the photographic equipment and the composition to the post-production editing, the special effects, and the soundtrack.

The structure is:

- 1) Discovering problems (observing phenomena, collecting data, forming problems, and proposing verification views);
- 2) Planning and research (finding variables, formulating research plans, collecting data);
- 3) Arguing and constructing models (analyzing data, presenting evidence, explaining and reasoning, proposing conclusions or solutions, establishing models);
- 4) Expression and sharing (expression and communication, cooperation and

discussion, assessment, and reflection) (Ku, 2021), and the content focuses on the interactive teaching of HKUST students as teachers. After the course was designed, the volunteers' professional ability and service cognition attitude were assessed, and action research teaching was carried out in groups. Three plans of action teaching began to be conducted. During this period, emphasis should be placed on classroom observation. The main assessment method was recording side shots. After teaching, simple questionnaires and interviews were carried out (Table 7 and Table 8). Finally, the conclusion and results were put forward through verification based on data analysis and organization, learning performance observation, counseling and reflection, and revision of content.

## 4. Implementation and Analysis

### 4.1. Implementation Procedure

The whole action research was divided into three phases after the question was

**Table 7.** Interview record.

Orientation	Questions
Assessment and feeling of the film and television camp	1. Do you like the micro-film teaching activities of the film and television camp? Why? 2. What do you think is the difference between the teaching of film and television camp activities and the curriculum in high school? Please give examples. 3. Can you understand the teacher's explanation (operation and principle)? Please give examples.
Learning results and gains	1. What did you learn after the camp? Please give examples. 2. Do you understand the content of the film and television camp? Please explain and give examples.
Difficulties in teaching content	1. Have you encountered any problems in the cooperation and discussion between the crew? How to solve it? 2. Do you think the content (principle) of the film and television camp is difficult? Why? 3. Did you encounter any difficulties in the course of the film and television camp (like raising questions, raising hypotheses)? Please give examples. 4. Did your crew encounter any difficulties during the filming process? How to solve them?

**Table 8.** Structural observation method: The behavioral goals of teachers of each group.

Goal	Score 1-5	Average Score
The teaching performance of teachers of each group	1. Clear spoken language	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
	2. Fully prepared photographic equipment	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
	3. Provide an appropriate waiting time when asking questions	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
	4. Ask more open-ended questions when asking questions	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
	5. Be able to answer the students' questions appropriately and solve the problems encountered by the students in the experiment	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
	6. Teaching time is properly controlled	Low 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> High
Vote	Vote for the best teacher	Vote number ( )

raised (Figure 7). The first phase was the green area: the planning period lasted for four months, and the main work projects were pre-departure training, application for funding from the Ministry of Education, and various tasks before going abroad. The second phase was the blue area: the action research and filming period lasted for 15 days, and the main work projects were film and television summer camp, film festival and awards, and VR promotional film shooting. These three projects were carried out at the same time, so there was overlapping implementation time and mutual work. The final phase was the orange area: the post-production period of action learning lasted for one month. The work projects are shown in Figure 8.

1) Planning content and settings of VR video shooting

The action research method analyzed the text from the perspective of problem-solving. In addition to exploring the artistic nature and aesthetic form of VR film creation, the volunteers made their thoughts on shooting VR promotional enrollment videos through the discussion of the group focus method, which is shown as follows:

- a) Use narration to introduce
- b) Emphasize clubs/beautiful shots

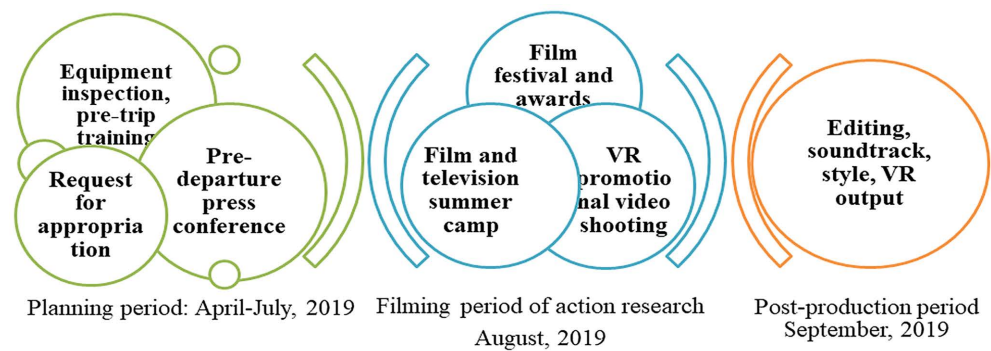


Figure 7. Plan/schedule of research on teaching action of VR video creation teaching action based on viewers' cognitive behavior (Source: this study).



