Development of Interaction Simulation Video for Enhancing Digital Empathy Skills

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Abstract
This study applies research and development design aimed creates an interactive simulation video that enhances digital empathy skills. There are two groups of participants. First, six experts in educational technology and digital empathy content were purposively selected. Second, 48 high school students were multi-stage sampling. The research instruments were (1) the evaluation form to check the quality of the interactive simulation video and (2) the digital empathy skill test to measure students of knowledge, practical, and attitudes. The data were analyzed using a mean, standard deviation, and percentage. There are three episodes of interactive simulation video. Episode 1, "I'm not afraid true...I'm really afraid it is not," is about spreading accurate information. Episode 2, "My Areas vs. Your Areas," is about respect for rights and emotional control. Episode 3, "Fun Post…Miserable," is about posting information creatively and politely. Each episode consists of three types of interactions; overlay elements, embedded questions, and hotspots. Based on the expert's evaluation, all episodes of interactive simulation videos are quality at the highest level in all aspects (content, video media, and interaction). Episode 1 had an average of quality 4.66 (S.D. = 0.52). Episode 2 had an average of quality 4.67 (S.D. = 0.52). Episode 3 had an average of quality 4.74 (S.D. = 0.44). The score of the digital empathy skills that students took after study on the interactive simulation video was 93.11% (knowledge 90.00%, practice 96.67%, attitude 92.67%). Thus, interactive simulation videos are effective in enhancing students' digital empathy skills.

Keywords: Interaction Video, Simulation Video, Digital Empathy Skills

Introduction

According to prior research, experiential learning is one of the best teaching methods for developing students' digital empathy skills. However, learning from real-world experience has some drawbacks. To support students in learning about digital empathy abilities and practicing how to apply those skills, the researchers embraced the concept of interactive simulation video as opposed to teaching through real-world experience. An interactive simulation video is an approach that encourages students to participate in the learning process independently while watching the video. Students are encouraged to comprehend, analyze, and reflect on circumstances that they may encounter in real life by using interactive simulation videos. Khammanee (2014) stated that adopting the simulation strategy when teaching encourages students to take on the defined learning objectives. The goal of the simulation technique is to encourage students to participate in a chosen narrative. The vignettes were based on actual circumstances that students can encounter in their daily lives online. Students made decision while watching the interactive simulation video will determine the results they experience.

The interactive simulation video is created to simulate real-world events using interactive video. The interactive simulation video's major goal is to give students a close-up experience in which they can either learn or practice new information and abilities. Using the interactive simulation video has many benefits, including motivating students to participate in their education, making it simple to monitor students' progress, and continuously assessing students' learning. The interactive simulation video also gives students rapid feedback. As a result, after each lesson, students can assess their performance and growth. Nonthaman (2018) stated that an interactive simulation video is a teaching tool that supports students' learning across all subject areas (cognitive, affective, and psychomotor abilities). The interactive simulation video will promote student motivation and deeper topic comprehension. Based on the aforementioned ideas, the research's aim was to develop an interactive simulation video for improving students' digital empathy skills.

Purpose

To develop an interactive simulation video that enhances digital empathy skills.

Methodology

Participants

There are two groups of participants. First, six experts in the field of educational technology and digital empathy content were purposively selected. All experts graduated with a doctoral degree and have experience related to designing teaching materials, interactive videos, digital intelligence, or digital empathy. Second, 48 high school students were multi-stage sampling. They are 11-grade students, both male and female.

Research Instruments

(1) An evaluation form uses to check the quality of the interactive simulation video. There are five levels of evaluation (Likert scale). The evaluation criteria are as follows (Leekitwattana, 2015):

5	means	“the most”
4	means	“a lot”
3	means	“moderate”
2	means	“few”
1	means	“minimal”

The score would be interpret as following:

The average score of 5.00 - 4.51	means	“highest quality”
The average score of 4.50 - 3.51	means	“high quality”
The average score of 3.50 - 2.51	means	“medium quality”
The average score of 2.50 - 1.51	means	“low quality”
The average score of 1.50 - 1.00	means	“least quality”

(2) The digital empathy skills test measures students of knowledge, practical skills, and attitudes. There are 24 questions. The digital empathy skills test examined the Item-Objective Congruence (IOC) by three content experts to check the validity. The experts' evaluation showed that the digital empathy skills test has content validity as the IOC comes up between 0.66 and 1.00. The difficulty of the items (p) was between 0.43 - 0.80. The discrimination power (r) was between 0.27 – 0.53. The reliability of the whole test (KR-21) was 0.78.