Figure 8. Photos of activities (Source: this study).

- c) Shoot landscapes and aerial scenes through an aerial camera
- d) Large land and beautiful scenery
- e) Campus life, clubs, and accommodation. What did students do?

Conclusion of the film preparatory meeting: Complete the shooting plan; draw up the schedule, club shooting, course shooting, boarding student interview, principal interview, student interview, special shooting, and school scene.

### 2) Copywriting script

Only one excerpt was taken as an example due to a large number of contents

- a) The principal sat under the big tree and smiled.
- b) The principal picked up the mug and drank tea.

Principal: "This school is the only private high school in Johor. The school is so vast that it is impossible to see all the classes at a glance, so the interaction between children and teachers is particularly important. There are a lot of courses and clubs in the school, which can stimulate children's potential and let teachers see the highlights of students. This school focuses on cultivating students' self-independence, takes labor education as its characteristic, and gives back to the society as the benchmark".

Boarding student interview: Interviewing foreign boarding students, where do they come from? Why do they choose to study here? How do they live here, how do they interact with classmates, what to do when they miss their hometown, how they think about the principal, what activities are held for boarding students? Conflict and resolution.

Principal interview: School logo, school mascot, newspaper data, award data, school characteristics, free play, and records of participating in extra-school activities.

Student interview: What career do they want to pursue in the future? Memories of school, words to teachers, graduation speech.

Special shooting: Special ceremony, chanting slogans at the meeting, writing a wish and throwing paper planes, people typesetting, and many people dancing.

School scene: Statues, buildings, school gates, churches, squares, sports fields, hall, special classrooms, offices, restaurants, auditoriums, general classrooms, campus animals, mascots, special facilities, and old trees.

### 3) VR style

The style of this VR video was confirmed to adopt the group focus method. During the meeting, volunteers put forward their ideas by referring to the advertising promotional videos online according to their preferences. The plans proposed by volunteers were adjusted to be: Shooting PHHS in one shot, crazy nuns' version of PHHS, the performance version of PHHS, warm old principal's opening version of PHHS, funny version of PHHS, a promotional video made by various songs, and dynamic version of the Taipei World Universiade film. Finally, the style combining the warm old principal's opening narration, the performance version of PHHS, and the dynamic version of the Taipei World University was selected.

#### 4) Narrative style

The promotional film was the real observation and experience of the creative group for PHHS and was the presentation of the value of the atmosphere from the narrative method. The film showed youth, laughter, and guidance and enlightenment of the education of the young students in PHHS with real sentiment through the learning process and the group life of students in PHHS, the objective reality with the brisk rhythm music, and the way of time and space reproduction.

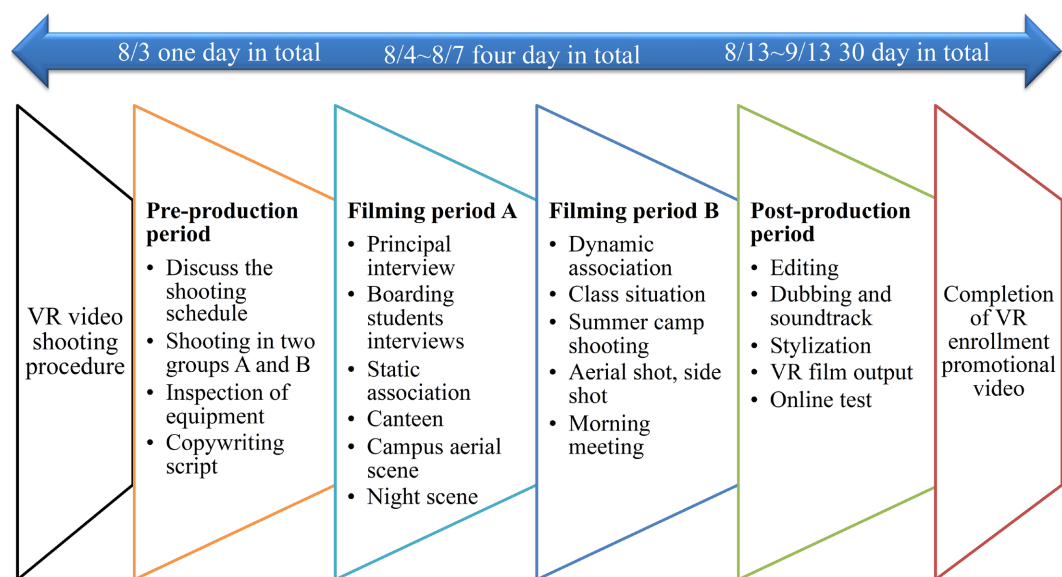
### 4.2. Production Period

#### 1) Implementation process of enrollment VR shooting

The shooting progress was divided into four phases (see **Figure 9**). The pre-production period is the orange block. The main task is to determine the shooting club, course, time, and date of the visit and participating classes with the principal and teachers of the PHHS. The four-day shooting period is the light blue and blue block, and the photography teams were divided into two groups to speed up the shooting schedule. The shooting content is shown in the figure below. The post-production period is the orange block, which lasted 30 days. It mainly included one week of editing and reviewing the master tape, one week of playing musical instruments, and about two weeks of video output and online testing.

#### 2) Viewpoints and ideas for VR videos

With the aim of enabling the image to speak, the goal of this VR film was to share the subjectivity of the subject and the person, to give creative decoration to the real material and to present the point of view with reality. Other than having the function of the film, the more important point was to gain the viewer's trust and then to communicate mentally in terms of cognitive viewpoints.



**Figure 9.** Implementation process of enrollment VR shooting.



### 3) Side shot, radio

Side shot was the process of making a documentary with a smartphone to record, video and take pictures. However, in order to record the process accurately, designated personnel were responsible for shooting and recording the overall action process.

VR sound was mainly used in environmental sound effects, and the sound effect part was only used for the principal's conversation. For the part of the public shouting, the processing of the noise on the vocal cords was enhanced to promote the realism of the scene, atmosphere, or dramatic information.

## 4.3. Post-Production Period

### 1) Film editing

The VR movie focused on lively and grand styles, mainly based on the orientation of movement and speed. While moving shots, such as long shots were few, VR movies contained more close shots and close-ups. Special angles were added, and the force and strength of movements were expressed through a lot of aerial shots in chasing and passage angles. By combining a large number of short shots and special optical effects (tracing, dissolving, split screen, and exposure), movements, and music, it was expected to produce a visual movement balance beyond the movements of PHHS's students and the camera movements to affect the rhythm and narrative of the film.

### 2) Dubbing and soundtrack

In this VR background music (referred to as BGM), fast-paced combination instrumental music was used to create a relatively sporty style, including keyboard and wind instruments, which were inserted into the dialogue to adjust the atmosphere and enhance the expressions of emotions.

## 4.4. Research on Teaching Action of VR Video Creation Analysis

### 1) Theoretical basis

The theme of this plan focused on education, service, and humanities and arts according to the ability of related majors to deal with problems in series. The plan structure can be supported by the application of film aesthetics theory, the basis of cultural and creative industry theory, the professional knowledge and skills of film and television design, and the perspective of international volunteer service. The course structure ranged from aesthetic theory to cultural and creative discussion, to the cultivation of film and television professional ability, and finally to the cultivation of empathy and service.