Research Design

This study applies research and development design to create an interactive simulation video to enhance digital empathy skills. The researcher has the following research procedures.

Phase 1: Create an Interactive Simulation Video

1.1 Create a simulation video according to the self-learning media design plan. The self-learning media design plan has already been verified by an expert. The researcher creating a simulation video of “Thinking Before Clicking ... Digital Citizen Ethics”, which consist of three episodes.

1.2 Take the finished simulation scenario video to develop it as an interaction, based on self-learning media design plan.

1.3 Bring interactive simulation video to experts to evaluate. In this regard, six experts in the field of educational technology and digital empathy evaluated the quality of the video. The evaluation form uses a five-level quality measure (Likert scales).

Phase 2: Find out the Effectiveness of the Interactive Simulation Video With 5th Grade Students Using the Achievement Assessment

2.1 Experiment with a small target group of three students by having students’ study from interactive simulation video to find application problems in various areas. The researcher observes the students during the lesson and ask questions (R1).

2.2 Using the information obtained to improve the interactive simulation video (D1).

2.3 Experiment with a medium-sized target group of 15 students by allowing students to study from the interactive simulation video that adjust from experiment with small target groups (R2).

2.4 Using the information obtained to improve the interactive simulation video (D2).

2.5 Experiment with a large target group of 30 students by allowing students to study from the adjusted interactive simulation video to determine the effectiveness of the video (R3).

2.6 Using the information obtained to improve the interactive simulation video (D3).

Result

Phase 1: Create an Interactive Simulation Video

1.1 The researcher created a simulation video of "Thinking Before Clicking...Digital Citizen Ethics", which consists of three episodes:

Episode 1: "I'm not afraid true...I'm really afraid it is not" about spreading accurate and accurate information, 05.24 minutes in duration.

Episode 2: "My areas Vs your areas" about respect for rights without violating other people's privacy and emotional control when conflicting, 06.16 minutes in duration.

Episode 3: "Fun post…Miserable" about posting information creatively and using words in polite way to communicate, 07.54 minutes in duration.

1.2 Take the finished simulation scenario video to develop it as an interaction based on a self-learning media design plan. Each episode consists of three types of interactions:

1.2.1 Overlay elements interaction: To insert a summary of the essence and conclusion of the content. The overlay elements help enhance knowledge which leads to strengthening skills and attitudes.

1.2.2 Embedded questions interaction: To insert a participatory question. Embedded question increases participation and reviews the students' knowledge and understanding. The students make decisions in a situation to strengthen their skills and attitudes.

1.2.3 Hotspots interaction: To direct students to external links by having the students (a) summarize their knowledge and understanding of principles and concepts, (b) apply the situations in the video to real life, and (c) express their feeling towards the simulation events in the video.

1.3 Six experts evaluated the quality of the video, which the evaluation results are follows.

Table 1: The result of interactive simulation video on episode 1: "I'm not afraid true...I'm really afraid it is not"

Items	Mean	S.D.	Interpret
Content	**4.70**	**0.46**	**The most**
1. The content is appropriate for the learner level	5.00	0.00	The most
2. Content accuracy	4.83	0.41	The most
3. Order of content presentation	4.50	0.84	A lot
4. Interesting content	4.50	0.55	The most
5. Appropriate of the language used in the video	4.67	0.52	The most
Video Media	**4.60**	**0.56**	**The most**
1. The sequencing is appropriate	4.33	0.82	A lot
2. The color tones are beautiful and consistent with video media	4.50	0.55	A lot
3. Voices and narrations are accurate and appropriate	4.67	0.52	The most
4. Background music sound effects are appropriate	4.83	0.41	The most
5. Media clarity	4.67	0.52	The most
Interaction	**4.67**	**0.48**	**The most**
1. The interaction style is suitable for learning style.	4.83	0.41	The most
2. Sequence and timing of each interaction is appropriate to the content	4.67	0.52	The most
3. Placement of text elements and interactive presentation graphics are appropriate	4.67	0.52	The most
4. Interesting interaction on video	4.67	0.52	The most
5. The narration and sound effects are appropriate	4.50	0.55	A lot
Overall	**4.66**	**0.51**	**The most**

Summarizes the quality of an interactive simulation video on episode 1: "I'm not afraid true...I'm really afraid it is not" by experts showing that there is a quality at the highest level in all aspects ($x = 4.66$). When considered individually in terms of content, video media, and interaction aspects, found to have the highest level of quality in all aspects as well.