### 2) Teaching themes

The theme of this VR was closely in line with the general situation of the development of film and television design in the real world. The general volunteer services are mostly group activities, Chinese teaching, or health education activities. A Malaysian elementary school principal once pointed out that he hoped that the services of the international volunteers could leave the content or spirit

that can be inherited. Therefore, he thought that maybe the teaching activity of film and television design major is a feasible way. Why does the international volunteer not organize an overseas film festival competition through the teaching of the on-campus film festival? Through an overseas film festival competition, Taiwanese students can have the opportunities to show their professional ability and learn from it, and the subjects can also learn the professional skills and aesthetics of film and television such as lighting photography.

### 3) Teaching method

a) Designing teaching methods to appropriately express the meaning of teaching materials

In the cultivation of film and television education for middle school students, the current education emphasizes liveliness and adaptability, so this teaching method allowed HKUST volunteers and local students to discuss learning methods through interaction based on the different exoticisms of Taiwan and Malaysia. For example, in the teaching of aerial photography, the Taiwan part prepared professional aerial photography machines. Meanwhile, local students who have aerial photography machines would be invited, and parents would be invited to bring all their aerial photography machines to enjoy together. Taiwanese volunteers could also learn about local aerial photography information, regulations, and restricted areas for aerial photography through local schools and parents. According to the field action research, local students had an 80% chance of staying in touch after participating in summer camp activities, and their chances of studying in Taiwan had also increased significantly.

b) Planning activities to motivate students and deepen the meaning of learning

This plan was to plan the creation competition of a summer camp micro-film in the cultivation of film and television education of high school students. Participants could obtain prizes and honors, and stimulate their potential and learning motivation through group competition, which allowed high school students to discuss and create scripts in group after class. They were trained by regular film and television courses, and volunteers from Taiwan University of Science and Technology who have experience in holding micro-film workshops in high schools served as teachers in each group to guide local students in Malaysia step by step to complete their own creative micro-film with their life experience.

In the part of VR film shooting, high school students could observe how Taiwan University of Science and Technology students shot professional audio-visual works, gained concepts and experience from them, and even became actors or staff members in one of the scenes while obtaining a sense of achievement in internships.

4) Students' learning

a) Students construct their understanding of knowledge and form relevant attitudes

Times make the generations face issues in different ways, so how to get stu-

dents to learn and understand in a way that allows them to get started. Internet, tablet, laptop, FB, and IG are the tools they have used after birth. Volunteers used these tools to discuss with foreign subjects, who might be high school students, principals, the chairman of the Home Association, or even state legislators. Teachers must let go and tutor because this is a way of action teaching, a kind of research, and a valuable part of flipped education. Students and volunteers cultivate their ability to communicate and coordinate, accept culture shock, take responsibility for themselves, and learn problem-solving methods from the Taiwanese education they have received, so as to improve their ability to survive and earn a living in the future (Mamlok-Naaman, 2018).

#### 5) Result assessment

After field practice services, the overall course effect was good, the learning effect of students was assessed. It could be assessed from the big goals, such as the success of micro-film summer camp, the success of the achievement film festival and awards, the safe completion of the VR promotional video, the completion of the international volunteer team service, and the success of the national diplomacy. The answer from the assessment was positive. This action research could then be tested with a theory-forming statement.

## 5. Findings and Discussions

Experts of action research mentioned that publication of research results is the best way to verify whether the research is effective and to respond to the questions that the research aims to explore based on the results of the research. The following will further discuss and analyze the key findings:

1) Understand current HKUST students' cognition, attitude, and behavior towards RVRV. The survey results are shown in **Table 9**.

**Table 9.** Organization of HKUST students' cognition, attitude, and behavior towards RVRV.

Project	Male	Female	HKUST Background	Teaching on RVRV Action
Cognition	Just OK	Very Good	Highly Correlated	1. 75% of students had wrong ideas the term RVRV generally means. 2. 15% of students had no concept of RVRV.
Suggestion	Students needed to take classes to understand what RVRV is and learn more about RVRV.			
Attitude	Just OK	Very Good	Positive Reaction	"Positive" and "Interested"
Suggestion	Students who were highly service enthusiasm to conduct RVRV action teaching could be found.			
Behavior	No Correlation	No Correlation	No Correlation	"National diplomacy", "Volunteer service", "Film and television design", and "Organization of film festivals"
Suggestion	The course can be designed according to the projects approved by the students to guide students' performance.			
Participation	Just OK	Very Good	No Correlation	1. 90% of students expressed their willingness to participate. 2. 60% of students believed that participating in RVRV could solve the current problem of off-campus internships.
Suggestion	Students who were highly willing to conduct RVRV action teaching could be found.			

According to the interview survey of 85 HKUST students who took the course of the value of international volunteer.

2) How are the applicability and results of the designed RVRV?

The research evidence, feedback and manifestations of each action plans are shown in **Table 10**.

Assess the applicability of teaching and course plans and summary of research results are shown in **Table 11**.

Of which, a very satisfactory reply was given by PHHS. In this study, each student was allowed to have the opportunity to serve in life, the number of service days was extended moderately, and the process and results of international service were fully discussed. It expanded students' diplomacy, improved their motivation, and incorporated the promotion situation and practice of volunteer services in various countries into the course introduction.

And finally, the question proposed at the beginning was verified: Can students with Taiwanese native film and television education do well in foreign VR promotional film shooting and services? After the assessment and feedback of the action plan, the result was obvious. The native Taiwanese students with local film and television education have the ability to complete VR filming and production in Malaysia, so the answer to this question is positive.

**Table 12** shows the reflection on service learning of the plan of research on

**Table 10.** Organization of research evidence, feedback and manifestations of each action plans.

Project	Research evidence	Part of the Feedback
Action plan of VR promotional video shooting		
Photos, side-shot videos, circulars, task lists for each group, film scripts and plans, listings for each group, shooting schedule, equipment list, and the principal's questions and speech.		<ol style="list-style-type: none"> <li>1. The completion of the VR enrollment promotional video</li> <li>2. The thank you letter from the principal of PHHS.</li> </ol>
Action plan of the film festival of film and television summer camp and awards		
The review film of the film and television camp, the awarding procedure table, the host's speech, and the list of prizes.		<ol style="list-style-type: none"> <li>1. The completion of the film festival of film and television summer camp and awards</li> <li>2. Malaysian high school students completed the creation of micro-films.</li> <li>3. A total of 300 students attended the achievement film festival. The chairman of PHHS, the chairman of the Home Association, state legislators, and reporters from Chinese-language newspapers were present to report on the event.</li> </ol>
International volunteer and national diplomacy		
Photos, videos, plans, corporate donation lists, pre-departure press conferences, air tickets, official documents, insurance policies, satisfaction surveys of the Youth Administration, teacher handouts and PPTs, and reflection lists.		<ol style="list-style-type: none"> <li>1. Reports in Malaysian Chinese-language newspapers.</li> <li>2. The satisfaction survey of the Youth Administration volunteer service</li> </ol>
Manifestations of the usual Taiwan film and television education and training		

**Table 11.** Organization of teaching and course plans and summary of research results (Source: this study).

Project	Applicability of teaching and course plans	Summary of research results
Action plan of VR promotional video shooting	The applicability meant that the volunteers who had experience in filming and had received VR film and television education performed their learning directly. The method of assessment teaching was to complete the production of VR enrollment promotional videos. The course plans included stories, photography, post-production editing, and soundtrack based on the coordination and interaction with the principal, teachers, and high school students. HKUST students re-examined the connotation of themselves and discovered the ability of autonomy in the process of filming and coordination.	The VR enrollment promotional video was edited, dubbed, sound tracked and finally exported to VR video files within one month after the volunteers returned to Taiwan. Countless video transmissions and remote discussions were made to complete this video.
Action plan of the film festival of film and television summer camp and awards	The film and television summer camp took “aesthetics” as the main axis and focused on the operation and learning of photography, editing, and special effects. At the same time, it helped students in PHHS make the basic photography, composition, and shooting of the film and provided professional film shooting or lighting assistance and aerial photography. In terms of the result film festival, students mastered the entire film festival procedure and awarding procedures, regulated music, and playing videos, and even made a review film of the film and television summer camp.	The students learned to observe and record the relevant culture of Johor, Malaysia through micro-films. On the first day, students interacted with each other in groups and learned micro-film production skills. On the second day, the production and editing of micro-films were explained. On the third day, students made the production of video clips and the publication of the results, with the Johor landscape and local humanities as the shooting theme, presenting the Johor landscape and humanistic stories.
International volunteer and national diplomacy	Students learned to cultivate civic literacy qualifications. The course plan was the output of film and television capabilities of the connotation of service learning. It can also be regarded as a kind of performance of cultural and creative industry ability, learning the joy, and growth of the moment. In the international volunteer service, Malaysian high school students could feel the care and knowledge transfer from the Taiwanese and then influenced them to become international service volunteers in the future. HKUST volunteers had self-awareness, skills, values, and beliefs, experienced differences and showed respect for foreign cultures and religions.	The United Nations Sustainable Development Goals (SDGs) were achieved. Achieve SDGs Goal 1, Goal 4, Goal 8 and Goal 17 (Please refer to <b>Table 2</b> for content).