Table 2: The result of interactive simulation video on episode 2: "My areas Vs your areas"

Items	Mean	S.D.	Interpret
Content	**4.70**	**0.48**	**The most**
1. The content is appropriate for the learner level	5.00	0.00	The most
2. Content accuracy	4.67	0.52	The most
3. Order of content presentation	4.50	0.84	A lot
4. Interesting content	4.67	0.52	The most
5. Appropriate of the language used in the video	4.67	0.52	The most
Video Media	**4.60**	**0.53**	**The most**
1. The sequencing is appropriate	4.33	0.82	A lot
2. The color tones are beautiful and consistent with video media	4.83	0.41	The most
3. Voices and narrations are accurate and appropriate	4.33	0.52	A lot
4. Background music sound effects are appropriate	4.67	0.52	The most
5. Media clarity	4.83	0.41	The most

Items	Mean	S.D.	Interpret
Interaction	**4.70**	**0.49**	**The most**
1. The interaction style is suitable for learning style.	4.67	0.52	The most
2. Sequence and timing of each interaction is appropriate to the content	4.67	0.52	The most
3. Placement of text elements and interactive presentation graphics are appropriate	4.67	0.52	The most
4. Interesting interaction on video	4.67	0.52	The most
5. The narration and sound effects are appropriate	4.83	0.41	The most
Overall	**4.67**	**0.50**	**The most**

The quality of an interactive simulation video on episode 2: "My areas vs. your areas" by experts showed that, there is quality at the highest level in all aspects (x = 4.67). When considering each side of content, video media, and interaction, it found that, there is the highest quality on all sides.

Table 3: The result of interactive simulation video on episode 3: "Fun post…Miserable"

Items	Mean	S.D.	Interpret
Content	**4.80**	**0.37**	**The most**
1. The content is appropriate for the learner level	5.00	0.00	The most
2. Content accuracy	4.67	0.52	The most
3. Order of content presentation	4.83	0.41	The most
4. Interesting content	4.67	0.52	The most
5. Appropriate of the language used in the video	4.83	0.41	The most
Video Media	**4.67**	**0.50**	**The most**
1. The sequencing is appropriate	4.67	0.52	The most
2. The color tones are beautiful and consistent with video media	4.83	0.41	The most
3. Voices and narrations are accurate and appropriate	4.50	0.55	A lot
4. Background music sound effects are appropriate	4.67	0.52	The most
5. Media clarity	4.67	0.52	The most
Interaction	**4.77**	**0.45**	**The most**
1. The interaction style is suitable for learning style.	4.83	0.41	The most
2. Sequence and timing of each interaction is appropriate to the content	4.83	0.41	The most
3. Placement of text elements and interactive presentation graphics are appropriate	4.67	0.52	The most
4. Interesting interaction on video	4.67	0.52	The most
5. The narration and sound effects are appropriate	4.83	0.41	The most
Overall	**4.75**	**0.44**	**The most**

Table 3 summarizes the quality of an interactive simulation video on episode 3: "Fun post … Miserable" by experts showing that there is quality at the highest level in all aspects (x = 4.74). When considering each side of content, video media, and interaction, there are the highest quality on all sides.

Phase 2: Find Out the Effectiveness of the Interactive Simulation Video With Students Using the Achievement Assessment.

2.1 Experiment with a small target group of three students by having students' study from interactive simulation videos to find application problems in various areas. The researcher observes the students during the lesson and interviews students about the video (R1).

2.2 Using the information obtained to improve the interactive simulation video (D1). Data analysis from observing the use of interactive simulation video and interviewing three students for various application problems. The results showed no problems.

2.3 Experiment with a medium-sized target group of 15 students by allowing students to study from the interactive simulation video that adjusts from the experiment with small target groups (R2). In order to determine the effectiveness of the interactive simulation video, students will be required to study the content through an interactive simulation video and take a digital empathy skills test after watching the video.

2.4 Using the information obtained to improve the interactive simulation video (D2). The researcher's analysis of performance values relative to the standard criteria is determined in Table 4.

Table 4: The results of the experiment were used with a medium-sized target group of 15 to determine the performance trend of interactive video scenarios.