teaching action of VR video creation based on viewers’ cognitive behavior, the United Nations Sustainable Development Goals (SDGs) were achieved.

3) Understand the development of RVRV cognition, attitude, and skills of HKUST students during of action research teaching.

In the reflection on the experience after returning to Taiwan (**Table 13**), the students in the experimental group had a deeper understanding of the cognition of RVRV than before going abroad and had a significant growth in cognition compared with students in the control group.

**Table 12.** Reflections and Feedback on Achieving the UN SDGs. (Source: this study).

UN Sustainable Development Goals	Reflections and Feedback on Achieving the UN Sustainable Development Goals
Goal 1 of SDGs	Taiwanese teachers and students donated books, stationery, and other supplies from Taiwan to PHHS. They taught students how to use film and television photography equipment by holding film and television summer camps. Give a man a fish, and you feed him for a day; show him how to catch fish, and you feed him for a lifetime. Through teaching, Taiwanese teachers and students helped them get rid of poverty through technical guidance.
Goal 4 of SDGs	The sustainable wisdom and effective learning environment of PHHS were promoted through the organization of courses on film and television aesthetics, the shooting of VR enrollment promotional videos, 3D animation teaching, and aerial photography teaching. As a result, professional education not only benefited high school students but also promoted the education development of communities.
Goal 8 of SDGs	It is expected that by imparting free film and television knowledge and skills, including sustainable development of the high school and community education, the flame of the cultural and creative industry can be ignited and grows in the local area, and then becomes a good business, allowing the cultural and creative industry to take root and become sustainable.
Goal17 of SDGs	In the satisfaction survey conducted by the Youth Administration, our service received great satisfaction and won the approval of the teachers and students of PHHS. The volunteers achieved the goal of realizing the meaning of service, social justice, and the improvement of civic awareness through the process of action research. It verified that the professional knowledge learned in Taiwan can obtain results in video abroad, and it stimulated the understanding and care of international humanities, expanded international space, and enhanced the competitiveness of VR film and television through the reflection of international volunteer service learning.

**Table 13.** Organization different groups of HKUST students' cognition, attitude, and Skills (Source: this study).

Project	Students in the experimental group	Students in the control group
Cognition	The volunteers in the experimental group could generally understand the meaning and advantages of RVRV, understand the specific shooting practices of VR, and finally become familiar with the learning steps of action research through the three phases of the action plan.	HKUST students did not understand what RVRV is and had to learn more about RVRV.
attitude	It is a wonderful impact and achievement for HKUST students of the experimental group to watch the exotic films made by their students. Compared with student in the control group, it was also a gain in attitude to listen to students' gratitude and thoughts about different cultures.	Students who asked fewer questions and spoke less.
skills	After returning to Taiwan, the students in the experimental group were generally better at controlling the technique in the crew and the film festival and mostly acted as the crew director, producer, and film exhibition coordinator.	HKUST students mostly acted as the crew not leader.
Reflect of growth	High	Low

There were thematic production, film festival practice, and production of video and audio in Taiwan in the teaching of the coordination technical ability to host and organize the film festival, so it was relatively familiar to the students. However, the challenges came from different national environments, cultural differences, and time constraints. The course plan of this action was actually to

cultivate on-the-spot reaction and skill familiarity under pressure, including the process organization of awarding, prize preparation, distribution, production of review film of film and television camp, the winning list, and the question of visiting the crew.