	Knowledge	**Practice**	**Attitude**	**Total**
Mean	4.53	4.80	4.53	4.62
Percent	90.67	96.00	90.67	92.44

The score of the digital empathy skills test after studying the interactive simulation video was found to be 92.44%, indicating that the interactive simulation video is based on criteria compared to standard criteria.

2.5 Experiment with a large target group of 30 students by allowing students to study from the adjusted interactive simulation video to determine the effectiveness of the video (R3). In order to determine the effectiveness of interactive simulation video, students will be required to study the content through interactive simulation video and take a digital empathy skills test after studying.

2.6 Using the information obtained to improve the interactive simulation video (D3). The researcher analysis of performance values relative to the standard criteria determined as in Table 5.

Table 5: The results of the experiment were used with a large target group of 30 to determine the performance trend of interactive video scenarios.

	Knowledge	**Practice**	**Attitude**	**Total**
Mean	4.50	4.83	4.63	4.66
Percent	90.00	96.67	92.67	93.11

The score of the digital empathy skills test after studying the interactive simulation video was found to be 93.11%, indicating that the interactive simulation video is based on criteria

compared to standard criteria. The Office of the Basic Education Commission (2010) stated that 80% of scores interpret as a student with excellent academic performance.

Discussion and Conclusion

The results reviewed the process involved in synthesizing documents and relevant research to establish the framework for designing interactive simulation video scenarios. Subsequently, the framework was used to develop a series of three episodes of interactive simulation videos. Each episode encompassed evaluations of content, video quality, and interaction. Expert assessments indicated that every component of each episode exhibited the highest quality. Furthermore, the digital literacy skills assessment scores showed a significant improvement in digital empathy skills, reaching an average score of 93.11%. The researchers would like to discuss the following points:

1. In terms of content, the researchers have studied the problems associated with the use of social media among teenagers (Supamangmee, 2021; Puwinchana, n.d.). The most common issue identified is cyberbullying, which involves infringements on personal data, emotional control, and the spread of fake news. These findings have influenced the thematic direction, treatment, and screenplay development for each episode of the video. This process includes organizing the presentation of content in a way that captures and enhances the learners' interest and understanding. Additionally, appropriate language usage aligned with the learners' level is considered, following the principles of scriptwriting. This process involves various steps, such as providing necessary information about scenes and characters, improving the script for better comprehension, and refining the storytelling to make it concise and engaging. These efforts contribute to making the content more interesting (Sargent & Rising, 2022).

2. In terms of video quality, the assessment results indicate the highest level of quality. This outcome is a result of designing interactive simulation video scenarios that encompassed the following elements: 1) Issues, 2) Concepts, 3) Learning Outcomes, 4) Evaluation Methods, 5) Themes, 6) Treatment, 7) Interactive Flowchart Activities, and 8) Screenplay. All of these components were developed during the pre-production phase and evaluated by experts in media and educational technology, and content expertise before creating the media. After completion, the videos were further assessed by both experts and student viewers who were similar to the target audience (try-out) for further refinement. This aligns with the rational approach to the media effectiveness evaluation process, which involves conducting evaluations in stages, using a panel of experts for evaluation based on judgment, and following the production process for each medium (Wattananarong, 2014). Additionally, the videos were used with try-out groups consistent with the evaluation principles mentioned by Chaijaroen (2008), which involve comparing the media against predetermined criteria. Furthermore, the digital literacy skills assessment scores showed a significant improvement in digital empathy skills, reaching an average score of 93.11%, compared to the criteria and evaluation results set by the Basic Education Commission, Ministry of Education, which are set at 80%, indicating excellent learning outcomes (Office of Academic Affairs and Education Standards, 2010).

3. In terms of interaction, the researchers employed various interactive formats, such as overlay elements, embedded questions, and hotspots, to make them suitable for the learning style and enhance the engagement of interactive responses in the simulation videos. This corresponds to the work of Palaigeorgiou, Papadopoulou, and Kazanidis

(2018), who define interactive videos as presentations that offer response options in various formats within the video. The purpose is to promote learner participation and engagement with the presented learning content.

The research findings demonstrate that the development of interactive simulation videos is an integration of the various concepts mentioned above, blended and applied to create interactive simulation videos. Overall, each episode of the videos exhibited the highest level of quality. Additionally, the results from using the interactive simulation videos showed their effectiveness in enhancing knowledge, skills, and attitudes related to ethical digital technology usage among learners.

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