4) Understand whether there were significant differences in the learning results (cognition, attitude, and behavior) of RVRV among students in Malaysian PHHS with different cultural backgrounds.

The research evidence included photos, side-shot activity videos, the signature list of the classmates who attended the group list of each group, the participation certificate issued by the University of Science and Technology, the listing of each group leader, the course flow chart, and the handouts and PPT of the teachers.

The teaching courses were divided into professor teaching and HKUST volunteers leading high school students to shoot micro-films. The focus was on how HKUST students could effectively lead high school students to complete the filming in a short period of time through communication and coordination and their own film and television skills. For the assessment method, the most popular volunteer teacher was selected through interviews of high school students and their votes. The analysis data were checked and organized.

According to the interview results, 80% of the students liked this film and television summer camp, and the least favorite part was that the number of days was too short. The most popular volunteer teacher was a volunteer girl from the University of Science and Technology, who showed affinity, which is still the basis for the high popularity. In addition, the satisfaction of professor teaching approached 95% (Figure 10 and Figure 11).

Sampling from the system: In the interviews, the film and television summer camp activities organized by Taiwanese friends were accepted and loved by the high school students of PHHS. From the enthusiastic feedback from the film festival, the micro-movies made by high school students were loved by the teachers and students of PHHS. They played their daily joys and sorrows and saw themselves. For high school students who had never filmed micro-films or participated in film festivals to show their own works, such a fresh experience brought a ripple in their hearts and became the nutrients for future film and television

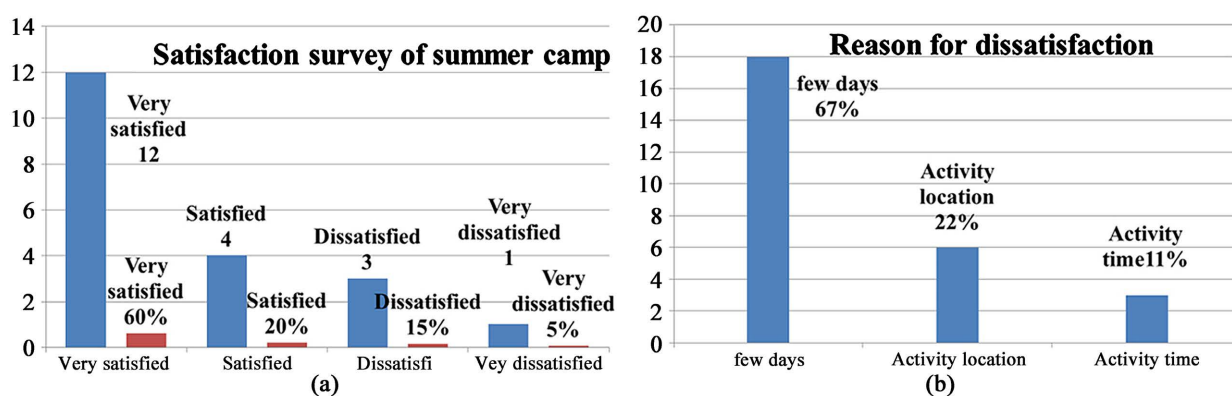
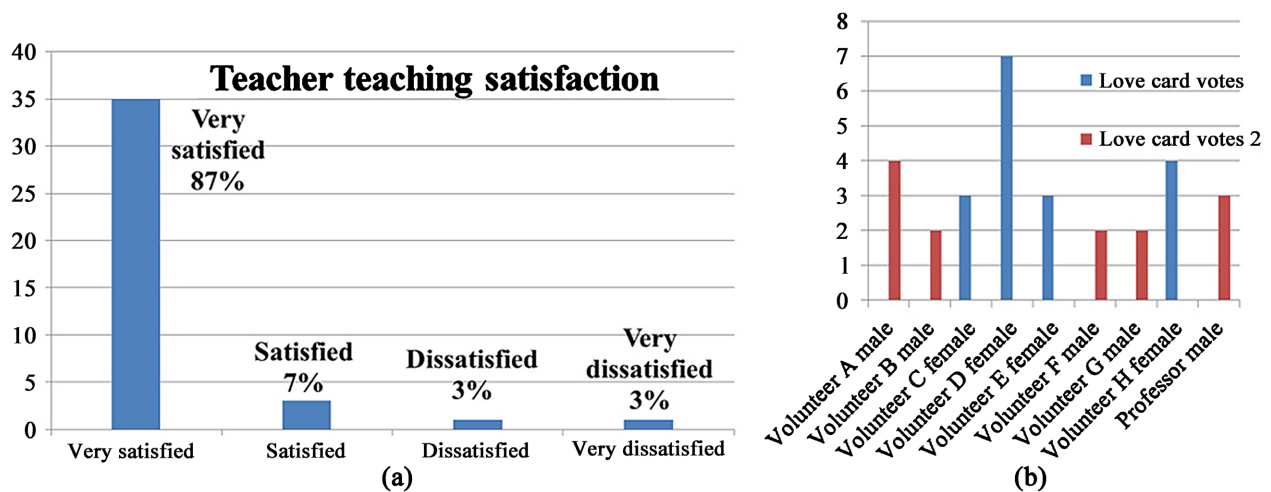


Figure 10. (a) Pie chart satisfaction survey; (b) Pie chart of dissatisfaction reason.



**Figure 11.** (a) Column chart of the most popular volunteer teacher; (b) Pie chart of teacher teaching satisfaction.

majors. In the process of interactive teaching, the students in the experimental group of PHHS did not have significant differences due to the cultural background of different countries. It means that regardless of the national and cultural background of the students, RVRV teaching can allow students to have good learning results in RVRV cognition, attitude and behavior and achieve the results of making a micro-movie in the action plan.

5) Propose the appropriate mode of RVRV course design and teaching for HKUST teachers.

a) The action plan teaching focused on students' overseas experience, directly and effectively allowed students to manage and use film and television skills independently, and transformed the spirit of service into daily life to achieve the unity of learning and practice.

b) The course design started from the film and television major and foreign service, and the specific method was to implement the interactive teaching method of life and action in the daily life experience. Action research has proved that such action teaching improved students' interests in learning, and actual exploration and action were more effective than traditional teaching.

c) In action, the teacher's observation and learning process and course reflection and suggestions could remind students of their subjective blind spots, improve the accuracy and objectivity of action research and make the course more applicable.

d) Use real-time network links to grasp students' information and actions, and use inquiry teaching in groups to cooperate with action research plans, so that students in the experimental group can be personally involved in creative experience learning.

e) The teaching effect was improved through the strength of the team, and students could complete VR video creation under the condition of mutual encouragement through rewards, group restraint, and competition, which could spread the spirit of volunteering to everyone and make international volunteer-



ing a positive behavior.

## 6. Conclusions, Limitations and Recommendations

The conclusions of this study can be summarized as follows:

- 1) The course design, execution process and testing of this study are all in line with expectations, and its experience can be replicated to some extent.
- 2) The feedback from participants (both students and teachers) was relatively positive, suggesting that the teaching model adopted by the Institute can be further promoted.
- 3) The concept of sustainable development is not only macro-level, but can also be flexibly applied to specific things according to actual conditions.

In addition to further reflecting on the problems that still exist in the research process and the areas that need to be improved in the implementation process, this study further proposes the following suggestions:

- 1) The teachers hoped that the experience of schools in Malaysia can pass on to HKUST students, so it will develop towards the result of the action decided by the teachers. The advantage is that there are solutions to problems. The disadvantage is that there will be no unexpected problems that wait for students to solve.
- 2) The teachers set up the VR video shooting, which caused a lot of problems in the post-production, the success of the result was determined after the service was completed.
- 3) All volunteer students were carefully selected elites. If they were replaced by ordinary classes, the research results obtained would be different.
- 4) The same action research model is suitable for Malaysia. If it is to be promoted to other countries, such as Uganda and Swatini in Africa, there may be a lack of equipment, a lack of network infrastructure. Furthermore, the language and communication skills of volunteer students need to be resolved.

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## Conflicts of Interest

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